Työterveyslaitos | Arbetshälsoinstitutet
Finnish Institute of Occupational Health

Efficacy of temporary work modifications on disability related to musculoskeletal pain and depressive symptoms: a controlled trial

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This publication has been accomplished with the support by the Finnish Work Environment Fund (project number 113077)

ISBN 978-952-261-789-7 (paperback)

ISBN 978-952-261-788-0 (pdf)

Juvenes Print, Tampere, 2017

ACKNOWLEDGEMENTS

This study was carried out in collaboration with five enterprises representing different industries in Finland. We are grateful for these enterprises, especially their human resource personnel for fruitful discussions on their sickness absence management practices, and how they could be developed within the study.

The occupational health service providers of the participating enterprises, especially the occupational physicians who recruited the patients, are thanked for their time and effort in this task. A total of 20 occupational physicians participated in individual and focus group interviews within the study, providing rich information about the reasoning of occupational physicians in the use of temporary work modifications, and facilitators and barriers in initiating work modifications in order to enhance return to work.

Finally, the Finnish Work Environment Fund is thanked for their funding that enabled to carry out this study.

Helsinki, December 2017

The authors

ABSTRACT

Background and aim

Reducing work load or work time enhances return to work and decreases sickness absence in musculoskeletal disorders, however less evidence exists regarding the benefits of work modifications in depressive symptoms. This study looked at, how occupational physicians can be encouraged to increase their use of work modifications at the early stage of work disability due to musculoskeletal pain and depressive symptoms, and, further, whether these work modifications will enhance return to work.

Study populations and methods

We carried out a controlled intervention study in five medium-sized and large companies. Invited to participate in the study were employees seeking medical advice in the occupational health service due to work disability of six weeks or less related to musculoskeletal pain or depressive symptoms. At the control phase the patients were treated as usual. After the educational intervention, consisting of an e-learning course, face-to-face workshop, and individual interviews the occupational physicians were expected to initiate work modifications more actively than before, in both musculoskeletal problems and depressive symptoms, tailoring the interventions individually and without a delay. The main outcomes were sustained return to work (working at least 28 days without a new sickness absence) and the number of sickness absence days during the follow-up of 12 months. Other outcomes were intensity of musculoskeletal pain, interference of pain with work and sleep, and depressive symptoms, inquired with questionnaires at 3 months intervals.

Interviews with the occupational physicians were carried out before the educational intervention to study the physicians' reasoning about the use of temporary work modifications, to identify their behaviors in initiating and negotiating work modifications at the workplace as well as following-up their effects. We also looked at the facilitators and barriers for these behaviors. We applied two theoretical frameworks (The Theoretical Domains Framework, TDF, and the Behaviour Change Wheel, BCW) to analyze the interviews, to develop and implement the educational intervention and to study its effects.

Results and their significance

A total of 34 employees from five enterprises participated in the intervention study. According to the intention to treat analysis, no difference in sustained return to work between the intervention and control group was seen. Sickness absence due to musculoskeletal diseases did not differ, either, and only few patients sought medical advice due to depressive symptoms.

Work modifications – typically reduction of working time – were implemented for half of the patients in the intervention group, while for half of the patients in the control group mainly other types of work modifications, such as work schedule changes, or reduction or elimination of heavy tasks, had been implemented. A sensitivity analysis, comparing patients with and without a work modification at three months within the intervention and control group, showed that patients in the intervention group with a work modification tended to have the fastest return to work. Although sickness absence days generally increased during follow-up, the increase tended to be smaller among those with an implemented intervention.

Musculoskeletal pain decreased in both the intervention and control group patients up to 9 months, and depressive symptoms in the intervention group up to 6 months and in the control group up to 9 months. The intention to treat analysis showed no differences between the intervention and control group in any of the secondary outcomes of pain intensity, pain interference with work or sleep, or depressive symptoms. In contrast, our sensitivity analyses showed that pain interference levels were lower in patients with an implemented work modification compared with those without a work modification.

Repeated individual interviews among occupational physicians before and after the intervention workshop showed that some had started to recommend temporary work modifications more actively than earlier to all eligible employees. Some reported a consideration for practice change, however, practical circumstances to realize this had not been optimal.

According to interviews among occupational physicians early return to work (RTW) supported with temporary work modifications can be considered as part of current treatment practice, especially in musculoskeletal pain or minor depressive symptoms. Early RTW was also seen to enhance employee well-being and prevent adverse effects of prolonged sickness absence. Moreover, early RTW was seen beneficial for the workplace stakeholders, as costs of disability can be kept low and the employee resources will be in use at least partly. Increasing workload of fellow-workers, as they may need to adopt additional tasks, as well as supervisor resources to plan the necessary organizational changes were mentioned as reservations. From a societal perspective early RTW was seen as beneficial, as long-term sickness absence can be avoided and their costs saved. Supporting early RTW with work modifications – instead of prescribing recurrent sick leaves – was perceived to enhance the professional fulfillment of occupational physicians.

The use of temporary work modifications was influenced by personal capability (having relevant knowledge and skills, remembering to initiate and monitor the process, and being accustomed to reflective practice) and motivation (conceptions of professional role and central work-related goals, beliefs about capability and consequences of one's actions, feedback received from earlier cases and related feelings). In addition, physicians' behavior

was influenced by opportunities provided by physical and social environment (e.g., time, predefined procedures and availability of modified work at companies, social pressure from stakeholders). The physicians also described means of overcoming the barriers and/or enhancing the facilitators of using temporary work modifications.

The findings from the interviews informed the development and implementation of the educational intervention. Participating physicians reported some behavior changes or considerations to change behavior during or after the intervention. Positive outcomes had come about through increased capability, enhanced motivation, and improved opportunities to apply temporary work modifications. Facilitated reflection on current practice and needs for change was perceived as an effective intervention method.

In conclusion, this study showed no effects of the use of temporary work modifications on the primary outcomes. Lack of effect can be partly understood by the frequent use of work modifications already at the control phase, leaving limited space for their increased use. Moreover, as some of the physicians who participated in the educational intervention did not recruit patients into the study, the intervention likely remained rather weak. The qualitative parts of the study produced new information about the reasoning of occupational physicians about the use of work modifications as well as the facilitators and barriers for their implementation. The Theoretical Domains Framework and the Behaviour Change Wheel that were utilized in the analysis of the interview data and in the design and implementation of the intervention served these purposes well.

ABSTRAKTI

Tausta, tavoitteet ja tarkoitus

Työkuormitusta tai työaikaa vähentämällä voidaan vähentää sairauspoissaoloja ja edistää työhön paluuta tuki- ja liikuntaelinten sairauksissa, mutta näyttö niiden hyödystä masennusoireissa on vähäisempää. Tässä tutkimuksessa selvitettiin, miten lääkäreitä voidaan kannustaa tilapäisten työjärjestelyjen käyttöön tuki- ja liikuntaelinten kipuihin ja masennusoireisiin liittyvän työkyvyttömyyden varhaisvaiheessa, ja edistääkö tilapäisten työjärjestelyjen käyttö työhön paluuta.

Aineisto ja menetelmät

Kontrolloitu interventiotutkimus toteutettiin viidessä keskisuuressa tai suuressa yrityksessä. Tuki- ja liikuntaelinperäisen kivun tai masennusoireen vuoksi työterveyshuoltoon hakeutuneita työntekijöitä, joiden työkyvyttömyys oli kestänyt enintään kuusi viikkoa viimeksi kuluneiden kolmen kuukauden aikana, pyydettiin mukaan tutkimukseen. Aluksi työterveyslääkärit hoitivat heitä kuten aikaisemminkin (kontrollivaihe). Verkkokurssista, seminaarista ja yksilöhaastatteluista koostuvan koulutusintervention jälkeen (interventiovaihe) lääkäreiden odotettiin ehdottavan työhön kohdistuvia muutoksia aikaisempaa aktiivisemmin, sekä liikuntaelinten kivuissa että masennusoireissa, yksilöllisesti räätälöiden ja viivyttelemättä. Päätulosmuuttujat olivat vakiintunut työhön paluu (vähintään 28 päivää ilman uutta sairauspoissaoloa työhön paluun jälkeen) ja sairauspoissaolopäivien määrä 12 kuukauden seurannassa. Muina tulosmuuttujina tarkasteltiin kolmen kuukauden välein toteutetuilla kyselyillä liikuntaelinkipujen voimakkuutta, niistä aiheutunutta haittaa työssä ja nukkuessa sekä masennusoireita.

Koulutusinterventiota edeltäneillä haastatteluilla selvitettiin, minkälaisilla periaatteilla työterveyslääkärit ehdottavat tilapäisiä työjärjestelyjä, millaista lääkärin toimintaa liittyy työjärjestelyjen ehdottamiseen, niistä neuvotteluun työpaikalla ja vaikutusten seuraamiseen sekä millaiset tekijät edistävät tai estävät näitä lääkärin toimintoja. Haastattelujen analyysissa, koulutusintervention suunnittelussa ja toteutuksessa sekä sen vaikutusten tarkastelussa hyödynnettiin kahta teoreettista viitekehystä (Theoretical Domains Framework, TDF ja Behaviour Change Wheel, BCW).

Tulokset ja niiden merkitys

Kontrolloituun interventiohankkeeseen osallistui 34 työntekijää viidestä yrityksestä. Vakiintuneessa työhön paluussa ei ollut eroja interventio- ja kontrolliryhmän välillä. Liikuntaelinten sairauksista johtuneissa sairauspoissaoloissa ei myöskään ollut eroja ryhmien välillä ja mielenterveyden häiriöistä johtuvia sairauspoissaoloja oli vain muutamalla työntekijällä.

Interventioryhmässä puolelle potilaista oli tehty työmuutoksia, tyypillisimmin työaikaa oli vähennetty, kun taas kontrolliryhmässä puolelle oli tehty muunlaisia työn muutoksia, esimerkiksi työvuorojärjestelyjä ja raskaiden työvaiheiden vähentämistä tai poistamista. Koska myös verrokkivaiheessa oli tehty työmuutoksia, vertasimme työhön paluuta ja sairauspoissaoloja niillä, joilla oli ensimmäisen kolmen seurantakuukauden aikana tehty työmuutoksia niihin, joiden työtä ei ollut muutettu. Tämä vertailu osoitti, että interventioryhmässä ne, joille oli tehty työn muutoksia, palasivat työhön nopeammin kuin muut. Vaikkakin sairauspoissaolot yleisesti lisääntyivät seurantavuoden aikana verrattuna seurantaa edeltäneeseen vuoteen, lisääntyminen oli vähäisempää niillä, joiden työhön oli tehty muutoksia.

Kivut vähenivät sekä interventio- että kontrolliryhmän potilailla 9 kuukauden seurantaan asti ja masennusoireet interventiovaiheessa 6 kuukauteen ja kontrollivaiheessa 9 kuukauteen asti. Toistomittausanalyysissä ryhmien välillä ei ollut eroja kivuissa, niistä aiheutuneessa haitassa eikä masennusoireissa, ei myöskään niissä tapahtuneissa muutoksissa seurannan aikana. Sen sijaan kivusta aiheutunut haitta oli vähäisempää niillä, joille oli tehty työn muutoksia, verrattuna niihin, joille muutoksia ei ollut tehty.

Haastatteluiden mukaan työterveyslääkärit pitivät työjärjestelyin tuettavaa varhaista työhön paluuta osana hyvää hoitoa, erityisesti tuki- ja liikuntaelinten sairauksissa ja lievissä masennusoireissa. Sen nähtiin myös edistävän yleistä työntekijöiden hyvinvointia ja ehkäisevän pitkittyvän sairauspoissaolon haittoja. Varhainen työhön paluu nähtiin pääosin myönteisenä myös työpaikan kannalta. Toisaalta esitettiin varauksia menettelyn hyödyistä. Esimerkiksi pienillä työpaikoilla voi olla vaikeata löytää korvaavaa tekijää ja sijaisia niihin tehtäviin, joita oireinen työntekijä ei pysty tekemään. Työjärjestelyt voivat myös merkitä työtovereiden ja esimiehen töiden lisääntymistä. Varhaisen työhön paluun nähtiin olevan yhteiskunnan kannalta hyödyllistä, koska näin voidaan ehkäistä pitkittyneitä sairauspoissaoloja ja vähentää työkyvyttömyydestä aiheutuvia kustannuksia. Taloudelliset kannusteet, esimerkiksi osasairauspäivärahan käyttämiseen, kuitenkin puuttuvat työntekijältä, jos työhön paluu osasairauspäivärahan turvin johtaa pienempään ansioon kuin jääminen täydelle sairauslomalle. Työterveyslääkärit kokivat varhaisen työhön paluun tukemisen työjärjestelyillä ja niihin liittyvät keskustelut työpaikalla ammatillisesti mielekkäänä tehtävänä – selvästi tyydyttävämpänä kuin toistuvien sairauspoissaolojen määräämisen.

Haastateltujen lääkäreiden mukaan tilapäisten työjärjestelyjen käyttöön vaikuttavat edistävästi tai estävästi heidän oma kyvykkyytensä (tiedot, taidot, käytön tarpeen huomaaminen, oman toiminnan tarkastelu) sekä oma motivaatio (oman ammattiroolin sisältö ja itselle tärkeät ammatilliset päämäärät, uskomukset omasta kyvykkyydestä ja oman toiminnan seurauksista, toiminnasta saatu palaute ja siihen liittyvät tunteet). Lisäksi työjärjestelyjen käyttöä edistävät tai estävät fyysisen ja sosiaalisen ympäristön tarjoamat mahdollisuu-

det (esim. lääkärin käytettävissä oleva työaika, työjärjestelyjen käyttöä koskevat sopimukset ja korvaavien töiden saatavuus työpaikoilla, asiakkaiden odotukset ja valmiudet). Haastatellut lääkärit kuvasivat myös, miten he itse olivat vähentäneet kokemiaan tilapäisten työjärjestelyjen käytön esteitä tai vahvistaneet käyttöä edistäviä tekijöitä.

Haastattelujen tuloksia hyödynnettiin koulutusintervention suunnittelussa ja toteutuksessa. Interventioon osallistuneet lääkärit kuvasivat pieniä käyttäytymisen muutoksia tai aikomuksia muuttaa käyttäytymistään. Muutoksia ja aikomuksia edistivät intervention aikana lisääntynyt kyvykkyys, vahvistunut motivaatio sekä parantuneet fyysisen ja sosiaalisen ympäristön tarjoamat mahdollisuudet. Fasilitoitu oman toiminnan ja muutostarpeiden reflektointi koettiin erityisen hyödylliseksi intervention menetelmäksi.

Kaiken kaikkiaan tutkimuksen koulutusinterventio ei näyttänyt edistäneen työhön paluuta tai vähentäneen sairauspoissaoloja. Koulutusinterventioon osallistuneiden lääkäreiden tarkastelu osoitti, että kokenein lääkäri, joka jo käytti sujuvasti työjärjestelyjä potilastyössä, oli rekrytoinut valtaosan potilaistaan verrokkivaiheessa, mikä lisäsi tässä vaiheessa tehtyjen interventioiden määrää ja vähensi mahdollisuutta saada suurta eroa työjärjestelyissä kontrolli- ja interventioryhmän välille. Edelleen, koska osa koulutusinterventioon osallistuneista lääkäreistä ei rekrytoinut lainkaan potilaita, interventio jäi potilaita rekrytoineiden lääkäreiden osalta heikoksi. Laadullisin menetelmin toteutetuilla hankkeen osatutkimuksilla saatiin uutta tietoa suomalaisten työterveyslääkäreiden käsityksistä tilapäisten työjärjestelyjen hyödyistä ja haitoista sekä niiden toteuttamista edistävistä ja estävistä tekijöistä. Aineiston analysoinnissa sekä koulutusintervention suunnittelussa ja toteutuksessa hyödynnettiin kahta teoreettista viitekehystä (TDF ja BCW), jotka sopivat näihin tarkoituksiin hyvin.

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1 BACKGROUND

Musculoskeletal and mental disorders are the two most common health problems worldwide associated with work disability. In the OECD countries, 6% of the working-age population receives disability benefits (OECD, 2010). In Finland, musculoskeletal disorders (MSDs) account for about a third and mental disorders almost a fourth of all sickness absence (SA) benefit expenditures (The Social Insurance Institution 2017). Of new disability pensions in 2016, 34% were awarded due to a MSD and 28% due to a mental disorder (The Finnish Pension Alliance TELA 2015).

Staying active instead of bed rest has been shown to improve recovery from MSDs (Dahm et al. 2010, Du Bois and Donceel 2012, Matsudaira et al. 2011, Waddell et al. 1997). The question arises, whether staying active at work and performing suitable work activities can prevent prolongation of work disability. Although the amount of research in the field of work disability and return to work (RTW) has steadily increased (Rollin and Gehanno 2012), there is still limited evidence on the effectiveness of interventions targeted at RTW (Palmer et al. 2012). Some workplace-based interventions, including either work modifications and/or involvement of workplace key stakeholders (e.g. worker, employer, RTW coordinator) have shown promising results (Franche et al. 2005, van Oostrom and Boot 2013). In a Dutch study, workplace intervention alone enhanced RTW in workers sick-listed 2-6 weeks due to low back pain (Anema et al. 2007).

While some evidence exists that RTW can be enhanced in persons with MSDs, the evidence among those with depressive symptoms is more limited and conflicting (Blank et al. 2008, Cornelius et al. 2011, de Vries et al. 2012, Furlan et al. 2012, van Oostrom and Boot, 2013). Most studies have examined the effects of medication and individual therapies. However, according to a recent systematic review adding a work-directed intervention to a clinical intervention reduced the number of sickness absence (SA) days compared with a clinical intervention alone (Nieuwenhuijsen et al. 2014). A meta-synthesis of eight qualitative studies concluded that workers with common mental disorders had difficulty deciding when they are ready to resume work and see how RTW solutions could be implemented at the workplace (Andersen et al. 2012).

The main aim of the current study was to examine the efficacy of temporary work modifications (TWM, e.g. workplace adaptations, altered work hours, amended duties, phased RTW), initiated at an early stage of work disability, on RTW in workers seeking medical advice at the occupational health (OH) service due to musculoskeletal pain or depressive symptoms. The hypothesis was that continuing to work with suitable workload is beneficial with regard to health outcomes and RTW and that temporary modification of workload

will enhance RTW and work retention. In addition, we hypothesized that a suitable workload can be achieved with TWM and their use can be enhanced by an educational intervention among occupational physicians (OPs).

2 AIMS

2.1 How occupational physicians reason about and use temporary work modifications?

Qualitative studies on occupational physicians' reasoning, and applying a theoretical framework to understand behavior and behavior change in using temporary work modifications for return to work

Occupational physicians (OPs) provide general practitioner -level medical care in addition to the statutory preventive OH services such as work-related health surveillance. Employees may self-refer to an OP even at an early stage of any disabling medical problem. Because statutory OH services include regular assessments of health and safety in the workplace, familiarity with the employees' work environment creates an ideal opportunity to encourage early RTW by means of accommodated work. Although both the legislation on OH services and the training of OPs support this approach, early RTW is not standard practice. Suggesting work modifications to the employee and advising the supervisor either by phone or writing a recommendation relies mostly on the consideration and motivation of OPs.

Few studies have utilized theoretical models or frameworks to understand the factors influencing practitioners' behavior in using work modifications. Van Duijn et al. (van Duijn et al. 2004) applied a health education model in investigating physicians' conceptions of the barriers to implementing modified work in companies. Fassier et al. (Fassier et al. 2015) developed a conceptual framework for identifying practitioners' perceptions of the factors influencing the implementation of a workplace-based RTW program. However, these studies do not provide theoretically informed means for addressing the recognized implementation problems.

We utilized two frameworks, the Behaviour Change Wheel (BCW) and the Theoretical Domains Framework (TDF), which together provide a comprehensive assessment of the factors that are likely to influence practitioners' target behavior and a theoretically informed development of interventions to promote the desired behavior. The BCW is a synthesis of 19 theoretical frameworks of behavior change (Michie et al. 2014, Michie et al. 2011) and is based on a model of human behavior, the COM-B model, which presents human behavior (B) as resulting from interaction between physical and psychological capabilities (C), opportunities provided by the physical and social environment (O), and reflective and automatic motivation (M). The TDF has been developed and validated for behavior change and implementation research, and can be used for a detailed analysis of the potentially

modifiable factors (falling under the three COM-B components) to target in an intervention. The refined TDF is composed of 84 constructs from multiple psychological theories (motivational, action, and organizational theories) and consists of 14 domains of theoretical constructs.

This part of the study had two aims:

First, a qualitative study was carried out to examine how OPs reason about encouraging early RTW by means of work modifications, i.e., how they perceive the rationales for and meaning of this practice. We explored the variation of OPs' reasoning, emerging from focus group discussions. More specifically, we aimed to identify what is central for OPs in relation to encouraging early RTW by studying both the content of the discussions as well as areas of agreement and disagreement between the participants.

Second, by utilizing the Theoretical Domains Framework (TDF) and the Behavior Change Wheel (BCW) we aimed

1) to identify factors that are likely to influence OPs' behaviors related to applying TWM and that could be targeted in future interventions; and

2) to evaluate the possible applicability of the intervention functions proposed by the BCW by investigating physicians' perceived means of overcoming the barriers and/or enhancing the enablers.

2.2 Educational intervention for enhancing the use of temporary work modifications to support return to work

Educational interventions have been criticized for being weak. In order to achieve behavior change, we included multiple components in our intervention, including individual interviews, an e-learning course and an interactive workshop, followed by a second individual interview.

The aim of the e-learning course was to increase knowledge about possibilities to enhance RTW in musculoskeletal diseases and mental disorders. The workshop targeted at delivering practical information about how to initiate and plan temporary work modifications. The interviews aimed at reflection of own practices and enhancing practice change.

Through individual interviews, we aimed to study, how an educational intervention produces change by applying the BCW and TDF for developing and evaluating the educational intervention. Moreover, we used the TDF as a specific tool for practice change. The focus was on participants' perceptions of personal intervention outcomes, and why and how these outcomes occurred.

2.3 Efficacy of temporary work modifications on return to work and sickness absence in musculoskeletal pain or depressive symptoms

The aim of this quantitative part of the study was to assess, whether an educational intervention among occupational physicians will enhance return to work and reduce sickness absence days and levels of pain and depressive symptoms among employees seeking medical advice due to work disability because of musculoskeletal pain or depressive symptoms.

3 METHODS

3.1 How occupational physicians reason about and use temporary work modifications?

Qualitative studies on occupational physicians' reasoning, and applying a theoretical framework to understand behavior and behavior change in using temporary work modifications for return to work

3.1.1 Occupational physicians' reasoning about temporary work modifications

Focus group discussions were considered an optimal approach for this study, because they encourage the participants to prompt each other, allowing a deeper insight into their reasoning (Barbour 2007, Hollander 2004, Kitzinger 1995). Altogether 11 OPs (7 women and 4 men) met in four focus groups. Two were all-female groups and two groups comprised both genders. Three groups included three participants, and one group discussion was held with two participants.

In order to challenge the participants to deliberate thoroughly and to express divergent arguments about encouraging early RTW with accommodated work, we used pre-defined propositions instead of ordinary open-ended questions. We produced five propositions on this topic on the basis of knowledge provided in scientific literature and earlier pilot interviews:

a. To continue at work or to return to work early using work modifications is often more beneficial than sickness absence.
b. Temporary work modifications are useful in both musculoskeletal and mental disorders.
c. It is the OP's responsibility to initiate work modifications.
d. The supervisor's willingness to implement work modifications depends on the personal characteristics of the worker with disability.
e. Confidentiality of health-related issues makes the use of work modifications difficult at workplaces.

One of the authors served as a moderator in all focus groups. To begin with, participants were asked to describe a case where they had been engaged in early RTW. After presenting a proposition the moderator asked participants to state whether they agreed or disagreed with it and to provide their reasoning for their views. Subsequent questions were used to follow up the arguments or accounts of experiences. The moderator actively sought to elicit contrasting perspectives to explore the rationales more in-depth. In the

end of each group discussion, participants were asked to raise other issues related to early RTW that they considered important but which had not been discussed so far.

Qualitative content analysis revealed five main categories (i.e., the reasons for supporting and not supporting early RTW), and related sub-categories were developed and systematically applied to the data of the first three focus groups. The analysis proceeded by looking for similarities and differences within groups and between groups. Preliminary explanations to account for the identified similarities and differences were developed. Deviant cases were sought and examined. Emerging explanations were revised in the light of disconfirming data. Finally, a fourth focus group discussion was convened. The analysis scheme was applied to the new data. Emerging explanations were discussed by the researchers and were found to fit, with no new categories or explanations needed.

3.1.2 Applying a theoretical framework to understand behavior and behavior change in using temporary work modifications for return to work

The material for this analysis was obtained in group discussions with 11 OPs described above. We also utilized materials from earlier pilot interviews conducted with four Finnish OPs.

All data were analyzed by qualitative content analysis, using both inductive and deductive approaches (Elo and Kyngäs 2007, Hsieh and Shannon 2005, Mason 2002). All accounts of OP behaviors were marked and labeled with preliminary codes. Later, main codes were decided and used to code the data. Finally, some codes were combined, and all codes were grouped into higher-order categories, i.e., the key OP behaviors.

Next, deductive content analysis was conducted to identify the barriers and facilitators that influence each of the key behaviors. The analysis proceeded from a thorough reading of the data and extraction of influencing factors to systematic coding. The coding framework comprised the 14 TDF domains:

- Knowledge; Skills; Memory, attention and decision processes; Behavioural regulation (falling under the Capability component of the COM-B model, included in the BCW);
- Environmental context and resources; Social influences (falling under the Opportunities component);
- Social/Professional role and identity; Beliefs about capabilities; Optimism; Beliefs about consequences; Intentions; Goals; Reinforcement; Emotion (falling under the Motivation component).

All data could be classified according to the TDF, and, consequently, no new categories were developed. Finally, inductive content analysis was used to identify and categorize participants' domain-specific means of targeting the factors influencing the key behaviors. The identified means were further scrutinized in light of the intervention functions proposed by the BCW.

3.2 Educational intervention for enhancing the use of temporary work modifications to support return to work

Six occupational physicians participated in the intervention that included two individual interviews, e-learning course, and face-to-face workshop. Intervention outcomes were assessed by an interview at baseline and after a follow-up of four months. All data were analyzed by qualitative content analysis, using both inductive and deductive approaches

3.3 Efficacy of temporary work modifications on return to work and sickness absence in musculoskeletal pain or depressive symptoms

The study was carried out by the Finnish Institute of Occupational health in collaboration with five medium-sized or large enterprises and their OH services, involving in total eight occupational physicians. We conducted a controlled trial, using a modified stepped wedge design. All physicians first started to recruit patients, examining and treating them as usual. After the intervention seminar, physicians were encouraged to prescribe temporary work modifications to all employees who would likely benefit from them. The inclusion and exclusion criteria are presented in Table 1.

Table 1. Inclusion and exclusion criteria of the study (Haukka et al. 2015).

Inclusion criteria	Exclusion criteria
1. Musculoskeletal pain (≥ 4/10) or/and depressive symptoms (positive response to any of the 2 screening questions on depression)	1. Anticipated long absence from work during the following 12 months due to other reasons, like pregnancy, studies, military service, alternation leave, other illness or its treatment (e.g. surgery, cytostatic therapy or radiation therapy)
2. Age 18-60 years, male and female	2. Serious or acute disease requiring full sickness absence (e.g. febrile infection, active stage of inflammatory joint disease; serious mental disorder)
3. Working full-time or nearly full-time (≥ 30 h/week)	3. Other factors having significant effect on disability (e.g. serious conflict at the workplace, difficult personal life situation, current problem due to a work accident, current insurance or workmen's compensation dispute, severe alcohol or drug dependency)
4. Employed in current job 4 months or longer and employment likely to continue the following 12 months	
5. Functional ability not sufficient to perform current work tasks	
6. Previous sickness absence 6 weeks or less during the preceding 3 months	

Questionnaires and registers of the OH service and the employers provided data on outcomes, determinants and covariates. The patients were requested to reply to the questionnaires at baseline and at 3, 6, 9, and 12 months follow-up, all sent via secured internet connection (paper version for those who did not have internet connection).

Information on durations and diagnoses (International Classification of Diseases and Related Health Problems, ICD-10) (WHO 2010) of sickness absences (SA) were gathered from the medical records of the OH service over 12 months before and after recruitment (Figure 1). Information on employment during the study and absences due to disease and other causes (e.g. studies, military service, parental leave, job alternation leave) were retrieved from the employers' records.

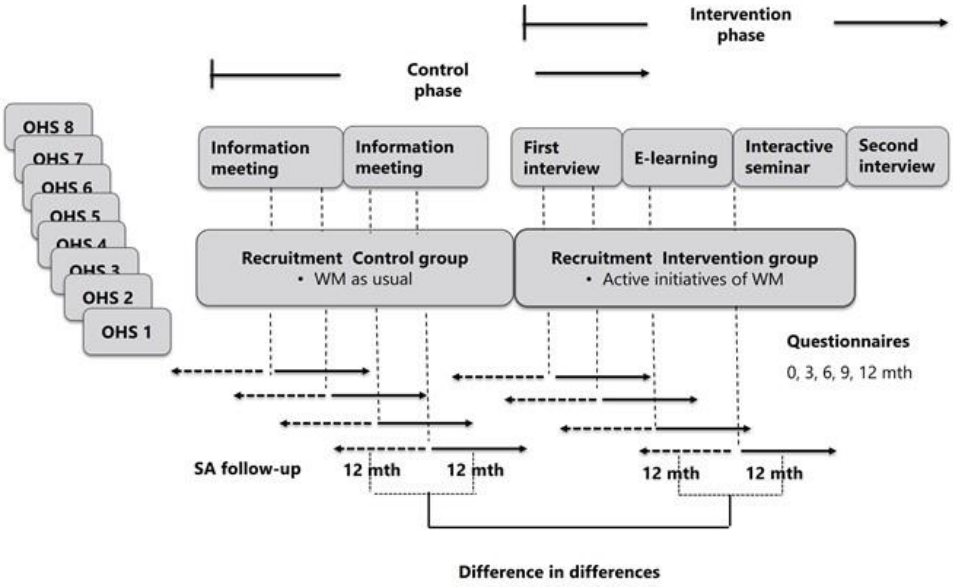

Figure 1. Flowchart of the study. Modified from Figure 2 in Haukka et al. 2015.

Information on implementation of work modifications at the workplaces was gathered by self-formulated questions. We also asked, who carried out the work tasks that the symptomatic worker could not do and whether working time was shortened based on recommendation by a physician.

The intervention and control group were compared with regard to potential confounders (age, gender, occupational factors, localization and intensity of musculoskeletal pain, intensity of depressive symptoms, health and work ability, sick-listed at the time of interview) urban/rural area, public/private sector, size of enterprise). Time to sustained RTW (at work without a new SA in the following 28 days) was compared between the intervention and control group. Additionally, the post-recruitment difference in the number of SA days during the 12 month period was looked at. Because work modifications had been carried out also in the control group, a secondary analysis was performed comparing those with an implemented work modification with those without. As there was no detailed information on the exact time of the start of these work modifications, we started the follow-up also for this analysis from the recruitment date.

Data on SA for 12 months before and after the recruitment date were available for 12 patients in the intervention group and for 18 patients in the control group. Spells of SA were identified in the medical records and classified by diagnosis to MSDs, mental disorders, and others. The distributions of the accumulated SA days were skewed and therefore the results were given in percentiles.

4 RESULTS

4.1 How occupational physicians reason about and use temporary work modifications?

4.1.1 Occupational physicians' reasoning about temporary work modifications

The five main categories revealed by qualitative content analysis were: to manage medical conditions, to enhance employee well-being, to help workplace stakeholders, to reduce costs to society, and to enhance OP's own professional fulfillment (Horppu et al., PLOS One 2016).

1. Early RTW to manage medical conditions

The focus of the first area of reasoning was early RTW as a management of medical conditions. RTW can be perceived as a proactive treatment for a medical condition, e.g. minor depressive symptoms or musculoskeletal pain. TWM can be used to decrease the physical or psychological exposures that are considered to have triggered or worsened the symptoms. In this way modified work can be a sufficient cure without a need for additional treatment.

Using early RTW as a means of managing a medical condition was brought up spontaneously in all focus groups. However, some reservations were also expressed with regard to this rationale. OPs emphasized that RTW applied too early may delay recovery. The groups were unanimous that some conditions (e.g., acute psychosis or severe sciatica) are inherently unsuitable for early RTW. In these cases, either early RTW hinders recovery or there are no duties which the disabled employee could perform safely and productively.

In addition, participants had divergent views of the application of this rationale. There were negotiations within groups about whether there are some (minor) medical conditions that should prompt an OP avoid suggesting early RTW for an employee. For example, it was stated that employees with burnout should be categorically ruled out of the option of early RTW. In contrast, it was argued that OPs should avoid preconceived classifications of medical conditions unsuitable for early RTW.

2. Early RTW to enhance employee well-being

The second area of reasoning focused on employees' well-being, in contrast to the restricted focus on the medical conditions of the previous category. Work modifications were viewed as a means of supporting employees' existing positive resources by creating a safe opportunity for motivated employees to stay at work. Participants described cases,

in which employees either declined sick leave or requested termination of sick leave, because, for example, they felt frustrated at home.

This reasoning about enhancing employees' well-being was brought up spontaneously in all focus groups. However, participants had divergent views of the application of this rationale to workers of all ages. Although reduced work motivation of workers was a common focus of worries, it was questioned whether OPs should be concerned about the work motivation of older employees.

3. Early RTW to help workplace stakeholders

The third rationale considered the relationship between early RTW and workplace stakeholders. First, early RTW was perceived as producing financial benefits for companies. Shorter sick leaves will help companies to keep costs at a minimum. It was stated that via TWM the employers do not need to pay for sick leave days, and skillful employees are doing at least some type of productive work. It was also suggested that, in the long run, companies' expenses for permanent disability are reduced when employees with disability are supported to stay at work.

This rationale was brought up spontaneously in three focus groups. However, participants remarked that certain types of companies, (e.g., small companies in the service sector, or companies doing piecework) may not benefit financially from encouraging early RTW via modified work. If a disabled employee is performing only a part of his/her normal service duties, fewer customers are being served or fewer goods are being produced.

Some participants questioned the credibility of the financial benefit for the company. They were not convinced that adequate evidence exists that early RTW will reduce company costs. They also pondered whether reduced company costs was an appropriate reason for early RTW practice.

4. Early RTW to reduce costs to society

The focus of the fourth rationale was on the benefits of this practice to society. Early RTW was perceived as a means of encouraging work participation. It was stated that all citizens benefit when as many of us as possible are working and paying taxes. Thus, early RTW should always be considered as the first option. In addition, early RTW was perceived as a means of reducing societal costs caused by work disability. These costs are mostly related to prolonged sick leaves, which may be prevented by work modifications.

This area of reasoning was brought up spontaneously in all groups, but reservations for the rationale were also expressed. It was suggested that although promoting early RTW may be beneficial for the society as a whole, it should not become a moral norm that oblige all individuals. For example, in case an employee returning to part-time work suffers

financially compared to full-time sick leave, he/she should not be expected to sacrifice personal interests for the society's good.

5. Early RTW as a means of professional fulfillment of the OPs

The focus of the fifth rationale was on the OP. Promoting early RTW was described as enhancing OPs' professional fulfillment. It was suggested that supporting an employee's work career in a long run by, e.g., the means of work modifications, is more meaningful than prescribing recurrent sick leaves. In addition, the types of tasks that OPs engage in when negotiating about work modifications with employees and employers were described as satisfying.

This area of reasoning was brought up spontaneously in three groups. However, limits of application were also expressed. Some duties related to work modifications were seen as satisfying while other duties were experienced as demanding and stressing.

All of the results above suggest that there may be a lack of knowledge among OPs with regard to the usefulness of early RTW with work modifications in different medical conditions and various types of work and workplaces. More education may be needed to strengthen OPs' confidence about when and how to use early RTW safely.

However, OPs' negotiations about the application of early RTW may also be interpreted as unwillingness to expand OP role from handling mostly employees with prolonged sick leaves to proactively encouraging for early RTW.

In addition to factors related to reasoning (knowledge and understanding), the practitioners' adoption of practices may be influenced by factors related to e.g., environmental contexts and resources, social influences, and practitioners' skills and conceptions of their professional roles (Cane et al. 2012, Fassier et al. 2011, Gardner et al. 2010, Grol and Grimshaw, 2003, Michie et al. 2005, Rebergen et al. 2010). Therefore, the second sub-study looked at these barriers and facilitators of early RTW among the participants.

4.1.2 Applying a theoretical framework to understand behavior and behavior change in using temporary work modifications for return to work

Three key behaviors that OPs engage in when using TWMs to support RTW or staying at work were: 1) initiating the process during consultation with the employee; 2) making recommendations to the workplace; and 3) following up the work modification process. Various barriers and facilitators were identified to influence the above key behaviors (Horppu et al., J Occup Rehabil 2017).

Capability: barriers and facilitators and physicians' means to target them

The following TDF domains are linked to Capability: Knowledge; Skills; Memory, attention and decision processes; and Behavioural regulation. All four domains were relevant to key OP behaviors. Physicians' domain-specific means of targeting the identified barriers and facilitators are presented in Table 2.

Table 2. OPs' experiences of and suggestions for means to increase Capability for using temporary work modifications (TWMs), with sample quotes (from Horppu et al. J Occup Rehabil 2017, table 2).

KNOWLEDGE

Knowledge has been acquired from:

- Formal education (about why to use TWMs): *"From the lectures of this subject mainly, and then from the research evidence there is about it". (OP5)*
- Senior physicians and discussions with colleagues (about how to use TWMs):*"Introduction from a more experienced colleague is extremely important to get on as soon as possible" (OP12) "We pretty intensively go through each other's cases also and ponder them together". (OP13)*
- Active practicing (about work at companies):"*I constantly try to get acquainted with different work possibilities and to find out what could be done there". (OP14)*

SKILLS

Skills have been acquired from:

- Active practicing (negotiation skills; right timing of RTW):*"As one is kind of a veteran in this, and has been through these talks so many times, one develops a certain eye". (OP10)*

Skills could be supported through:

- Formal education (negotiation skills): *"Conversation and cooperation skills to make the patients realize why this would be in their own interest". (OP3)*
- Guidelines for evaluating the right timing of RTW: "*It would be nice to also have clear rules you can then lean on". (OP4)*

MEMORY, ATTENTION, AND DECISION PROCESSES

Remembering has been supported by:

- Agreements between the occupational health provider and a company that TWMs are considered with all eligible employees: *"In one company we put a tremendous effort not to put people on sick leave unnecessarily before finding out, whether they have possibilities to return to their work with these limitations". (OP3)*
- Monitoring procedures predefined by the occupational health provider: "*In our occupational health center we have agreed upon a procedure that I myself also follow not to forget anything". (OP12)*

BEHAVIOURAL REGULATION

Behavioural regulation has been enhanced by:

- Reflective discussions**:** *"Now (during the focus group discussion) I see what I then should have been able to use more and think about". (OP4)*

The Behaviour Change Wheel (BCW) proposed that for addressing factors related to Capability, the following intervention functions be considered (Michie 2014; Michie 2011): education, training, modeling, enablement, or environmental restructuring. Various behavior change techniques may be utilized to serve each intervention function. The means used or suggested by the participants are examples of these techniques. Continuous education courses and different types of informal learning at the workplace can be used to increase relevant knowledge and understanding (education), as well as to impart necessary skills (training). Guidelines for proper length of sick leaves, predefined agreements on TWMs with companies, and predefined follow-up procedures are examples of changing the physical or social environment in order to promote the desired behavior (environmental restructuring).

Opportunity: barriers and facilitators and physicians' means to target them

The following Theoretical Domains Framework domains are linked to Opportunity: Environmental context and resources; and Social influences. Both domains were relevant to key OP behaviors. Physicians' domain-specific means of targeting the identified barriers to and facilitators of behaviors are presented in Table 3.

The BCW framework proposed that the following intervention functions be considered for targeting the Opportunity-related determinants of behavior: training, modeling, enablement, environmental restructuring, or restriction. Our participants described how the application of TWMs has been or could be further enhanced by providing OPs with adequate physical and social resources. In addition, some OPs had already actively strived to change the physical or social context by themselves. These means, along with the suggested society-level actions, are examples of the behavior change strategies serving the environmental restructuring and enablement functions.

Table 3. OPs' experiences of and suggestions for means to increase Opportunity for using temporary work modifications (TWMs), with sample quotes (from Horppu et al. J Occup Rehabil 2017, table 3).

ENVIRONMENTAL CONTEXT AND RESOURCES

Physical resources have been created/increased by the OPs:

- Promoting agreements on TWMs procedures with companies: *"In our occupational health action plan we offer it, it's an offer that is included in occupational health". (OP8)*
- Informing other colleagues about TWMs: *"We organized a meeting where we discussed this with GPs, and their role in it". (OP12)*

Employer could provide OPs with more resources:

- Possibility to focus on supporting SAW/RTW: *"Our work arrangements should be such that it's possible to do this kind of work and not only medical treatment". (OP12)*

Society-level means could be developed:

- Easier procedure for applying benefits: *"I find the application process lousy. The Swedish model, for example, is more handy". (OP5)*
- Solutions for disadvantageous benefits: *"The systems should be such that it always is financially more advantageous to return to work". (OP7)*

SOCIAL INFLUENCES

Social resources have been increased by the occupational health provider:

- Occupational health provider has informed companies about TWMs: *"Occupational health providers have conveyed the message about these support measures and why it's profitable to favor them. The supervisors have understood the message". (OP13)*

Social resources have been created/increased by the OPs:

- Keeping TWMs short enough to promote coworkers' positive attitudes: *"You can go on with this (TWMs) for a couple of months, but then you should reach more permanent solutions". (OP4)*
- Instructing supervisors on introducing TWMs to workplace: *"I have suggested that when a person returns to a work modified with easier tasks or shorter hours, there should be a meeting with the co-workers". (OP14)*
- Building trustful relationships with stakeholders: *"The trust ... that we are not trying to deceive supervisors by smuggling disabled people to work". (OP8)*
- Informing union representatives: *"I try to inform the union representatives what all this is about". (OP15)*

Social resources could be enhanced by society-level means:

- Stakeholders' attitudes towards TWMs should be influenced by social marketing: *"The companies and supervisors should be directly informed. Informing in public through many different channels". (OP12)*

Motivation: barriers and facilitators and physicians' means to target them

The following TDF domains are linked to Motivation: Social/professional role and identity; Beliefs about capabilities, Optimism; Beliefs about consequences, Intentions; Goals; Reinforcement; and Emotion. All domains apart from Optimism and Intentions were relevant to the key OP behaviors. Intentions, i.e. 'conscious decision to perform a behavior or a resolve to act in a certain way (Cane et al. 2012), was not relevant, because all participants already used TWMs at least occasionally. No data were deemed to match Optimism, which refers to a general disposition rather than specific capabilities ('the confidence that things will happen for the best or that desired goals will be attained'). Physicians' domain-specific means of targeting the identified barriers and facilitators of behavior are presented in Table 4.

The BCW framework proposed that for addressing factors related to Motivation, the following intervention functions be considered: education, training, modeling, persuasion, enablement, environmental restructuring, incentivization, or coercion. In our data, instruction provided by senior physicians is an example of the techniques serving the educational function. Active practicing among TWMs and conscious reviewing of the outcomes of one's work can have training and enabling functions. Strong societal messages concerning work participation, delivered through public debate, is an example of a behavior change technique serving persuasion.

Table 4. OPs' experiences of and suggestions for means to increase Motivation for using temporary work modifications (TWMs), with sample quotes (from Horppu et al. J Occup Rehabil 2017, table 4).

PROFESSIONAL ROLE AND IDENTITY

Proactive role can be developed through:

- Instruction from senior doctors: *"I'd say that this role should pretty thoroughly be explained to the specializing doctors"(OP10)*

BELIEFS ABOUT CAPABILITIES

Confidence in one's capability to handle TWM processes has been developed through:

- Active practicing among TWMs: *"At least I have the experience that you can modify a job. Sometimes it may be slow and take some time ... And something may always go wrong but that's life, isn't it. You don't have to worry about it". (OP6 &OP8)*

BELIEFS ABOUT CONSEQUENCES

Beliefs about the benefits of OP's activity have been developed through:

- Experiences from prior cases: *"People usually don't even think that something could be done. The patients seldom come up with that idea (TWMs)". (OP9) "When they are informed about this possibility, I can't recall one person who hadn't been enthusiastic about it and found it positive". (OP13)*

GOALS

Personal goals have been influenced by:

- Societal-level messages concerning working life: "*The Finnish Institute of Occupational Health has been drumming us these 'tidings of joy': 'no more long sick leaves and patients quickly back to work'. Every sick leave that I prescribe means a deduction to our national output". (OP5)*

REINFORCEMENT

Motivating feedback has been elicited through:

- Reviewing the outcomes of one's work*: "I just went through all my return-to-work negotiations for the last year. In most cases the outcome was a return to work and some kind of a positive solution". (OP9)*

EMOTION

No means mentioned to increase positive emotions.

4.2 Educational intervention for enhancing the use of temporary work modifications to support return to work

Initially, five of six occupational physicians were assessed to be in need for practice change with regard to at least one of the target behaviours. At follow-up, most of them reported a change or a plan for a change later. We identified mechanisms of action for behaviour change related to all components of the COM-B model. The application of TDF as an explicit reflection tool was regarded as useful by the participants.

4.3 Efficacy of temporary work modifications on return to work and sickness absence in musculoskeletal pain or depressive symptoms

A total of 22 patients were recruited at the control phase and 12 at the intervention phase. One control patient was excluded from the study due to contracting a serious disease. The main reason for not attaining the planned number of patients was lack of time of the OP to introduce the study and motivate participation. Several efforts were made to encourage OPs to recruit more patients, however without success.

4.3.1 Characteristics of the patients at baseline

The mean age of the patients in the intervention group was 47 years and in the control group 43 years. Most patients in the intervention group and more than two thirds of the control group were women. There were no major differences in work schedules and working time between the groups, however perceived mental strenuousness of work and work uncertainty were a little higher in the control group than the intervention group. The patients in the control group more often reported high frequency of physical activity and higher frequency of alcohol consumption that the patients in the intervention group (Table 5).

Table 5. Demographic, occupational and lifestyle factors at baseline.

Characteristic	Intervention group (n= 12)	Control group (n=22)
Demographic factors		
Age (years), mean (SD)	47.1 (9.3)	43.3 (12.1)
Gender (female), n (%)	11 (91.7)	16 (84.2)
Marital status (married/cohabiting), n (%)	10 (83.3)	11 (64.7)
Basic education (a-level), n (%)	6 (50.0)	8 (42.1)
Highest education (bachelor's degree), n (%)	1 (8.3)	5 (26.3)
Occupational factors		
Job seniority (years in current work tasks), median (range)	11.0 (3-33)	8.0 (1-42)
Main work schedule in current work task, n (%)		
Daytime job	4 (33.3)	6 (31.6)
Two-shift job (day/evening)	7 (58.3)	9 (47.4)
Three-shift job (day/evening/night)	1 (8.3)	3 (15.8)
Evening/night/ other job	0	1 (5.3)
Average working time (h/week, main occupation), median (range)	34 (30-38)	37 (8-45)
Sideline job (yes), n (%)	1 (8.3)	1 (5.3)
Physical and psychosocial factors at work		
Physical strenuousness of work (1=light, 5=very strenuous), mean (SD)	3.6 (0.8)	3.4 (1.1)
Awkward work postures (yes), n (%)	11 (91.7)	16 (84.2)
Mental and social strenuousness of work (1=light, 5=very strenuous), mean (SD)	3.3 (1.3)	3.8 (0.8)
Perceived work uncertainty (1=very little, 5= very much), mean (SD)	1.9 (1.1)	2.4 (1.0)
Workplace atmosphere (1=very good, 5=very poor), mean (SD)	2.6 (1.0)	2.4 (0.8)
Supervisor support (1=very often, 5=very rarely), mean (SD)	2.6 (1.2)	2.4 (1.1)
Co-worker support (1=very often, 5=very rarely), mean (SD)	2.0 (1.0)	1.8 (0.8)
Possibilities for work modifications (1=very much, 5=not at all), mean (SD)	3.5 (0.8)	3.7 (0.8)
Lifestyle factors		
BMI (kg/m^2), mean (SD)	26.2 (2.9)	25.5 (3.8)
Regular smokers, n (%)	4 (33.3)	5 (26.3)
Physical exercise, n (%)		
Low	4 (33.3)	8 (42.1)
Moderate	6 (50.0)	5 (26.3)
High	2 (16.7)	6 (31.6)
Alcohol consumption (≥ 2 times per week), n (%)	1 (8.3)	4 (21.1)

The main reason for seeking medical advice was musculoskeletal pain for all but one in the intervention and two in the control group. More patients in the control than intervention group had moderate or severe depression according the Patient Health Questionnaire, however, they assessed their current work ability with regard to mental work demands higher than the intervention group (Table 6). The patients in the intervention group had slightly more sickness absence days due to musculoskeletal diseases (median 11 days) before the intervention compared with the control group patients (median 7 days) (Table 7).

Table 6. Health and work ability at baseline.

Characteristic	Intervention group (n= 12)	Control group (n=22)
Medical diagnosis for work disability, n (%)		
Musculoskeletal pain	11 (91.7)	20 (90.9)
Depressive symptoms	1 (8.3)	2 (9.1)
Musculoskeletal pain during the previous 7 days		
Pain, yes, n (%)	11 (91.7)	18 (89.5)
Intensity of pain (0=no pain, 10=the worst possible), mean (SD)	7.6 (1.0)	7.4 (1.8)
Pain interference with work (0=not at all, 10=unable to work), mean (SD)	6.2 (2.2)	5.1. (1.9)
Pain interference with sleep (0=not at all, 10=unable to sleep), mean (SD)	5.1 (3.3)	5.5 (3.5)
Depressive symptoms (PHQ)[a]		
PHQ score, n (%)		
0-4 (None)	6 (50.0)	9 (47.4)
5-9 (Mild depression)	5 (41.7)	5 (26.3)
10-14 (Moderate depression)	1 (8.3)	3 (15.8)
15- (Moderately severe/ severe depression)	-	2 (10.5)
Mean (SD)	5.5 (3.2)	6.4 (5.3)
Min-max	2-14	0-16
Sleep disorders (1= never, 6= every night), mean (SD)		
Having trouble falling asleep	2.2 (1.5)	2.7 (1.4)
Waking up several times per night	4.3 (1.9)	4.6 (1.8)
Having trouble staying asleep	3.4 (1.8)	3.4 (1.8)
Waking up after the usual amount of sleep feeling tired and worn out	4.3 (1.4)	3.8 (1.5)
Health and work ability		
Perceived health (1= poor, 5= excellent), mean (SD)	2.7 (0.5)	2.6 (0.9)
Current work ability vs. the lifetime best (0=unable to work, 10=work ability at its best), mean (SD)	5.4 (2.1)	5.8 (2.2)
Current work ability vs. physical work demands (1=very poor, 5=very good), mean (SD)	2.6 (0.8)	3.0 (1.1)
Current work ability vs. mental work demands (1=very poor, 5=very good), mean (SD)	3.3 (1.2)	4.0 (0.8)
Probability to continue in current job 2 years from now, taking into consideration health (relatively certain), n (%)	7 (58.3)	10 (52.6)
Importance of work (0=no importance, 10=one of the most important thing in life), mean (SD)	7.6 (1.6)	8.2 (1.4)
Current sick leave, n (%)		
No	3 (25.0)	8 (42.1)
Part-time sick-leave	2 (16.7)	2 (10.5)
Full sick-leave	7 (58.3)	9 (47.4)
Estimated time to RTW (less than a week), n (%)	2 (22.2)	5 (45.5)
Physician-diagnosed depression, n (%)		
No	8 (66.7)	14 (73.7)
Once	3 (25.0)	1 (5.3)
Several times	1 (8.3)	4 (21.1)
Current antidepressants (yes), n (%)	2 (16.7)	2 (10.5)

[a] Patient Health Questionnaire (scale 0-27)

Table 7. Number of sickness absence (SA) days 12 months before and after the recruitment. Main diagnosis of SA: MSD = musculoskeletal disorders; Mental = mental disorders; Other = other disorders. Median, quartiles (25%; 75 %), minimum and maximum.

	Intervention group (n=12)		Control group (n=18)	
	med (25%; 75 %)	min; max	med (25 %; 75 %)	min; max
Time to sustained work	26; (2; 61)	0; 365	9 (5; 27)	0; 242
All SA	19 (13; 30)	2; 32	15 (7; 32)	0; 42
All SA after	44 (12; 128)	3; 357	28 (6; 115)	0; 293
MSD before	11 (2; 18)	0; 28	7 (0; 22)	0; 41
MSD after	28 (5; 124)	0; 357	12 (1; 68)	0; 242
Mental before	0 (0; 0)	0; 30 (n=2)	0 (0; 0)	0; 9 (n=2)
Mental after	0 (0; 0)	0; 47 (n=2)	0 (0; 0)	0; 14 (n=3)
Other before	4 (0; 6)	0; 15	6 (1; 12)	0; 21
Other after	0 (0; 4)	0; 10	4 (0; 9)	0; 286

4.3.2 Work modifications

The most typical work modification in the intervention group was shortened work time, both as a shortened work week and work day. Other interventions, e.g., amended duties, were reported by 20% of patients in the intervention group. Of note is that other types of work modifications, such as work schedule changes, or reduction or elimination of heavy tasks, were reported by more than half of the control group at 3 months (Table 8).

Table 8. Implemented work modifications during the follow up of 12 months (I= intervention group; C= control group).

Characteristic	3mth (n=23)		6mth (n=22)		9mth (n=21)		12mth (n=16)	
	I (n= 10)	C (n=13) [a]	I (n= 10)	C (n=12) [a]	I (n= 8)	C (n=13) [a]	I (n= 6)	C (n=10) [a]
Shortened work time recommended by physician, n (%)								
No	5 (50.0)	12 (92.3)	5 (83.3)	9 (81.8)	6 (75.0)	11 (91.7	5 (83.3)	7 (70)
Yes	5 (50.0)	1 (7.7)	1 (16.7)	2 (18.2)	2 (25.0)	1 (8.3)	1 (16.7)	3 (30)
Shortened work day, n (%)								
No	2 (40.0)	1 (100.0)	1 (100.0)	1 (50.0)	1 (50.0)	-	1 (100.0)	1 (33.3)
Yes	3 (60.0)	-	-	1 (50.0)	1 (50.0)	1 (100.0)	-	2 (66.7)
Shortened work time (h/day), mean (SD)	4.7 (0.6)	-	-	4	4	4	-	4.5 (0.7)
Shortened work week, n (%)								
No	1 (20)	-	-	1 (50.0)	-	1 (100.0)	-	-
Yes	4 (80)	1 (100.0)	1 (100.0)	1 (50.0)	2 (100.0)	-	1 (100.0)	3 (100.0
Number of work days/week, mean (SD)	3.3 (0.5)	4	3	3	4	-	-	3.3 (0.6)
Reduction in work time in other ways, n (%)								
No	5 (100.0)	1 (100.0)	-	1 (50.0)	1 (50.0)	-	-	3 (100.0)
Yes	-	-	1 (100.0)	1 (50.0)	1 (50.0)	1 (100.0)	1 (100.0)	-
Other work modifications to support work performance, n (%)								
No	8 (20.0) [b]	6 (46.2) [c]	4 (66.7) [d]	8 (72.7) [e]	6 (75.0) [f]	10 (76.9) [g]	6 (100.0) [h]	6 (60.0) [i]
Yes	2 (20.0)	7 (53.8)	2 (33.3)	3 (27.3)	2 (25.0)	3 (23.1)	-	4 (40.0)
Implemented modifications, n (%)								
Work aids/tools	-	-	-	-	1 (50.0)	-	-	1 (25.0)
Ergonomics changes	-	-	-	-	-	1 (100.0)	-	1 (25.0)
Altered work hours/ breaks, shift arrangements	-	2 (28.6)	-	2 (66.7)	1 (50.0)	1 (100.0)	-	2 (50.0)
Working from home	-	-	-	-	-	-	-	-
Reduced work load/omitted work tasks	-	-	-	1 (33.3)	-	-	-	-
Amended duties	1 (50.0)	3 (42.9)	1 (100.0)	2 (66.7)	2 (100.0)	-	-	1 (25.0)
Other modifications	1 (50.0)	3 (42.9)	-	1 (33.3)	-	1 (100)	-	-

[a] One was excluded due to contracting serious disease

[b] 1 of 8 (12.5 %) indicated that work modifications would have been necessary
[c] 2 of 6 (33.3 %) indicated that work modifications would have been necessary
[d] 1 of 4 (25.0 %) indicated that work modifications would have been necessary
[e] 1 of 8 (12.5 %) indicated that work modifications would have been necessary
[f] 2 of 6 (33.3 %) indicated that work modifications would have been necessary
[g] 2 of 10 (20.0 %) indicated that work modifications would have been necessary
[h] 3 of 6 (50.0%) indicated that work modifications would have been necessary
[i] 1 of 6 (16.7%) indicated that work modifications would have been necessary

4.3.3. Primary and secondary outcomes during follow-up

The median time for sustained return to work was 26 days in the intervention and 9 days in the control group (Figure 2, table 7). The vast majority (83% in both groups) returned to work within three months.

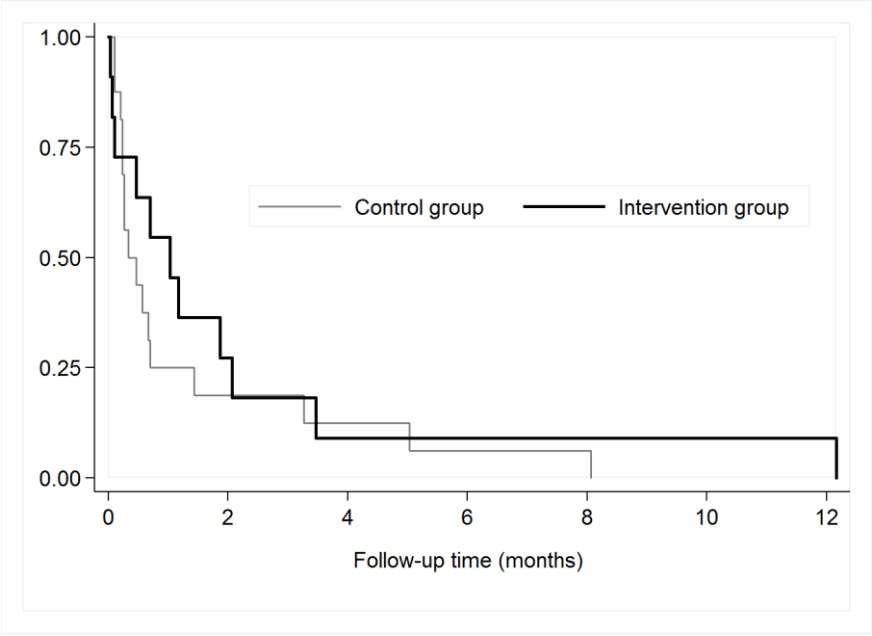

Figure 2. Time to return to work in the intervention and control group.

Sickness absence days due to MSD increased both in the intervention and control group, the increase in the median being due to a few persons having very long sickness absences. Sickness absence due to mental disorders was infrequent (table 7).

A total of 23 (69.7%) patients responded to the follow-up questionnaire at 3 months, 22 (66.7%) at 6 months, 21 (63.6%) at 9 months and 16 (48.5%) at 12 months.

The pain intensity declined in both groups until 9 months, however the decline was 0.6 to 1.1 units at most. Pain interference with work declined in the intervention group by 1.8 units, however it slightly increased in the control group. Of note is that only 60%, 43% and 67% of the respondents in the intervention group were at work at 6, 9 and 12 month-follow-ups. The interference with sleep temporarily declined in the intervention group, however in the control group only minor changes were observed. Depressive symptoms

declined in both intervention and control group, in the intervention group the symptoms were at the lowest level at 6 months and in the control group at 9 months (table 9).

Table 9. Musculoskeletal pain and depressive symptoms during the follow up of 12 months (I=intervention group; C= control group).

Characteristic	3mth (n= 23)		6mth (n= 22)		9mth (n=21)		12mth (n=16)	
	I (n= 10)	C (n=13) [a]	I (n= 10)	C (n=12)[a]	I (n= 8)	C (n=13)[a]	I (n=6)	C (n=10) [a]
Musculoskeletal pain during the previous 7 days, n (%)								
No	-	2 (15.4)	1 (16.7)	2 (18.2)	-	3 (23.1)	-	2 (20.0)
Yes	10 (100.0)	11 (84.6)	5 (83.3)	9 (81.8)	8 (100.0)	10 (76.9)	6 (100.0)	8 (80.0)
Intensity of pain (0=no pain, 10=the worst possible), mean (SD)	7.1 (1.9)	6.8 (1.9)	6.6 (1.7)	6.3 (1.7)	6.0 (2.0)	6.2 (1.8)	6.5 (1.9)	6.4 (2.0)
Pain interference with work (0=not at all, 10=unable to work), mean (SD)	4.8 (1.8)	3.9 (2.2)	5.0 (2.6)	4.0 (2.7)	3.3 (1.5)	4.6 (2.5)	3.0 (1.4)	4.3 (3.1)
At work, n (%) [b]	8 (80.0)	10 (76.9)	6 (60.0)	10 (83.3)	3 (42.9)	11 (84.6)	4 (66.7)	6 (60.0)
Pain interference with sleep (0=not at all, 10=unable to sleep), mean (SD)	6.1 (3.0)	4.5 (2.1)	4.2 (3.0)	4.2 (2.0)	3.1 (3.0)	3.8 (2.8)	4.7 (2.6)	5.0 (2.8)
Depressive symptoms (PHQ) [c]								
PHQ score, n (%)								
0-4 (None)	4 (40.0)	7 (53.8)	7 (77.8)	8 (72.7)	4 (50.0)	11 (84.6)	3 (50.0)	5 (62.5)
5-9 (Mild depression)	5 (50.0)	2 (15.4)	2 (22.2)	1 (9.1)	4 (50.0)	1 (7.7)	3 (50.0)	2 (25.0)
10-14 (Moderate depression)	1 (10.0)	3 (23.1)	-	1 (9.1)	-	1 (7.7)	-	-
15- (Moderately severe/ severe depression)	-	1 (7.7)	-	1 (9.1)	-	-	-	1 (12.5)
Mean (SD)	5.4 (2.7)	5.9 (6.6)	3.4 (2.6)	4.4 (6.0)	4.0 (3.1)	2.5 (3.6)	4.5 (2.9)	5.3 (7.0)
Min-max	1-10	0-23	0-8	0-19	0-9	0-13	1-8	0-21

[a] One was excluded due to contracting severe disease; [b] Have been at work during the previous 7 days; [c] Patient Health Questionnaire (scale 0-27)

In the repeated measures analysis, combining data from all measurement points, no differences were observed in pain, pain interference or depressive symptoms between the intervention and control group (Table 10).

Table 10. Musculoskeletal pain and depressive symptoms during the 12-month follow-up. Mixed model repeated measures analysis.

Outcome	Intervention group			Control group			Mean difference	
	n	Mean	SD	n	Mean	SD	Difference	P value
Pain intensity	39	6.82	1.70	56	6.75	1.80	0.07	0.84
Pain interference with work	26	4.88	2.21	45	4.13	2.48	0.75	0.18
Pain interference with sleep	38	4.71	2.96	57	4.75	2.89	-0.04	0.94
Depressive symptoms	42	4.71	3.00	67	4.97	5.54	-0.26	0.75
Change from baseline during follow-up								
Pain intensity	26	-1.00*	1.55	36	-1.25	1.93	0.25	0.56
Pain interference with work	12	-1.08	3.15	15	-0.67	3.62	-0.41	0.74
Pain interference with sleep	25	-2.04	4.02	36	-1.72	3.98	-0.32	0.75
Depressive symptoms	30	-1.30	3.93	42	-1.07	7.87	-0.23	0.87

n = number of observations. *Negative value indicates a decrease in the measures during follow-up

Sensitivity analyses

Sensitivity analyses were carried out within the intervention and control group to compare patients with and without an intervention during the first three months. Time to return to work showed a tendency to be shorter among those with an implemented work modification in the intervention group, however in the control group it was longer for those with an implemented work modification. In both intervention and control group the number of SA days due to MSD and the increase in sickness absence days were lower during the follow-up among those with an implemented work modification compared with those without work modification. Due to small numbers, no group differences were statistically significant (Table 11).

Table 11. Sickness absence (SA) days 12 months before and after recruitment according to implemented work modification during the first three months of follow-up. Main diagnosis of SA: MSDs =musculoskeletal disorders; Other = other disorders. Median, quartiles (25%; 75 %).

Outcome	Intervention group		Control group	
	Implemented work modification (n=4)	No work modification (n=5)	Implemented work modification (n=6)	No work modification (n=6)
	med (25%, 75%)	med (25%, 75%)	med (25%, 75%)	med (25%, 75%)
Time to sustained return to work	2 (0, 22)	10 (0, 30)	35 (0, 104)	20 (4,36)
All SA before	21 (13, 29)	28 (18, 32)	24 (10, 41)	15 (3,32)
All SA after	44 (28, 74)	75 (7, 180)	71 (1, 173)	74 (39,123)
MSD before	5 (0, 11)	15 (10, 27)	17 (0, 33)	6 (2,25)
MSD after	28 (6, 49)	70 (7, 180)	16 (1, 149)	68 (32,117)
Other before	9 (2, 14)	5 (2, 6)	7 (0, 12)	4 (1, 10)
Other after	0 (0, 8)	0 (0, 3)	0 (0, 37)	5 (0, 10)
Change from baseline to the end of follow-up				
All SA	20 (4, 60)	44 (-17, 155)	40 (-14, 153)	65 (16, 101)
MSD	18 (4, 46)	63 (-14, 159)	3 (-5, 120)	63 (15, 109)
Other	-6* (-14, 3)	-2 (-6, 0)	-3 (-10, 33)	-1 (-3, 3)

*Negative value indicates a decrease in SA at the end of follow-up

In the intervention group, levels of pain interference with work and sleep decreased more among those with an implemented work modification compared with those without. In the control group, pain interference with sleep and depressive symptoms decreased more among those with an implemented work modification compared with those without. (Table 12).

Table 12. Musculoskeletal pain and depressive symptoms during the 12-month follow-up. Mixed model repeated measures analysis. Mean and 95% confidence interval (95% CI).

Outcome	Intervention group		Control group	
	Implemented work modification (n=4)	No work modification (n=5)	Implemented work modification (n=6)	No work modification (n=6)
	Mean (95%, CI)	Mean (95%, CI)	Mean (95%, CI)	Mean (95%, CI)
Pain intensity	6.4 (4.9, 7.8)	6.4 (5.2, 7.5)	6.5 (5.0, 7.9)	6.8 (5.8, 7.7)
Pain interference with work	3.4 (0.6, 6.2)	6.2 (4.0, 8.4)	6.0 (2.2, 9.7)	4.9 (3.3, 6.5)
Pain interference with sleep	4.4 (2.3, 6.5)	4.1 (2.6, 5.6)	5.1 (3.5, 6.7)	4.6 (2.9, 6.3)
Depressive symptoms	3.9 (1.0, 6.8)	5.4 (2.8, 7.9)	3.9 (1.2, 6.7)	5.1 (2.9, 7.3)
Change from baseline during follow-up				
Pain intensity	-1.4* (-2.5, 0.6)	-0.7 (-1.8, 0.3)	-0.9 (-2.0, 0.2)	-1.6 (-2.4, -0.7)
Pain interference with work	-3.4 (-6.4, -0.4)	-0.9 (-3.2, 1.5)	4.0 (-0.1, 8.1)	-0.7 (-2.5, 1.0)
Pain interference with sleep	-3.0 (-5.3, -0.8)	-0.6 (-2.4, 1.2)	-3.2 (-5.2, -1.2)	0.6 (-1.0, 2.2)
Depressive symptoms	-1.4 (-5.2, 2.4)	-1.0 (-4.4, 2.4)	-4.1 (-7.7, -0.4)	0.3 (-2.7, 3.2)

*Negative value indicates a decrease in measures during follow-up

5 DISCUSSION

The intention to treat analysis of this study showed no difference in sustained return to work between the intervention and control group. Sickness absence due to musculoskeletal diseases did not differ, either, and only few patients sought medical advice due to depressive symptoms. A sensitivity analysis, comparing patients with and without a work modification at three months within the intervention and control group, showed that patients in the intervention group with a work modification tended to have the fastest return to work. Although sickness absence days generally increased during follow-up, the increase tended to be smaller among those with an implemented intervention. The intention to treat analysis showed no differences between the intervention and control group in any of the secondary outcomes of pain intensity, pain interference with work or sleep, or depressive symptoms. In contrast, our sensitivity analyses showed that pain interference levels were lower in patients with an implemented work modification compared with those without a work modification. Repeated individual interviews among occupational physicians before and after the intervention workshop showed that some had started to recommend TWM more actively than earlier to all eligible employees. Some reported a consideration for practice change, however, practical circumstances to realize this had not been optimal.

A further scrutiny of the results of the quantitative and qualitative part of the study revealed that some physicians who took part in the qualitative interviews and intervention workshop did not recruit patients after the workshop and the first interview. Moreover, one physician who was not assessed to be in need for practice change, as she already used TWM actively, recruited many patients already before the workshop. As a result of this, the use of work modifications was frequent already at the control phase, leaving little space for their increased use. Therefore, the lack of effect more likely was due to problems in the implementation of the intervention than a failure in the underlying theory of the study.

According to focus group interviews among occupational physicians early RTW supported with temporary work modifications can be considered as part of current treatment practice, especially in musculoskeletal pain or minor depressive symptoms. Targeting work modifications at the physical or psychological exposures that are considered to have triggered or worsened the symptoms will provide favorable circumstances for recovery. Early RTW was also seen to enhance employee well-being and prevent adverse effects of prolonged sickness absence. Moreover, early RTW was also seen beneficial for the workplace stakeholders, as costs of disability can be kept low and the employee resources will be in use at least partly. Increasing workload of fellow-workers as they may need to adopt additional tasks as well as supervisor resources to plan the necessary organizational changes

were mentioned as reservations. From societal perspective early RTW was seen as beneficial, as long-term sickness absence can be avoided and their costs saved. Supporting early RTW with work modifications – instead of prescribing recurrent sick leaves – was perceived to enhance professional the fulfillment of occupational physicians.

Individual and focus group interviews among physicians revealed three key behaviors related to applying TWMs: 1) initiating the process with the employee, 2) making recommendations to the workplace, and 3) following up the process. OP behaviors were influenced by several factors related to personal capability and motivation, and opportunities provided by the physical and social environment. Capability comprised relevant knowledge and skills related to applying TWMs, remembering to initiate TWMS and monitor the process, and being accustomed to reflective practice. Opportunity comprised physical resources (e.g. time, predefined procedures, and availability of modified work at companies), and social pressure from stakeholders. Motivation comprised conceptions of a proper OP role, confidence to carry out TWMs, personal RTW-related goals, beliefs about the outcomes of one's actions, feedback received from earlier cases, and feelings related to applying TWMs. OPs' perceived means to target these identified factors were linked to the following BCW intervention functions: education, training, persuasion, environmental restructuring, and enablement. The results suggest that at least these functions should be considered when designing future interventions.

Strengths and weaknesses of the study

Via individual and focus group interviews among OPs this study provided new results of their views and experiences from the use of TWM in supporting early RTW. Physician behaviors related to planning and implementing work modifications were modeled using the Theoretical Domains Framework and the Behavior Change Wheel, which have not earlier been used for this purpose. These frameworks were also utilized to assess behavior changes after the intervention workshop, e-learning course and first motivational interview.

A major limitation in the quantitative part of the study was that the targeted number of patients was not reached. As only a minority of patients had depressive symptoms as their main reason for their visit, we were unable to produce new information about TWM in mental problems. Although we believed that our register-based follow-up of our primary outcomes of sustained RTW and sickness absence would guarantee a complete follow-up, an unforeseen change in the occupational health service provider prevented us from receiving follow-up information of four patients in one of the participating companies. The participation rate in our web-based questionnaire follow-up was acceptable until 9 months (70, 67 and 64% at 3, 6 and 9 months, respectively), but dropped to 49% at 12 months, reducing the effective sample size in our analyses. Nevertheless, we were able to

include 95 observations in the analyses of pain intensity and pain interference with sleep and 109 observations in the analyses of depressive symptoms. Due to slowly progressing recruitment, the recruitment period was prolonged. Practical and financial reasons prevented further continuation of recruitment.

Recruitment problems were encountered by us (Shiri et al. 2011, Viikari-Juntura et. 2012) also earlier, and these problems seemed to increase. The feasibility of these types of studies might improve, if they could be linked with a scheduled development program of the company or their occupational health service provider. Our study was in line with some of the development programs in the participating companies, however, this link may not have been strong enough. When the recruitment of patients is an extra duty for the physicians, most of them feel that the burden and time requirement of this work is too high in their busy schedule seeing patients.

Conclusions

In conclusion, this study showed no effects of the use of temporary work modifications on the primary outcomes. Lack of effect can be partly understood by the frequent use of work modifications already at the control phase, leaving limited space for their increased use. According to focus group interviews occupational physicians perceive recommending work modifications as a meaningful task with beneficial effects. The Theoretical Domains Framework and the Behaviour Change Wheel proved useful in the RTW context to indicate the occupational physician behaviors that need to be targeted in order to enhance the use of temporary work modifications.

REFERENCES

Andersen MF, Nielsen KM, Brinkmann S. A meta-synthesis of qualitative research on return to work among employees with common mental disorders. Scan J Work Environ Health 2012; 38; 93-104.

Anema JR, Steenstra IA, Bongers PM, de Vet HC, Knol DL, Loisel P, van Mechelen W. Multidisciplinary rehabilitation for subacute low back pain: graded activity or workplace intervention or both? A randomized controlled trial. Spine 2007; 32:291-298; discussion 299-300.

Barbour R. Doing focus groups. Los Angeles: Sage, 2007.

Blank L, Peters J, Pickvance S, Wilford J, Macdonald E. A systematic review of the factors which predict return to work for people suffering episodes of poor mental health. J Occup Rehabil 2008;18:27-34.

Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. Implement Sci 2012;7:37.

Cornelius LR, van der Klink JJ, Groothoff JW, Brouwer S. Prognostic factors of long term disability due to mental disorders: a systematic review. J Occup Rehabil 2011;21:259-274.

Dahm KT, Brurberg KG, Jamtvedt G, Hagen KB. Advice to rest in bed versus advice to stay active for acute low-back pain and sciatica. Cochrane Database Syst Rev 2010(6):CD007612.

de Vries G, Koeter MW, Nabitz U, Hees HL, Schene AH. Return to work after sick leave due to depression; a conceptual analysis based on perspectives of patients, supervisors and occupational physicians. J Affect Disord 2012;136:1017-1026.

Du Bois M, Donceel P. Guiding low back claimants to work: a randomized controlled trial. Spine 2012;37:1425-1431.

Elo S, Kyngäs H. The qualitative content analysis process. J Adv Nurs 2007;62:107-115.

Fassier JB, Durand MJ, Caillard JF, Roquelaure Y, Loisel P. Results of a feasibility study: barriers and facilitators in implementing the Sherbrooke model in France. Scand J Work Environ Health 2015; 41:223-233.

Fassier JB, Durand MJ, Loisel P. 2nd place, PREMUS best paper competition: implementing return-to-work interventions for workers with low-back pain--a conceptual framework to identify barriers and facilitators. Scand J Work Environ Health 2011;37:99-108.

Finnish Centre for Pensions (ETK), The Social Insurance Institution of Finland (KELA). Statistical yearbook of pensioners in Finland 2013. Official statistics of Finland. Helsinki: Erweko Oy, 2014. http://www.etk.fi/wp-content/uploads/2015/10/Tilasto%20Suomen%20el%C3%A4kkeensaajista%202013.pdf (accessed 21 Dec 2017).

Franche RL, Baril R, Shaw W, Nicholas M, Loisel P. Workplace-based return-to-work interventions: optimizing the role of stakeholders in implementation and research. J Occup Rehabil 2005;15:525-542.

Furlan AD, Gnam WH, Carnide N, Irvin E, Amick BC, 3rd, DeRango K, McMaster R, Cullen K, Slack T, Brouwer S, Bültmann U. Systematic review of intervention practices for depression in the workplace. J Occup Rehabil 2012;22:312-321.

Gardner BT, Pransky G, Shaw WS, Hong QN, Loisel P. Researcher perspectives on competencies of return-to-work coordinators. Disabil Rehabil 2010;32:72-78.

Grol R, Grimshaw J. From best evidence to best practice: effective implementation of change in patients' care. Lancet 2003;362:1225-1230.

Haukka E, Martimo KP, Kivekäs T, Horppu R, Lallukka T, Solovieva S, Shiri R, Pehkonen I, Takala EP, MacEachen E, Viikari-Juntura E. Efficacy of temporary work modifications on disability related to musculoskeletal pain or depressive symptoms--study protocol for a controlled trial. BMJ Open 2015;5(5):e008300.

Hollander J. The social contexts of focus groups. J Contemp Ethnogr 2004;33:602–637.

Horppu R, Martimo KP, MacEachen E, Lallukka T, Viikari-Juntura E. Application of the Theoretical Domains Framework and the Behaviour Change Wheel to Understand Physicians' Behaviors and Behavior Change in Using Temporary Work Modifications for Return to Work: A Qualitative Study. J Occup Rehabil. 2017 Apr 8. doi: 10.1007/s10926-017-9706-1.

Horppu R, Martimo KP, Viikari-Juntura E, Lallukka T, MacEachen E. Occupational Physicians' Reasoning about Recommending Early Return to Work with Work Modifications. PLoS One. 2016 Jul 1;11(7):e0158588. doi: 10.1371/journal.pone.0158588.

Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. Qualitative Health Research 2005;15:1277-1288.

Kitzinger J. Qualitative research. Introducing focus groups. BMJ 1995; 311:299-302.

Mason J. Qualitative researching. 2nd ed. London: Sage Publications; 2002.

Matsudaira K, Hara N, Arisaka M, Isomura T. Comparison of physician's advice for nonspecific acute low back pain in Japanese workers: advice to rest versus advice to stay active. Ind Health 2011;49:203-208.

Michie S, Atkins L, West R. The Behavior Change Wheel: a guide to designing interventions. London: Silverback; 2014.

Michie S, Johnston M, Abraham C, Lawton R, Parker D, Walker A, Psychological Theory G. Making psychological theory useful for implementing evidence based practice: a consensus approach. Qual Saf Health Care 2005;14:26-33.

Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implement Sci 2011;6:42.

Nieuwenhuijsen K, Faber B, Verbeek JH, Neumeyer-Gromen A, Hees HL, Verhoeven AC, van der Feltz-Cornelis CM, Bültmann U. Interventions to improve return to work in depressed people. Cochrane Database Syst Rev 2014;12:CD006237.

OECD. Sickness, Disability and Work: Breaking the Barriers. A Synthesis of Findings across OECD Countries, 2010. http://www.oecd.org/publications/sickness-disability-and-work-breaking-the-barriers-9789264088856-en.htm (accessed 21 Dec 2017).

Palmer KT, Harris EC, Linaker C, Barker M, Lawrence W, Cooper C, Coggon D. Effectiveness of community- and workplace-based interventions to manage musculoskeletal-related sickness absence and job loss: a systematic review. Rheumatology 2012;51:230-242.

Rebergen DS, Bruinvels DJ, Bos CM, van der Beek AJ, van Mechelen W. Return to work and occupational physicians' management of common mental health problems-process evaluation of a randomized controlled trial. Scand J Work Environ Health 2010;36:488-498.

Rollin L, Gehanno JF. Research on return to work in European Union countries. Occup Med 2012;62:210-215.

Shiri R, Martimo KP, Miranda H, Ketola R, Kaila-Kangas L, Liira H, Karppinen J, Viikari-Juntura E. The effect of workplace intervention on pain and sickness absence caused by upper-extremity musculoskeletal disorders. Scand J Work Environ Health 2011;37:120-128.

The Finnish Pension Alliance TELA, 2015. https://www.tela.fi/tyoelakekuntoutus2016 (accessed 21 Dec 2017).

The Social Insurance Institution. Statistical yearbook of the Social Insurance Institution 2016. Official Statistics of Finland. Helsinki: Erweko Oy Oy, 2017. https://helda.helsinki.fi/bitstream/handle/10138/228883/Kelan_tilastollinen_vuosikirja_2016.pdf (accessed 21 Dec 2017).

Waddell G, Feder G, Lewis M. Systematic reviews of bed rest and advice to stay active for acute low back pain. Br J Gen Pract 1997;47:647-652.

van Duijn M, Miedema H, Elders L, Burdorf A. Barriers for early return-to-work of workers with musculoskeletal disorders according to occupational health physicians and human resource managers. J Occup Rehabil 2004;14:31-41.

van Oostrom S, Boot C. Workplace interventions. In Loisel P, Anema J.R. (eds). Handbook of work disability: prevention and management. New York; Springer 2013:335-355.

WHO. International Classification of Diseases and Related Health Problems, 10th Revision (ICD-10). WHO 2010. http://apps.who.int/classifications/icd10/browse/2010/en. 2010.

Viikari-Juntura E, Kausto J, Shiri R, Kaila-Kangas L, Takala EP, Karppinen J, Miranda H, Luukkonen R, Martimo KP. Return to work after early part-time sick leave due to musculoskeletal disorders: a randomized controlled trial. Scand J Work Environ Health 2012;38:134-143.