Work-related functioning among long-term sick-listed workers with persistent subjective health complaints

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                     prof.dr. C.A.M. Roelen
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Chapter 1

General introduction

Patient: "Although I felt there was clearly something wrong, I first thought it was all in my imagination because there were no clear physical abnormalities. So I kept pushing myself, but at a certain point I couldn't manage my daily activities and work anymore. I consulted many different physicians and underwent several examinations. Nevertheless, there were no clear diagnoses for my health complaints, and I received many different treatments and varying rehabilitation advice. Some physicians said that I simply needed to take some rest and advised me to report sick at work. Others said that my health complaints were not that severe or even that they did not exist. This all made me uncertain about my situation, especially because I still did and do not know what might be wrong with me. I feel that I'm still not able to live my life as I used to, and I know that fully going back to work will have a negative impact on how I feel and on my health and capacities in the future."

Physician: "Patients with health complaints without a clear underlying pathology suffer from a disorder that we do not yet know or understand. On the one hand, they can have problems in their daily functioning due to these health complaints. Ignoring or rejecting these health complaints does not help the patient. On the other hand, the lack of clear objective medical findings in these patients and the different rules and regulations in several health care systems make it difficult for physicians to assess the exact level of functioning and to give optimal advice about recovery, rehabilitation and participation possibilities. I have seen patients with these health complaints in which my assessment and advice differed from the level of functioning as perceived by the patients themselves and from the assessments and advice of other physicians."

Subjective health complaints in health care

The patient and physician anecdotes above illustrate the tension between different perspectives on the level of functioning and on possibilities for recovery, rehabilitation and participation in the paid work process for patients with health complaints that are not directly observable for physicians, but that instead are subjectively reported by the patient. Such complaints are generally known as subjective health complaints (SHC)[1].

Traditionally, physicians were trained to use a biomedical model in which they searched for objective abnormalities in the function or structures of body systems (i.e. disease) that they could treat[2]. However, health cannot merely be described by the absence of a disease, and not all symptoms and complaints fit into the criteria of a disease[3]. Therefore, a broader model was introduced in the 1950s that makes a clear distinction between the concepts of disease and patients' experience of ill health (i.e. illness)[4]. In the 1970s, it was suggested that a triad in which social and cultural aspects (i.e. sickness) around the illness and the disease are also incorporated would be more optimal[5,6]. Since then there has been a gradual shift to a more biopsychosocial model to structure guidelines and patient-centered care in several health care systems[7].

In 1996, a medical work disability criterion was introduced in the social security

system in the Netherlands to enable better application of the biopsychosocial model in medical work disability assessments[8]. Based on this criterion, physicians do not have to search for an objective underlying disease of the illness but instead evaluate whether the sick-listed worker is disabled as a direct and medically objective consequence (i.e. testable, reproducible and consistent) of a disease or illness[8]. This enables physicians to legitimise disability and sickness absence for workers with SHC better, but the rules, regulations and guidelines around the social security system and several other health care systems are still partly designed around the biomedical model[7,9]. Many physicians therefore still find it difficult to assess the exact level of functioning and to advise and support long-term sick-listed workers with SHC in their recovery, rehabilitation and participation process during their disability assessment[10-13]. At the same time, sick-listed workers with SHC still report difficulties in dealing with the legitimacy of their complaints, as they still have no clear underlying biologically defined disease[12,14,15].

Adapting the rules, regulations and guidelines in health care systems, especially in the social security system, could assist physicians in their assessment, support and advice about the level of functioning, recovery, rehabilitation and participation possibilities for long-term sick-listed workers with SHC. Unfortunately, knowledge about the legitimisation, recovery, rehabilitation and participation process for long-term sick-listed workers with SHC is scarce, and little is known about how the rules, regulations and guidelines in health care systems may be altered to better assist physicians in their assessment, support and advice for those workers. More knowledge about the functioning of those workers and in comparison with those with other disorders could be a meaningful step towards more optimal rules, regulations and guidelines on how to assess, advise and support long-term sick-listed workers with subjective health complaints.

Terminology surrounding subjective health complaints
This thesis predominantly uses the umbrella term subjective health complaints (SHC), but along with the upcoming biopsychosocial model, there has been a scientific debate about the classification of and the terminology used to describe health complaints for which adequate medical examination does not reveal a conventional organic pathology[16]. Based on the shared demographic, clinical and psychosocial features of patients with such health complaints, several general names have been used for the complaints such as functional, somatic, unexplained and psychosomatic symptoms[17]. However, the diversity in the nature of these health complaints and the wide variety of medical specialists that support patients with these health complaints have resulted in difficulties to find one clear term. The descriptions used therefore are often comprised of single health complaints (e.g. pain, fatigue or dizziness) or state the complaints in terms of syndromes (e.g. fibromyalgia, somatoform disorder or irritable bowel syndrome)[17]. However, such descriptions are often over-inclusive,

overly restrictive or stigmatizing and often have considerable overlap.

Several umbrella terms for the health complaints under consideration have been suggested in the literature[18]. The most commonly used terms are "medically unexplained symptoms" (MUS) or "medically unexplained physical symptoms" (MUPS)[18]. However, several patients and physicians find the term 'unexplained' misleading, arguing that the complaints are admittedly unexplained but not unexplainable; they suggest that the biopsychosocial model does provide explanations for this type of health complaints[19-21]. Many patients and physicians therefore prefer the term "persistent physical symptoms" (PPS)[19,20]. As not all health complaints are purely physical, however, perhaps a more neutral and descriptive umbrella term that avoids the discussion of an underlying pathology or causality is "subjective health complaints" (SHC)[1]. To give acknowledgement to the patients and to stay as neutral as possible, this thesis will predominantly use SHC but will use PPS as a synonym.

The burden of subjective health complaints in health care

SHC is an important global health issue[22,23]. Patients with SHC are highly prevalent in all health care systems and are associated with high direct (i.e. health care use) and indirect (i.e. productivity loss due to sickness absence) health care costs[22,23]. SHC is one of the most common reasons for seeking medical care: up to 50% of all consultations in primary as well as secondary curative health care relate to SHC[24,25]. While most of the health complaints are mild and transient within a year, one-fourth persist for a much longer period of time[26]. Moreover, patients with persistent SHC frequently experience high physical distress, substantial disability, role impairments and difficulties in their recovery process, which may lead to social and work dysfunction and long-term sickness absence[27,28].

At least 15–20% of all long-term sick-listed workers are diagnosed with SHC[29,30]. When left untreated and unsupported, the prognosis for vocational rehabilitation is poor, and workers may be eligible for work disability benefits[27]. Up to 8% of the work disability benefits are provided to workers with SHC[27,31]. For the workers themselves, such benefits are associated with a weakened financial position, an increased risk for permanent exit from the work force and a compromised quality of life, and for employers and society at large they incur substantial costs[32]. The recovery, rehabilitation and participation process of sick-listed workers with SHC are important for reducing these social, economic and health consequences[33,34].

Challenges in handling subjective health complaints in health care systems

Patients with SHC are mostly supported in their recovery by one or several physicians from different medical specialties in curative health care[35,36]. When the patient is also sick-listed, the gatekeeper law in the Netherlands applies for occupational and social security health care during the first two years of sickness absence[37]. Employers are

obligated to support their employed sick-listed workers in their vocational rehabilitation and participation in the paid work process with the help of an occupational physician, and the Dutch Social Security Institute (UWV) is obligated to support non-employed sick-listed workers with the help of an insurance physician[37].

The key tasks for all physicians involved in the two-year process is to assess the level of functioning and to support patients and sick-listed workers in and give advice about the recovery, rehabilitation and participation process[36,38]. Many physicians report difficulties in these tasks for patients and workers with SHC in particular: they struggle with the traditional biomedical concepts of disease, and they may be limited by their own specialist roles and by the rules and regulations of their own health care system[39,40]. In recent years, guidelines have been provided to support physicians in their key tasks, but guidelines for SHC are limited and mostly focus on curative health care and less on occupational and social security health care[41-44]. This may result in a variety of ideas, advice and decision-making strategies by different physicians and, subsequently, in patient confusion, problems in the legitimisation of the illness and the sick role, and unnecessary obstacles in the recovery, rehabilitation and participation process[45-47].

To reach more uniformity between physicians form different health care systems on how to manage and support functioning and sickness absence for patients and workers with SHC, rules, regulations, and guidelines could be adapted. This could prevent obstacles in the recovery, rehabilitation and participation process in occupational and social security health care. More insight into the possible differences between physicians from different health care systems is therefore needed.

Challenges in handling work disability assessments for subjective health complaints
If after two years of sickness absence workers in the Netherlands are still sick-listed, they can apply for a work disability assessment for the certification of work disability benefits at UWV[48]. The medical part of these assessments are performed by insurance physicians who have to obtain information about workers' health complaints, interpret this information and evaluate and justify a probable relation between the self-perceived health complaints and objective medical information. They then have to translate the information to the level of work-related functioning[36,48-50]. Despite the medical work disability criterion introduced in the Netherlands in 1996[8], which means that physicians have to evaluate whether the sick-listed worker is disabled as a direct and medically objective consequence of a disease or illness, physicians still report problems with this evaluation, as the health complaints and the perception of illness of workers with SHC mostly do not correlate with the objective findings of the physicians[51,52]. Furthermore, physicians report that there is still a general lack of auxiliary rules and regulations and of standardised procedures and guidelines on how to reliably interpret and translate the workers' self-perceived health complaints to the

level of functioning[10-13]. In addition, during the medical work disability assessments, workers with SHC are more often dissatisfied than workers with other disorders because they more often feel misunderstood, disbelieved or rejected[14,15].

As these feelings may worsen the health complaints and may result in patient–physician disagreements, it is important to have better insights into the extent that physicians take workers' self-perceived health into account and into the underlying factors on which physicians base their disability assessment for workers with SHC and other disorders. These insights may help give advice on how to adjust the rules and regulations and optimise standardised procedures and guidelines on how to reliably interpret and translate health complaints in general and on how to limit disagreements during medical work disability assessments between workers with SHC and physicians about the level of functioning.

Challenges in the support of long-term sick-listed workers with subjective health complaints

Based on the outcome of the medical work disability assessment of the insurance physician, a labour expert evaluates if and to what extent the worker is able to work and if and to what extent work disability benefits can be granted[48]. For long-term sick-listed workers, the impact of work disability benefits on themselves and on society at large is substantial, and sustainable work participation is therefore important[33,34]. Work participation can be encouraged by utilising remaining work ability and increasing work productivity[53,54]. However, long-term sick-listed workers report persistent difficulties in meeting work demands and maintaining their work activities[55]; additionally, physicians report difficulties in the support of long-term sick-listed workers with SHC due to the lack of evidence-based advice for participation possibilities and increasing work productivity[10-13].

Studies have revealed that external and psychosocial factors – such as age, self-perceived health, self-efficacy, self-perceived recovery expectations, social support, job demands and claim-related aspects – are more important for sustainable participation in paid work for long-term sickness absence and chronic disorders than for short-term sickness absence[56-59]. It has been suggested that modification of these factors may help the return to work and ability to remain at work[60]. To date, however, most studies have either focused on well-defined specific chronic disorders, looked across several health conditions or focused solely on the first two years of sickness absence[56-60]. In addition, the few studies that have examined factors for sustainable participation in paid work for long-term sick-listed workers with SHC are not conclusive[61].

Gaining knowledge about how to better support long-term sick-listed workers with SHC in their recovery, rehabilitation and participation process and on how to help them to remain at work in a sustainable way therefore seems highly worthwhile. With more knowledge on this topic, guidelines may be complemented and physicians can

get more support to identify which of these workers are associated with increased risks for permanent exit from the work force and to optimise the recovery, rehabilitation and participation process of long-term sick-listed workers with SHC. In addition, comparing the outcomes between workers with SHC with those with other disorders will also give insight into the impact of the underlying pathology on the recovery, rehabilitation and participation process and into whether physicians should give comparable advice for long-term sick-listed workers with other disorders.

Aim and objectives of this thesis
The main aim of this thesis is to obtain insight into the work-related functioning of long-term sick-listed workers with SHC. A further aim of this thesis is to evaluate whether the same outcomes of work-related functioning are observed in long-term sick-listed workers with other disorders as well. This thesis therefore covers the following objectives:

1. To evaluate similarities and differences between physicians from several medical specialties in different health care systems in their assessment on the level of work-related functioning and sickness absence of long-term sick-listed workers with SHC, and to reach consensus on this topic.
2. To assess the correlation between self-perceived health of long-term sick-listed workers with SHC and other disorders and physician-assessed level of work-related functioning in medical work disability assessments.
3. To explore important prognostic factors for returning to work and staying at work of fully or partially long-term sick-listed workers with SHC, and to compare the outcomes with fully or partially long-term sick-listed workers with other disorders.

Outline of this thesis
The six chapters of this thesis can be divided into four main parts. The **first part** focuses on similarities and differences in the assessment of work-related functioning and sickness absence between physicians from different medical specialties in different health care systems of workers with SHC. We performed a modified Delphi study with one preliminary round, two email rounds and one face-to-face meeting, to reach consensus among the participating physicians on the level of work-related functioning of workers with SHC (**Chapter 2**). We also performed a cross-sectional study to identify differences in the outcomes of sickness absence assessments between occupational physicians in the occupational health care system and insurance physicians in the social security system of workers with SHC (**Chapter 3**).
The **second part** of this thesis focuses on the correlation between the workers' self-perceived health and the physician-assessed level of functioning during medical work

disability assessments. We used baseline questionnaires of participants with SHC and other disorders from the prospective cohort study that we performed (the Forward cohort) together with the outcomes of medical work disability assessments from the database of UWV to analyse the correlation between the workers' self-perceived health and the physician-assessed level of functioning **(Chapter 4)**.

The **third part** of this thesis is concerned with important prognostic factors for returning to and staying at work of fully or partially long-term sick-listed workers with SHC and other disorders. We used register data of UWV, and baseline and follow-up questionnaires from the Forward cohort of fully long-term sick-listed workers **(Chapter 5)** and partially long-term sick-listed workers with SHC and other disorders **(Chapter 6)**.

The **fourth and last part** of this thesis, finally, consists of a summary and discussion, methodological considerations and implications of the research findings for policies, practice and future research **(Chapter 7)**. This thesis addresses the need for more information about possibilities for recovery, rehabilitation and participation in the paid work process and as such aims to contribute to further development of central rules and regulations that guide health professionals to help workers who suffer from SHC in particular.

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PART I
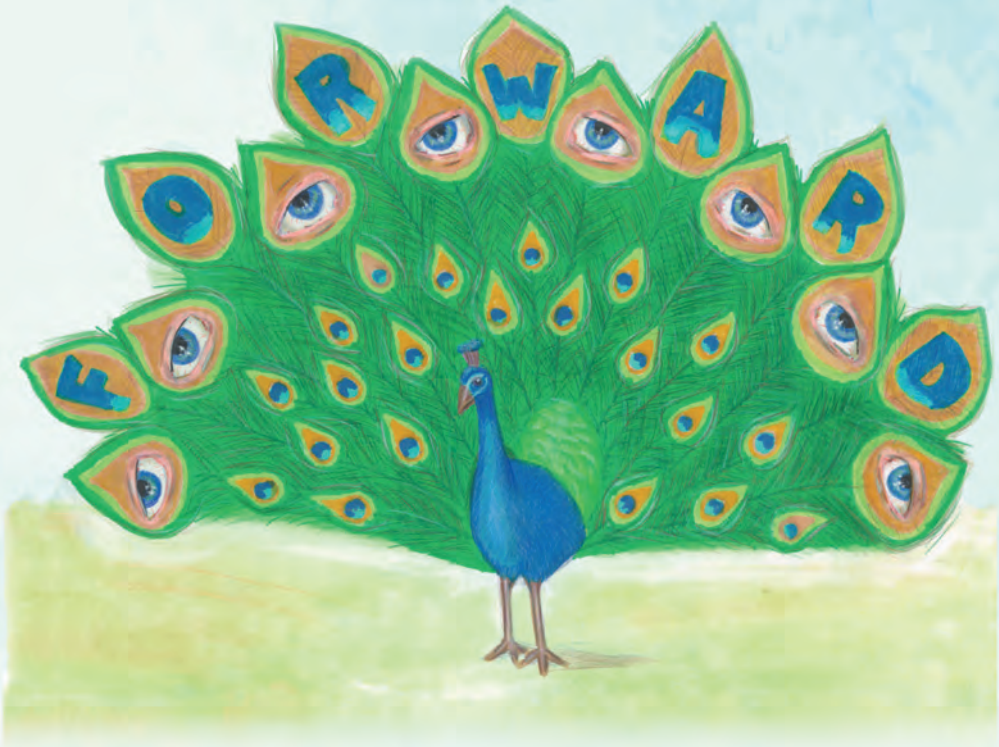
Evaluation of similarities and differences between physicians in their assessment on the level of work-related functioning and sickness absence

Chapter 2

Limitations to work-related functioning of people with persistent "medically unexplained" physical symptoms: a modified Delphi study among physicians

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Anema JR

Abstract

Aim

The purpose of this study was to obtain consensus among physicians of several medical specialties on the level of limitations to work-related functioning of people with persistent "medically unexplained" physical symptoms (PPS).

Methods

A modified Delphi study was conducted with 15 physicians of five different medical specialties. The study involved two email rounds and one meeting. In each round, the physicians prioritised the level of limitations in 78 work-related functioning items for four different PPS cases. These items were based on the Dutch Functional Ability List, national guidelines and scientific literature regarding the International Classification of Functioning.

Results

In all four cases, the physicians reached consensus on the level of limitations to work-related functioning in 49 items. The physicians reported the highest number and level of limitations for PPS of the back and lower extremities, but they reported hardly any limitations for PPS of the abdomen and genitals. For PPS of the head, they reported mainly limitations to personal and social functioning; for PPS of the neck, back and upper or lower extremities, they reported mainly limitations to dynamic movements and static postures. The physicians could not reach consensus on limitations in the category of working hours.

Conclusion

Physicians reached consensus on the level of limitations in a substantial part of work-related functioning items for PPS. There was a difference in the number and severity of limitations between different cases of PPS. The assessment of functioning seems to be based more on the specific impairment than on the underlying cause.

Introduction

The most commonly used term for persistent physical symptoms that, after appropriate medical examination, lack an underlying pathological cause, and therefore cannot be fully explained by a defined organic disease, is medically unexplained physical symptoms (MUPS)[1]. Despite the term "medically unexplained", there is more and more evidence that these physical symptoms might be explained through underlying processes and mechanism. Therefore, and on behalf of the preferences of patients, we chose to use the term Persistent "Medically Unexplained" Physical Symptoms (in short PPS) for these type of symptoms[2,3]. PPS are common worldwide, compromising up to 50% of all consultations in curative health care[4,5]. Most of these symptoms are self-limiting or recover within a year after some form of therapy, but for about 20–30% of people with PPS the symptoms persist for a longer period of time[6,7]. Those people often have multiple, severe complaints and feel high physical distress, which mostly leads to social dysfunction[8]. In addition, the physical distress is associated with significant occupational dysfunction, long duration of sick leave, and work disability[9,10]. For example, Hoedeman et al.[11] reported a prevalence of 15% of severe PPS in employees on long-term sick leave, and those employees may be eligible for a work disability benefit[12,13]. In several European countries, at least 5–8% of all new work disability benefits are awarded to people with PPS[14,15].

The process of deciding on a claimant's eligibility for work disability benefits varies between countries, but what usually plays a crucial role in the assessment is the underlying cause of the complaints and the interpretation of limitations to work-related functioning[16,17]. For the interpretation of limitations to work-related functioning, physicians have to translate medical findings and complaints to functional abilities and work disabilities[18,19]. The outcome of such work disability assessments is not only essential for the eligibility of work disability benefits, but also for the advice physicians give about recovery and participation opportunities, long-term prognosis, and treatment options[17,20]. As differences in advice may form an unnecessary obstacle in the recovery and return-to-work process[12,21], it is important there is agreement on the limitations to work-related functioning between physicians in various settings, such as insurance medicine, occupational medicine and curative health care[22,23].

In cases of PPS, many physicians find it difficult to translate the complaints and dysfunction to limitations to work-related functioning because of the lack of objective medical findings[24,25]. Complaints mostly do not correlate with physicians' objective findings, nor with the work capacity rated by physicians[26]. Moreover, studies have shown that physicians of different medical specialties, and physicians from several countries, can differ in their appraisal of work ability in people with PPS[27,28]. This emphasizes the need for more knowledge on how to assess abilities and disabilities in work for this target group, and to limit disagreements in determining eligibility for sick

leave or work disability benefits. To support physicians in these assessments, and to prevent differences in appraisals, several studies have provided recommendations and advices on standardised procedures for a work disability assessment[29,30]. However, these recommendations are not specific in their formulation, and do not provide particular recommendations on how to translate complaints to limitations to work-related functioning.

Despite the high prevalence of people with PPS, and the high number of these people claiming work disability benefits, there is still limited evidence for a uniform policy in the work disability assessment of people with PPS. Therefore, it is important to reach consensus between physicians of different medical specialties. The aim of this study was to reach consensus on the level of functional limitations related to work of people with PPS among physicians of several medical disciplines.

Methods

This study used a modified Delphi technique by combining the Delphi technique and the nominal group technique[31]. These techniques are the most commonly accepted consensus methods in health care services in cases where the research evidence is incomplete, unobtainable or conflicting[32,33]. The Delphi technique is a decision-making multistage technique among anonymous experts, whereas the nominal group technique uses structured meetings with face-to-face contact[32, 33]. Both methods aim to obtain consensus among experts on a given issue by ranking a list of items in several rounds[32,33]. Previous research has used several modifications and combinations of these techniques as well[34,35]. The combined Delphi technique and nominal group technique in this study was used to obtain multidisciplinary consensus among physicians on limitations in work-related functioning items for people with PPS. The entire process consisted of a preliminary round, two email rounds according to the criteria of the Delphi technique, and one meeting using the nominal group technique. An overview of the study design is presented in Figure 1. The study was conducted between January and September 2015.

Preliminary round

To help provide a guide and reference points for the physicians in this study we used case vignettes of common PPS. For pragmatic reasons we chose a maximum of four case vignettes, and based the type of PPS on their prevalence according to the literature, and on the numbers of the Dutch Social Security Institute (UWV)[36,37]. These are PPS of the head, neck and upper extremities, abdomen and/or genitals, and the back and lower extremities (Appendix A). For each type of PPS we searched the database of UWV. We chose four real cases as case vignettes. All cases provided

adequate and clear information about the health complaints, the treatment and the guidance in the return-to-work process up till now. The Functional Ability List (FAL)[38] was used, in combination with a part of the International Classification of Functioning (ICF)[20], to develop a list of work-related functioning items. The FAL is a standardised format list of 106 functioning items, used by insurance physicians (IPs) in the Netherlands, to assess limitations and disabilities that may be important to functioning in work[38]. The FAL is comparable to the ICF, but with more detailed items. The items of the FAL are categorised into six domains: personal functioning (30 items), social functioning (17 items), dynamic movements (31 items), static postures (11 items), adjusting to environment (13 items), and working hours and time (4 items). More than two third of the items have a dichotomous scoring option; the presence or absence of a specific functional limitation. Nearly one third has three up to five ordinal scoring options providing a range of functional limitations[38].

Figure 1 Study design
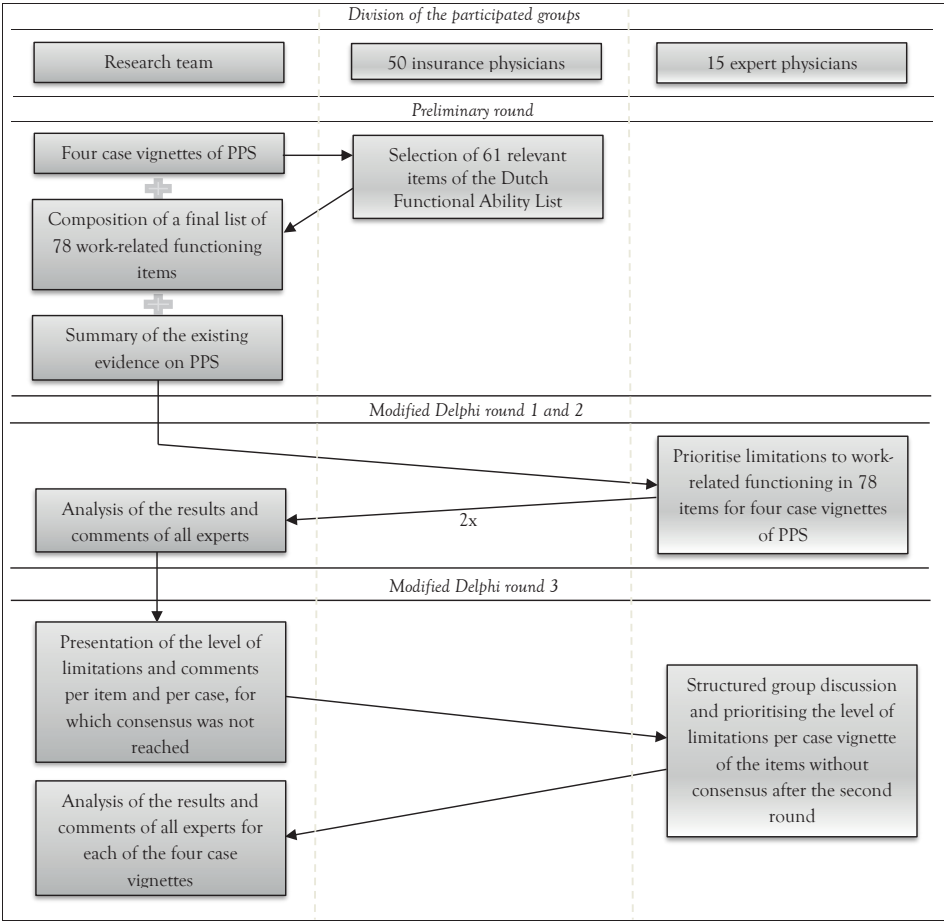
In order to develop a design list of work-related functioning items for this modified Delphi study, a group of 50 IPs were asked to select which items of the FAL can give possible limitations to work-related functioning in the four different case vignettes of PPS. We then asked these IPs to recommend the medical specialty fields of physicians who should participate in this study. This was done during a meeting in which PPS, in general and in relation to work disability, were discussed between the IPs and the researcher (KW). The IPs selected 61 relevant items from the FAL, and the researchers compared this list of items with the scientific literature regarding the ICF[39-41], and with national guidelines[42] about limitations and functioning of people with PPS. As a result, 17 additional possible relevant items of work-related functioning with PPS were added to the list of 61 items. This addition resulted in a final list of 78 work-related functioning items.

Expert panel selection
Based on the recommendations of the 50 IPs, this study used physicians of five medical specialties highly involved in the treatment or guidance of patients with PPS in the return-to-work process. For a structured meeting, a maximum of 20 persons is advised[31-33]. We invited 18 physicians to participate in our study, anticipating that at least 80% would agree. The invited physicians were all considered experts in PPS because they had sufficient professional experience in dealing with PPS in their own daily practice. The resulting expert panel (*n*=15) consisted of three IPs, three occupational physicians, three general practitioners, three psychiatrists, and three rehabilitation physicians.

The modified Delphi technique
Rounds 1 and 2 In the first round, the experts received descriptions of the four case vignettes and a summary of the existing evidence on PPS created by the researchers. In addition, they received the final list of 78 work-related functioning items, with a directory on how these items should be evaluated. The experts were asked to report any potential limitations in these items per case vignette, based on their expertise and the available literature. All experts were asked to do this independently, but they could give comments or ask questions via email. Figure 2 shows an example of one of the items to be scored.

After the first round, the researchers processed and calculated the scoring of each expert, and calculated the degree of consensus in each item per case vignette. All items with ≥75% agreement on the level of limitations were accepted without further rating or discussion. In the second round, the level of scores per item in which no consensus was reached, together with a summary of the comments from the experts in the first round, were sent back to the experts via email. The experts were again asked to rate these items per case vignette. After this second email round, the researchers

processed and calculated the results of the reported limitations in the same way as after the first round.

Round 3 In the third round, a meeting was arranged for all experts. During this meeting, the researchers explained once more the objective of the study, the results so far, and what the procedures of the nominal group technique entailed. After this introduction, the researchers graphically presented the level of limitations per item and per case vignette for which consensus was not yet reached. In addition, they presented the new comments from the second round. The experts were invited to discuss all these remaining items per case vignette. With the nominal group technique, all experts had the opportunity to clarify and to comment on the items separately. After discussing an item, the experts were asked for the last time to individually score any potential limitation of that particular item per case vignette. After the meeting, the researchers calculated the degree of consensus in this third round. This maximum of three rounds had been chosen for the modified Delhi study beforehand, for practical reasons. Consequently, the result after three rounds was the final result for the items that did not reach consensus.

Figure 2 Example of one item on the work-related functioning item list

Bending

Definition:
Bending the upper body forward from a standing position and return back to the standing position shortly after.

Interpretation:
The dynamic load of bending concerns a few degrees of bending, normally no more than 90 degrees. When bending, the bended position does not take more than a few seconds. Bending can be necessary to increase the maximal effective personal reaching distance; to touch an object beneath hip height, to pick something up, to put something down, or to manipulate something. The angle of bending will be appraised by drawing a notion line from the hip joint to the shoulder joint. The angle of this line in combination with the lead line is the bending angle.

Ability score:
0. Normal: is able to bend over an angle of 90 degrees (able to pick up a piece of paper from the ground)
1. Limited: is able to bend over a maximum angle of 60 degrees (able to pick up a bag from the ground)
2. Highly limited: is able to bend over a maximum angle of 45 degrees (able to pick up something from a chair)

	Ability score	Comments
Case 1: PPS of the head		
Case 2: PPS of the neck and upper extremities		
Case 3: PPS of the abdomen and/or genitals		
Case 4: PPS of the back and lower extremities		

Results

Three out of 18 invited experts declined to participate in the study due to time constraints, or lack of familiarity with the FAL or Delphi technique. The 15 participating experts reported that they provided health care for at least 40 patients with PPS each year. All 15 experts responded to the first and second email rounds. Thirteen experts attended the meeting in the third round and completed the last scoring round during the meeting. The other two experts completed the third scoring round by email with input from the expert comments derived from the meeting.

First and second rounds

In the first round, all experts scored the 78 items regarding limitations to work-related functioning in the four case vignettes individually. In 17 out of the 78 items, they reached consensus for all cases; these items were accepted and were not re-submitted in the next round to the experts. The experts reached consensus on 49 items for one, two or three of the cases; for 12 items they did not reach consensus in any of the cases (Table 1). All experts gave comments related to a particular item. The most frequently reported comment was the experienced difficulty in assessing the functional ability on a case vignette. The experts from curative health care experienced some difficulty in working with the items of the FAL, as they were not familiar with it. The experts with an insurance medicine background experienced difficulty accepting any limitation when no objective health problem was established. Based on these issues raised by the experts, 21 items divided over the four case vignettes were not fully assessed in this first round by one or two experts. After the second email round, there was an increase of consensus among the experts from 17 to 33 out of the 78 items for all cases. Most consensus in the cases was seen for necessary adjustments to the work environment (Table 1). A summary of the full process, rating options and results is provided in Appendix B.

Table 1 Number of items for which consensus on the level of limitations was reached, categorised per number of cases, per item category and per round

| | | Number of items with consensus, per number of cases (©) | | | | | | | | | | | |
| | | Round 1 | | | | Round 2 | | | | Round 3 | | | |
Category of items	Total items	one ©	two ©	three ©	four ©	one ©	two ©	three ©	four ©	one ©	two ©	three ©	four ©
Personal functioning	14	5	2	4	2	1	3	4	5	0	0	6	8
Social functioning	12	3	1	7	1	0	2	5	5	0	0	2	10
Dynamic movements	29	2	3	11	8	2	7	8	12	0	4	9	16
Static postures	9	0	3	3	1	1	1	3	3	1	0	2	6
Adjusting to environment	8	0	2	3	3	0	0	2	6	0	0	1	7
Working hours – time	6	0	0	0	2	1	0	1	2	1	0	1	2
Total	78	10	11	28	17	5	13	23	33	2	4	21	49

Meeting discussion

In the third round, during a meeting that lasted three hours, 45 items divided over the four case vignettes were discussed. During the meeting, the comments from the experts were mostly related to the exact interpretation of a particular item, and to the translation of the provided information about medical complaints in the case vignettes to the level of limitations to work-related functioning. Several items required a more extensive discussion, which lead to consensus among the experts in the majority of cases. No agreement could be reached for the category of limitations in working hours, as the experts continued to differ in their interpretation: the IPs of the social security agency commented that they had "to use strict rules in the assessment of working hours limitations"[43], whereas all other physicians stated that "limitations in working hours can be used as a treatment, and as a tool in the return-to-work process and participation." All experts agreed that return to work could be reached for the presented case vignettes, if the patients received proper therapy and would be provided with a healthy work environment.

Consensus on limitations to work-related functioning

After the three modified Delphi rounds, the experts reached consensus on 49 out of 78 items (63%) for the level of limitations to work-related functioning in all four cases. The experts did not reach consensus on any of the cases for two items that were related to the category of working hours (Table 1). The experts did reach consensus on the level of limitations to work-related functioning in 68 items (87%) for PPS of the head, on 65 items (83%) for PPS of the neck and upper extremities, on 72 items (92%) for PPS of the abdomen and/or genitals, and on 64 items (82%) on PPS of the back and lower extremities (Table 2). For the items on which the experts did reach consensus, the most frequent and the most severe limitations were found on PPS of the back and lower extremities, especially in the categories dynamic movements and static postures. For PPS of the head, the experts mostly agreed on limitations in the categories of personal and social functioning. For PPS of the abdomen and/or genitals, the experts agreed that limitations to work-related functioning would be likely for only three items. Most limitations for PPS of the neck and upper extremities were found to dynamic movements and static postures (Table 3). Appendix B lists all the items per case vignette, the level of consensus between the experts, and the degree of limitations that can be scored.

Table 2 Number of items for which consensus on the level of limitations was reached after the third round, categorised per case and item category

Category of items	Total items	PPS of the head	PPS of the neck and upper extremities	PPS of the abdomen and/or genitals	PPS of the back and lower extremities
Personal functioning	14	11	13	14	12
Social functioning	12	10	12	12	12
Dynamic movements	29	28	22	26	23
Static postures	9	8	7	9	7
Adjusting to environment	8	8	8	8	7
Working hours and time	6	3	3	3	3
Total	78	68	65	72	64

Table 3 Level of limitations for which consensus was reached after the third round, categorised per case vignette and item category

PPS of the back and lower extremities

Items per category (possible limitations):	Level of limitation
Personal functioning;	
High working tempo on the working place (2)	1[a]
Increased personal risk on the working place (2)	1
Dynamic movements;	
Pulling or pushing (3)	2[b]
Lifting (4)	2
Handle heavy objects frequently (2)	1
Turning/twisting round (2)	1
Kneeling or squatting (2)	1
Walking time per day on work (4)	2
Walking on different surfaces (2)	1
Walking stairs (4)	2
Moving around using transportation (3)	1
Static postures;	
Maintaining a sitting position (4)	2
Maintaining a standing position (4)	2
Maintaining a kneeling or squatting position (2)	1
Maintaining a bending or twisting position (2)	1
Need for possibility to change body position (2)	1
Adjusting to environment;	
Wearing protection gear (2)	1
Vibration (2)	1

PPS of the head

Items per category (possible limitations):	Level of limitation
Personal functioning;	
Focusing attention (3)	1
Solving problems (3)	1
Handling stress and other psychological demand (2)	1
Distraction from others during work (2)	1
Need for predictable working situation (2)	1
Frequent disruptions on the working place (2)	1
Frequent deadlines and/or production peaks (2)	1
High working tempo on the working place (2)	1
Social functioning;	
Dealing with conflicts (3)	1
Cooperating with someone else (3)	1
Contact with clients (2)	1
Management tasks (2)	1

Table 3 Continued

PPS of the head

Items p1er category (possible limitations):	Level of limitation
Dynamic movements;	
Duration time of using a keyboard and/or mouse (4)	1
Adjusting to environment;	
Sound intensity (2)	1
Vibration (2)	1
Working hours and working time;	
Working during the night (between 00:00-06:00) (2)	1

PPS of the neck and upper extremities

Items per category (possible limitations):	Level of limitation
Dynamic movements;	
Turning or twisting hands or arms (2)	1
Reaching out (3)	1
Pulling or pushing (3)	1
Handle heavy objects frequently (2)	1
Climbing (4)	1
Static postures;	
Working above shoulders (2)	1
Maintaining head in one position (4)	1
Adjusting to environment;	
Wearing protection gear (2)	1
Vibration (2)	1

PPS of the abdomen and/or genitals

Items per category (possible limitations):	Level of limitation
Static postures;	
Standing time per day on work (4)	1
Adjusting to environment;	
Vibration (2)	1
Possibility to use a toilet quickly (2)	1

[a]=mild limitations; [b]=moderate limitations

Discussion

The main purpose of this modified Delphi study was to obtain consensus on the level of limitations in work-related functioning for workers with persistent "medically unexplained" physical symptoms (PPS). Fifteen physicians from five different medical specialties scored the level of limitations in 78 items, based on the functional ability list (FAL) and the international classification of functioning (ICF), for four different cases of PPS. After three rounds, they obtained consensus on the level of limitations for 49 items in all four cases. The level of limitations for PPS ranged between no limitations to severe limitations, and the number and severity of limitations differed between the four PPS cases. The physicians reported the highest number and most severe limitations for PPS of the back and lower extremities, whereas they reported hardly any limitations for PPS of the abdomen and/or genitals. They reported mainly limitations in personal and social functioning for PPS of the head, and mainly

limitations in dynamic movements and static postures for PPS of the back and lower extremities as well as for PPS of the neck and upper extremities. The experts did not reach consensus for any of the cases on limitations of working hours.

Comparison with literature

The literature on the assessment of work functioning for people with PPS is limited. As far as we know, no comparable study exists that has developed consensus-based recommendations concerning limitations to work-related functioning regarding PPS. However, previous studies have shown that for structuring functional limitations, the ICF is a useful framework for several health conditions comparable with PPS[39–41], such as chronic pain, dizziness and low back pain. For each of these conditions, a list of core items is available that describes possible limitations in bodily functions and structures. These lists address global core sets of limitations in activities, restrictions in participation and problems in environmental factors, which are essential for daily functioning. These core sets show similarities with the limitations we found in our study on dynamic movements, static postures, personal and social functioning, and environmental factors[39–41], and can be used to structure the limitations in work-related functioning on heading points. However, in comparison with our study, they are less suitable for describing and translating the precise work-related functioning[44]. Moreover, in agreement with the ICF core sets for the conditions that are comparable with PPS[39–41], our study showed, that in the assessment of work-related functioning, the different types of complaints have to be evaluated distinctly. Limitations to work-related functioning depend on the type and severity of the complaints and not on the underlying cause of the complaints, which is in contrast to other studies[45,46].

We are not aware of any comparable studies that have developed similar recommendations for the assessment or structure of limitations in working hours for people with PPS. However, there are studies that have reported that people with PPS are able to work and participate if they are able to reduce their working hours[47], that a temporary reduction in working hours may contribute to the return-to-work process, and that it may sometimes be a better alternative than full-time sick leave[48,49]. In addition, a reduction in working hours can be seen as part of the treatment for PPS from a curative perspective[50]. On the other hand, in many European countries a limitation of working hours provides legal ground for a work disability benefit from an insurance perspective[27,43]. This may lead to differences in views between physicians regarding advice concerning limitations in working hours. In daily practice, this may cause conflicting advice for patients with PPS[27].

Strength and limitations

We believe our study had several strengths. The main strength of this study was the use of a modified Delphi technique among expert physicians of different specialties

to reach consensus on limitations to work-related functioning for this difficult patient group. The broad range of medical expertise provided a wide range of competences and views that helped to maintain a broad perspective on the topic. The experts all had significant scientific credibility and/or working experience with PPS in their own specialty field. Moreover, they are representatives of their specialty field, and can therefore help improve the practical applicability of the outcomes of this study and facilitate the communication between different medical doctors. Another strength of this modified Delphi study was that all experts were provided with a summary of the relevant and available literature on this topic, and they were all able to give and revise their opinions and rates anonymously, without peer pressure. During the group discussion, they were able to discuss and elucidate their point of view. With strictly coordinated guidance from the process leader, we also tried to limit the risk of peer pressure during this discussion, however this could not be completely ruled out. Further strengths include that all participating physicians completed the entire study, and that they reached consensus on more than half of the items.

There are some weaknesses to consider when using a modified Delphi method. Firstly, the results of this study were based on the opinions of a small group of medical experts of five medical specialties. This may not be fully representative of all health care physicians. However, this is inevitable when using a qualitative approach, and using a limited number of participants was essential to having a structured meeting to reach consensus[33]. Secondly, the use of four case vignettes from the insurance medicine field as a guideline for the experts to score the limitations may also have some disadvantages, as case vignettes do not take into account co-morbidities, other medical or non-medical factors, or the information from a real medical consultation. However, case vignettes have been shown to be valuable and practical in a qualitative study such as ours[35].

Another limitation could be the use of the ICF in combination with the FAL, as not all experts were familiar with this method. The ICF is a validated list for the evaluation of functioning, and the FAL template has proven to be valuable for the assessment of functional work disabilities in the Netherlands[20, 38]. The FAL is not evidence-based, but the combination with the validated ICF makes it suitable for the purpose of this study and applicable for other European countries. IPs of the Dutch Social Security Agency have used the FAL for many years, and they therefore have much experience with using this assessment method. The other medical experts, however, were less familiar with this method, which we tried to overcome by providing full descriptions of the meanings on the items, functioning and limitations. Still, due to this knowledge lag not all items were scored by all experts in the study, which was solved in the next round with some extra information and explanation.

Interpretation of the results

This study indicates that, despite a small body of evidence, physicians from several medical specialties were able to reach agreement for a substantial number of limitations to work-related functioning in PPS. This deepened the insight that people with PPS can have functional limitations despite the absence of objective medical findings. On the other hand, people with PPS still have many possibilities to work functioning despite these limitations, and this study indicates that the assessment of functioning seems to be based more on the specific impairment than on the disease. Although the presented cases were all considered PPS, there was a difference in the number and severity of limitations between them, and there was also a difference in the translation from medical findings and health complaints into functional abilities and disabilities in work between the different cases of PPS. We suggest that physicians have to keep this in mind in the assessment of functional work limitations.

Implications for practice and future research

This was a first attempt to translate thoughts of physicians from different medical specialty fields to recommendations for work-related functioning related to PPS. The items in the list that reached consensus may be used in the daily practice of assessing work ability for people with PPS. This stimulates better inter-rater reliability and less conflicting advice, that may give patients with PPS a better understanding about their possibilities and work abilities. Implementing these recommendations may help the return-to-work process in the daily practice of disability assessments in the Netherlands. However, these recommendations may also be well applicable in other European countries as the issues regarding work disability in case of persistent physical symptoms are quite similar[22–26]. Besides, the insight that people with these symptoms can have functional limitations despite the absence of objective medical findings can give countries, in which people with these type of symptoms are not eligible for a disability benefit, thoughts to reconsider. As the emphasis in this study was on the items of the FAL, future studies need to assess to what extent these findings can be easily translated and are also applicable to all relevant items of the ICF.

Even though the experts reached consensus on more than half of the items in this study, there were still some items that they did not reach agreement on, especially in the category limitations in working hours. To deal with this difference in views, and to further improve inter-rater reliability, it is important to achieve further agreement among physicians, and to study the effectiveness of a temporary or permanent limitation in working hours.

Conclusion

For four different types of PPS, physicians of five different medical specialty fields reached consensus on 49 out of 78 items on the level of limitations to work-related functioning. The physicians agreed on how to translate the health complaints of people with different cases of PPS to limitations to work-related functioning. Different cases of PPS gave different outcomes on the level of limitations to work-related functioning. Both the highest number and the most severe limitations were considered for symptoms of the back and lower extremities, especially in the dynamic and static movements categories. This means that the translation of PPS into functional limitations for work differs between different types of PPS and indicates that the assessment of functioning seems to be based more on the specific impairment than on the underlying cause.

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Appendix A Case vignettes

Case 1 PPS of the head
Client

The client is a 52-year-old woman, who has been sick listed for her job as shop keeper in a boutique for two years. She has a working contract for 20 hours a week.

Personal and social status of the client

The client is married with two grown children, who live away from home. Her husband gives her a lot of support. She is currently able to do small household chores.

Claim of subjective limitations

The client always feels tired and therefore cannot work for more than a few hours a day. She is not capable of working in a noisy or busy environment such as with many people, many colors, or many other stimulants. She has problems with focusing on tasks, and working under pressure or with deadlines. The client thinks that she cannot work at this moment, except for her daily chores, but maybe within one year she may be able to go back to work.

Client history

Two years ago the client had an accident with her bicycle. Since then, she has been suffering from many headaches, tinnitus and fatigue complaints. These complaints are present the entire day, but they may differ in intensity and duration throughout the day. At first, she was able to handle these complaints, but gradually the complaints intensified, especially in an environment with many stimulants or in stressful situations.

During the day, she tries to do some activities at home, such as her household chores or getting the groceries. This is only possible if she is able to take breaks every hour or so. She divides her daily tasks into small parts, and she will do the tasks very slowly if possible.

She sleeps a lot, but it is intermittent. She has problems with falling asleep and wakes up a couple of times during the night. In the morning, she still feels tired. During the day she is not able to focus on tasks for a long period of time because of the tiredness. After an hour of focused work, the headaches start getting worse. It feels like pressure in the head with complaints of dizziness. She has no symptoms of fainting. After two hours, she is not able to focus on her tasks anymore. To reload, she has to do some relaxing exercises or she has to stay in a quiet room.

She is not able to work because of the complaints; she is also not capable of going to social events or any other busy event anymore. She and her family have had to adjust to the new situation, for example by always turning the sound down on the television.

She sometimes goes to places with her friends, but then she is not able of doing anything the next day. In the past, she was used doing a lot of things on one day, but now she is only able to do a couple of things during the day with many breaks. The few social things that she still can manage include reading magazines, watching movies with subtitles and walking with friends without talking the whole day.

Medication

The client uses Oxazepam, if necessary. Last week she took it twice. She stopped taking Melatonin because it did not work.

Observational and physical examination

The client came to the consult on her bike, and she carried a bag into the consulting room. The client said that she would not take the stairs to the first floor because she needed to save her energy. However, during the consultation she did not appear tired and she had no problems with breathing.

The client did not appear sick. She had a tidy appearance and looked like people of her own age. The client had a normal posture and condition for her age. There seemed to be no abnormalities in her movements.

Mental status

During the consultation, the client showed no problems with focusing or memory tasks, and there was normal eye contact. The client appeared a little bit irritated and tense, with a slight passive aggressive attitude. She was upset that she had to explain her complaints again, and mentioned that she expected that all her complaints were known already.

Complementary examinations and treatment

- An ear, nose and throat specialist performed an audio-logical examination, which did show a high tone loss, but not significant and suitable for her age. MRI of the cerebrum and balance tests showed no abnormalities.
- A neurologist reported a cerebral contusion. According to the client, the neurologist suggested that recovery may take one to two years, with the chance that some complaints will never get better. The neurologist had referred the client to a rehabilitation physician.
- The rehabilitation physician reported that the client had a sensory integration problem. He referred her to a rehabilitation trajectory, which is still ongoing at this moment. The trajectory consists of two hour consults three times a week, with an ergonomist, alternated with a psychologist, a physiotherapist, a movement therapist and the rehabilitation specialist. Moreover, the client has psychosomatic physiotherapist sessions with the psychologist and she does exercises to relax

more. She travels to the rehabilitation center independently, taking a 20 minute bike ride. When she arrives, she does need 15 minutes to relax in a quiet room, because she cannot focus on the therapy otherwise. Between the therapy sessions she also takes 15 minutes to relax in the same manner.

- The overall goal of the trajectory is to learn how to handle stimulants better. She is already able to listen better to her body and her complaints, and to build up her activities slowly. She is also able to do more activities than before.
- She is in contact with an alternative biological center to look at her diet, which may also help to reduce the complaints.

Case 2 PPS of the neck and upper extremities

Client

The client is a 29-year-old woman, who has been sick listed for her job as a pharmacist assistant for one year. She has a working contract for 32 hours a week.

Personal and social status of the client

The client lives together with her boyfriend, who helps her a lot in the household chores and with lifting heavy items.

Claim of subjective limitations

The client has pain in her neck, and shoulder, arm and chest on the left side. Due to these health complaints, she feels less physical strength in her left arm. As a result, she is not able to lift things – for example a bag of potatoes above shoulder level – , and she is not able to open a bottle, or to wring out a cloth. In addition, she also has problems with using the keyboard on the computer, and with driving a vehicle. She says that she is not able to work due to this health complaints. The client is right handed, and with her right side she is still able to do things.

Client history

Two years ago the client fell on her left arm. She has had pain in her neck, and arm, shoulder and chest on the left side ever since. The left shoulder is painful the whole time and worsens when she moves her head or keeps her head in one position for a long time, for example when she works on the computer. Her left arm, from the shoulder to the elbow, feels stiff and sleepy and is especially painful with movements. The left shoulder feels like it is fixated, and it is very difficult and painful to raise her left arm above her shoulder. However, this is less difficult and painful with tape on her back from the physiotherapist. When she uses her left arm and hand for a longer period of time, it looks swollen, warm and changes color. The client's sternum is also painful, swollen and warm, especially when moving the arms above her head and with breathing.

Because of the health complaints, she has difficulties with doing her household chores. She does not have enough strength to vacuum, clean the house, or do the dishes. She does try, but when she does this for too long or too much, her left arm becomes very painful. As a result, she cannot do any household chores anymore. The pain also creates problems with sleeping. She is not able to lie on her left side, and she awakens every two to three hours. She is awake at 7 a.m., but then still feels tired. Around 10 a.m. she gets out of bed. Throughout the rest of the day, she usually makes her bed, watches television, goes outside for a walk, does some exercises, and goes to an appointment if she has one. The client travels alone on her bike, by walking or by using the metro.

Medication

The client used Diclofenac, Ibuprofen and Paracetamol before; now she uses Zaldiar when she needs it for the pain. In addition, she uses Vitamin C.

Observational and physical examination

During the consultation, the client did not appear sick. She had a tidy appearance and looked like people of her own age. The client had a normal posture and condition for her age. There seemed to be no abnormalities in her movements. Changing from a sitting to a standing position and maintaining a sitting position did not give her any problems. The client left her left arm at rest, as much as possible during the consultation; however, she used her left hand if she needed something from her bag. During physical examination of the neck, the client said that she felt a lot of pain with only a light touch, pressure on the neck or by movement of the neck. In addition, she reported pain and refused to put her left arm above her shoulder due to the pain. Subject to the pain, further physical examination of the upper extremities, the chest and lungs showed no abnormalities.

Mental status

During the consultation, the client showed no problems with focusing or memory tasks and showed no psychiatrically symptoms.

Complementary examinations and treatment

- The client went to the emergency room (ER) because of a swollen arm and serious pain, directly after she was fallen on her left arm. At the ER, a MRI of the neck and the left shoulder was made, which showed no pathological causes for the complaints. An X-ray of the chest and left arm showed no fractures. A physician at the ER bandaged her left arm, and gave her painkillers. The swelling of the left arm reduced after a week, but she still had a lot of pain and the color of her left arm was still changed.
- The client went to an orthopedic specialist. He advised the client to give her left arm more rest first, after which he advised the client to start with physiotherapy and Vitamin C intake. Furthermore, the orthopedic specialist sent the client to the pain specialist.
- The pain specialist prescribed other painkillers, and referred the client to the psychological care unit for individual counseling once a week. On this somatic and psychological care division the client learned to cope better with her complaints. He also advised to continue the physiotherapy to build up her physical condition, to exercise her arm muscles, to use tape if necessary to limit the pain and to stay active (twice a week). This therapy also focused on how to function in her household.

- Due to the ongoing complaints of chest pain, the client was also sent to the cardiologist, who reported no clinical pathologies of the heart, based on echo, ECG, cycle proof and blood examination.
- The client also consulted a haptonomist to learn how to bring the body and mind together.

Case 3 PPS of the abdomen and/or genitals

Client

The client is a 29-year-old woman, who has been sick listed for her job as call center assistant for two years. She has a working contract for 32-40 hours a week.

Personal and social status of the client

The client lives together with her boyfriend and her one-year-old son. Her boyfriend cooks and buys the groceries. Her mother helps her with the household chores and the care of her son.

Claim of subjective limitations

The client has a normal day and night rhythm; however, she needs a lot of help in her daily activities due to her health complaints. She does her utmost to do household chores by herself, and she tries to walk by herself. However, during the day she lies on the couch a lot because it reduces her complaints.

Client history

The client has pain in her abdomen, especially in the surroundings of her stomach, the entire day. Toileting is difficult because of obstipation complaints; however, two to three times a day she has stomach cramps and then she has diarrhea. At times, she feels like she is not able to do anything. Last night, she had cramps twice. Moreover, she has regurgitations, without vomiting. She cannot think of provoking factors: the complaints are not related to food or beverage. She has had a period when she felt fewer complaints, but now it is getting worse again. In the beginning, she had blood in her stool, but no slime. The pain in her abdomen worsens with movements and bumps.

Medication

The client used Naproxen and Macrogol in the past, but it did not help.

Observational and physical examination

The client came to the consult on her motor scooter. During the consultation, the client did not appear sick. She had a tidy appearance and looked like people of her own age. The client had a normal posture and condition for her age. There seemed to be no abnormalities in her movements. Maintaining a sitting position did not give her any problems, however her face revealed that she has pain.

Physical examination of the abdomen showed no serious abnormalities. Auscultation gave loudly peristalsis, but no sink murmur or souffles. Percussion and palpation were normal. The liver and spleen were not palpable, and there was no sign of rebound tenderness. However, the client felt pressure pain over the whole abdomen, especially

in the upper left quadrant. The abdomen was flexible.

Mental status
During the consultation, the client showed no problems with focusing or memory tasks and showed no psychiatrically symptoms.

Complementary examinations and treatment
- The client went to a gastrointestinal and liver specialist, who conducted a gastroscopy and endoscopy because of blood in the feces and the regurgitation complaints. Both scope examinations showed no abnormalities. Pathology samples, further blood and feces examinations also showed no pathological causes for the complaints.
- The client also went to a surgeon, who did physical examinations and an ultrasound of the abdomen. Both examinations showed no abnormalities.

<u>Case 4 PPS of the back and lower extremities</u>
Client
The client is a 39-year-old man, who has been sick-listed for his job as shift planner for a bus company for one year. He has a working contract for 40 hours a week.

Personal and social status of the client
The client is single and father of four children. He lives in a house with two floors and a custom stair. He has a scoot mobile, which he uses for light groceries. He cannot drive a car anymore. Two times a week he has a maid, who helps him with the household chores. The client is in financial debt.

Claim of subjective limitations
The client is not able to maintain a sitting position for more than 30 minutes and a standing position for more than 5 minutes, due to his health complaints. However, if he is able to stretch out his legs, the client is able to sit for a couple of hours during the day and to stand if needed. When he moves his legs, the pain disappears for a short period of time, but the pain comes back. Walking is therefore not possible for more than 30 minutes. The client needs a walker to walk outside the house. Walking the stairs is difficult and painful. He is not able to carry heavy things or bend forward.

Client history
The client has had stabbing pain in his hips for a couple of years now. The pain radiates to the lower back and the legs, up to the calves and shins. The left side is worse than the right side. Sometimes, a dull feeling appears, without tingling. The complaints gradually started, and are getting worse now. Due to the pain, the client sometimes feels that he is losing his balance, and that he is going to faint. However, this has not happened before. He has no complaints of deficits.

Medication
The client uses Vitamin D and Amitriptyline.

Observational and physical examination
During the consultation, the client did not appear sick. He had a tidy appearance and looked like people of his own age. The client had a normal posture and condition for his age. However, he walked very slowly to the consultation room and he used a walker. He sat on the point of his chair to reduce the complaints of his back. However, he showed no signs of abnormal urges to move.
Physical examination of the back and hips showed, except for hyperesthesia of the lower extremities, no further abnormalities. However, the client felt pain in all movements of the hips and the back.

Mental status

During the consultation, the client showed no problems with focusing or memory tasks, and showed no psychiatrically symptoms. The patient pointed out that he finds it very difficult that he is so disabled at his age; he has problems with acceptance. During the consultation, he was emotional a couple of times.

Complementary examinations and treatment

For the complaints, the client had visit a neurologist and an orthopedic specialist. Both did examinations:

- MRI of the back and the hips showed no abnormalities.
- X-ray, vascular research and EMG of the legs showed no abnormalities.
- Examinations of the blood only showed a small decrease of Vitamin D.

The general practitioner of the client referred him to an orthopedic manual therapist. This therapist said that the vertebras were shifted and gave him an alternative treatment. However, the effect of this treatment was minimal. Thereafter, the general practitioner referred him to the department of somatology and psychology; intake has not yet taken place.

Appendix B Consensus course for all the four cases

Items per category:	Number of possible limitations	Round 1; Most scored level of limitations (% consensus on that level)			
		Case 1[a]	Case 2[b]	Case 3[c]	Case 4[d]
Personal functioning;					
Focusing attention*	3	1 (53)	0 (100)	0 (87)	0 (100)
Dividing attention*	3	0/1 (47)	0 (100)	0 (100)	0 (100)
Insight into own abilities*	2	0 (67)	0 (87)	0 (87)	0 (73)
Insight into own disabilities*	2	1 (53)	0 (53)	1 (60)	0/1 (47)
Solving problems*	3	0/1 (47)	0 (87)	0 (80)	0 (60)
Undertaking multiple tasks*	2	0/1 (47)	0 (87)	0 (73)	0 (67)
Carrying out daily routine	2	0 (93)	0 (87)	0 (80)	0 (80)
Handling stress and other psychological demands	2	1 (93)	0 (67)	0 (53)	0 (60)
Distraction from others during work	2	1 (87)	0 (100)	0 (100)	0 (100)
Need for predictable working situation	2	1 (73)	0 (93)	0 (80)	0 (80)
Frequent disruptions on the working place	2	1 (100)	0 (87)	0 (73)	0 (80)
Frequent deadlines and/or frequent production peaks*	2	1 (100)	0 (67)	0 (53)	1 (60)
High working tempo on the working place	2	1 (87)	0 (53)	0 (53)	1 (67)
Increased personal risk on the working place	2	1 (53)	0 (67)	0 (87)	0 (53)
Social functioning;					
Watching	2	0 (73)	0 (100)	0 (100)	0 (100)
Listening	2	0 (87)	0 (100)	0 (100)	0 (100)
Having a conversation	3	0 (60)	0 (100)	0 (100)	0 (100)
Handling emotional problems of others*	3	1 (53)	0 (87)	0 (73)	0 (73)
Expression of own emotions/feelings*	3	0 (60)	0 (87)	0 (93)	0 (80)
Dealing with conflicts*	3	1 (47)	0 (80)	0 (67)	0 (60)
Cooperating with someone else*	3	1 (53)	0 (87)	0 (87)	0 (87)
Contact with clients	2	1 (67)	0 (93)	0 (100)	0 (87)
Contact with patients*	2	0 (53)	0 (80)	0 (80)	0 (73)
Possibility to lean on colleagues	2	0 (53)	0 (80)	0 (73)	0 (67)
Contact with colleagues	2	0 (73)	0 (93)	0 (100)	0 (100)
Management tasks	2	1 (73)	0 (87)	0 (87)	0 (87)
Dynamic movements;					
Hand-arm use; Ball grasp	2	0 (100)	0 (80)	0 (100)	0 (100)
Hand-arm use; Pen grasp	2	0 (100)	0 (93)	0 (100)	0 (100)
Hand-arm use; Tweezer grasp	2	0 (100)	0 (100)	0 (100)	0 (100)
Hand-arm use; Key grasp	2	0 (100)	0 (93)	0 (100)	0 (100)
Hand-arm use; Cylinder grasp	2	0 (100)	0 (80)	0 (100)	0 (100)
Hand-arm use; Squeeze and grap power	2	0 (100)	0 (60)	0 (100)	0 (100)
Hand-arm use; Fine hand use	2	0 (100)	0 (73)	0 (100)	0 (100)
Hand-arm use; Repetitive tasks	2	0 (93)	1 (53)	0 (100)	0 (100)
Using a keyboard and/or mouse	2	0 (100)	0 (73)	0 (100)	0 (100)
Duration time of using a keyboard and/or mouse	4	0/1/2 (33)	1 (47)	0 (73)	0 (67)
Turning or twisting hands or arms	2	0 (100)	1 (100)	0 (100)	0 (100)
Reaching out*	3	0 (100)	1 (67)	0 (100)	0 (100)
Reaching out frequently*	4	0 (80)	1 (40)	0 (93)	0 (80)
Bending	3	0 (100)	0 (80)	0 (93)	2 (47)
Bending frequently*	4	0 (60)	0 (47)	0 (73)	3 (47)
Turning/twisting round*	2	0 (100)	0 (73)	0 (100)	1 (67)
Pulling or pushing	3	0 (93)	1 (53)	0 (80)	1/2 (47)
Lifting	4	0 (87)	3 (53)	0 (60)	2 (47)

	Round 2; Most scored level of limitations (% consensus on that level)				Round 3; Most scored level of limitations (% consensus on that level)			
	Case 1	Case 2	Case 3	Case 4	Case 1	Case 2	Case 3	Case 4
	1 (73)	-	-	-	1 (80)	-	-	-
	1 (60)	-	-	-	1 (60)	-	-	-
	0 (80)	-	-	0 (87)	-	-	-	-
	0 (53)	0/1 (47)	1 (73)	1 (53)	0 (93)	0 (80)	0 (80)	0 (73)
	1 (60)	-	-	0 (73)	1 (80)	-	-	0 (100)
	0 (53)	-	0 (93)	0 (80)	0 (53)	-	-	-
	-	-	-	-	-	-	-	-
	-	0 (80)	0 (53)	0 (80)	-	-	0 (93)	-
	-	-	-	-	-	-	-	-
	1 (87)	-	-	-	-	-	-	-
	-	-	0 (100)	-	-	-	-	-
	-	0 (60)	0 (67)	1 (73)	-	0 (93)	0 (80)	1 (73)
	-	1 (60)	0 (60)	1 (80)	-	0 (60)	0 (87)	-
	1 (67)	0 (73)	-	1 (80)	1 (53)	0 (93)	-	-
	0 (73)	-	-	-	0 (93)	-	-	-
	-	-	-	-	-	-	-	-
	1 (53)	-	-	-	0 (87)	-	-	-
	1 (67)	-	0 (80)	0 (80)	1 (67)	-	-	-
	0 (93)	-	-	-	-	-	-	-
	1 (73)	-	0 (80)	0 (73)	1 (100)	-	-	0 (80)
	1 (67)	-	-	-	1 (80)	-	-	-
	1 (80)	-	-	-	-	-	-	-
	0 (67)	-	-	0 (80)	0 (80)	-	-	-
	1 (53)	-	0 (87)	0 (67)	1 (53)	-	-	0 (87)
	0 (80)	-	-	-	-	-	-	-
	1 (93)	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	1 (53)	-	-	-	0 (87)	-	-
	-	0 (87)	-	-	-	-	-	-
	-	1 (67)	-	-	-	1 (73)	-	-
	-	0 (60)	-	-	-	0 (93)	-	-
	1 (40)	1 (60)	0 (87)	0 (60)	1 (80)	1 (60)	-	0 (87)
	-	-	-	-	-	-	-	-
	-	1 (87)	-	-	-	-	-	-
	-	2 (60)	-	-	-	2 (73)	-	-
	-	-	-	2 (60)	-	-	-	0 (53)
	0 (73)	0 (80)	0 (87)	3 (67)	0 (73)	-	-	3 (53)
	-	0 (87)	-	1 (80)	-	-	-	-
	-	1 (73)	-	2 (67)	-	1 (100)	-	2 (80)
	-	3 (47)	0 (60)	2 (100)	-	3 (47)	0 (60)	-

Items per category:	Number of possible limitations	Round 1; Most scored level of limitations (% consensus on that level)			
		Case 1[a]	Case 2[b]	Case 3[c]	Case 4[d]
Carrying	4	0 (87)	3 (53)	0 (60)	3 (47)
Handle light objects frequently	4	0 (73)	1/2 (33)	0 (73)	0 (33)
Handle heavy objects frequently	2	0 (80)	1 (93)	0 (60)	1 (93)
Moving head	3	0 (93)	0 (60)	0 (100)	0 (100)
Walking distances	4	0 (93)	0 (100)	0 (60)	1 (53)
Walking time per day on work	4	0 (53)	0 (60)	0 (40)	2 (47)
Walking on different surfaces	2	0 (100)	0 (93)	0 (87)	1 (80)
Walking stairs	4	0 (100)	0 (100)	0 (80)	2/3 (40)
Climbing*	4	0 (73)	1 (53)	0 (67)	3 (47)
Kneeling or squatting	2	0 (100)	0 (93)	0 (100)	1 (80)
Moving around using transportation	3	0 (93)	0 (87)	0 (87)	1 (60)
Static postures;					
Maintaining a sitting position	4	0 (100)	0 (93)	0 (67)	2 (60)
Sitting time per day on work*	4	0 (60)	0 (60)	0 (60)	3 (40)
Maintaining a standing position	4	0 (93)	0 (93)	0 (60)	2 (53)
Standing time per day on work	4	0 (60)	0 (53)	0/1/2 (33)	3 (60)
Maintaining a kneeling or squatting position	2	0 (100)	0 (87)	0 (87)	1 (100)
Maintaining a bending and/or twisting position	2	0 (100)	0 (53)	0 (87)	1 (87)
Working above shoulders	2	0 (100)	1 (100)	0 (100)	0 (67)
Maintaining head in one position	4	0 (53)	1 (40)	0 (93)	0 (93)
Need for possibility to change body position	2	0 (100)	0 (67)	0 (93)	1 (80)
Adjusting to environment;					
Temperature; Heat	2	0 (93)	0 (100)	0 (100)	0 (100)
Temperature; Cold	2	0 (87)	0 (80)	0 (80)	0 (60)
Draught	2	0 (80)	0 (93)	0 (93)	0 (73)
Wearing protection gear	2	0 (80)	1 (53)	0 (87)	1 (67)
Sound intensity	2	1 (93)	0 (100)	0 (100)	0 (100)
Vibration	2	1 (67)	1 (80)	1 (53)	1 (87)
Light intensity	2	0 (60)	0 (100)	0 (100)	0 (100)
Possibility to use a toilet quickly	2	0 (100)	0 (100)	1 (80)	0 (80)
Working hours and working time;					
Working during the day (between 06:00-12:00)*	2	0 (87)	0 (80)	0 (87)	0 (93)
Working during the day (between 12:00-18:00)*	2	0 (87)	0 (93)	0 (87)	0 (87)
Working during the evening (between 18:00-24:00)*	2	0/1 (47)	0 (73)	0 (60)	0 (53)
Working during the night (between 00:00-06:00)*	2	1 (60)	0 (67)	0 (53)	0/1 (47)
Possible working hours per day*	5	4 (33)	3 (33)	3 (33)	4 (33)
Possible working hours per week*	5	4 (40)	3 (40)	3 (40)	2/4 (27)

[a]=Case 1: PPS of the head; [b]=Case 2: PPS of the neck and upper extremities; [c]=Case 3: PPS of the abdomen and/or genitals; [d]=Case 4: PPS of the back and lower extremities.

*means one or two of the experts did not fill in this item for that case in one of the rounds.

	Round 2; Most scored level of limitations (% consensus on that level)				Round 3; Most scored level of limitations (% consensus on that level)			
	Case 1	Case 2	Case 3	Case 4	Case 1	Case 2	Case 3	Case 4
	-	3 (53)	0 (73)	3 (60)	-	1/2 (40)	0 (80)	2 (67)
	0 (87)	1 (53)	0 (93)	2 (47)	-	1 (73)	-	1 (53)
	-	-	0 (60)	-	-	-	0 (67)	-
	-	0 (53)	-	-	-	0 (60)	-	-
	-	-	0 (67)	1 (60)	-	-	0 (87)	1 (53)
	0 (60)	0 (87)	0 (53)	2 (100)	0 (80)	-	1 (53)	-
	-	-	-	-	-	-	-	-
	-	-	-	2 (73)	-	-	-	2 (93)
	0 (73)	1 (87)	0 (87)	3 (60)	0 (93)	-	-	2 (73)
	-	-	-	-	-	-	-	-
	-	-	-	1 (100)	-	-	-	-
	-	-	0 (73)	2 (80)	-	-	0 (93)	-
	0 (87)	0 (67)	0 (67)	3 (47)	-	0 (87)	0 (80)	2 (47)
	-	-	0 (87)	2 (87)	-	-	-	-
	0 (73)	0 (53)	1 (47)	3 (67)	0 (73)	0 (73)	1 (87)	3 (53)
	-	-	-	-	-	-	-	-
	-	1 (53)	-	-	-	1 (53)	-	-
	-	-	-	0 (87)	-	-	-	-
	0 (73)	1 (73)	-	-	0 (93)	1 (93)	-	-
	-	0 (53)	-	-	-	0 (93)	-	-
	-	-	-	-	-	-	-	-
	-	-	-	0 (67)	-	-	-	0 (67)
	-	-	-	0 (93)	-	-	-	-
	-	1 (93)	-	1 (93)	-	-	-	-
	-	-	-	-	-	-	-	-
	1 (80)	-	1 (80)	-	-	-	-	-
	0 (73)	-	-	-	0 (100)	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	0 (53)	0 (87)	0 (93)	0 (80)	0 (53)	-	-	-
	1 (80)	0 (73)	0 (73)	1 (60)	-	1 (53)	1 (53)	1 (60)
	4 (33)	3 (53)	3 (67)	3 (40)	3 (33)	3 (33)	3 (47)	3 (47)
	4 (40)	3 (60)	3 (67)	2 (40)	3 (33)	3 (47)	3 (47)	2/3 (33)

Chapter 3

Sick leave assessments of workers with subjective health complaints: a cross-sectional study on differences among physicians working in occupational health care

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Abstract

Aim
To obtain more insight on differences in sick leave assessments of workers with subjective health complaints, we studied sick leave assessments among Dutch occupational and insurance physicians, and explored possible determinants for these differences.

Methods
A cross-sectional study was conducted among 50 occupational and 43 insurance physicians in the Netherlands. They all assessed sick leave (complete, partial or no) of nine video case vignettes of workers with subjective health complaints and gave their opinion on the complaints, sick leave and health status. Data were analysed via a multinomial regression approach, using generalised estimating equations in SPSS.

Results
Compared to occupational physicians, complete sick leave was less likely to be assessed by insurance physicians (odds ratio 0.74, 95% confidence interval 0.56–0.97). For occupational physicians, psychological diagnoses, private issues, and reduced work ability had more influence on the outcome of the sick leave assessment than for insurance physicians.

Conclusion
There are differences in sick leave assessments for workers with subjective health complaints between physicians working in the same occupational health system; insurance physicians are stricter in assessing complete sick leave than occupational physicians. These differences may be explained by differences in roles, tasks and perspectives of the physician in occupational health care.

Introduction

One of the generic used terms for health complaints that lack objective medical findings and for which no sufficient underlying pathological cause can be found, is the term medically unexplained physical symptoms[1]. However, not all subjective health complaints are purely physical, and there is some evidence that underlying mechanisms may explain the health complaints[2]. Therefore, we will use the more broader term subjective health complaints (SHC) in this paper.

SHC is very common in curative health care, as well as in occupational health care: these complaints account for at least 15-20% of all long-term sick leaves[3-5]. For sick leave assessments physicians have to estimate the severity of the work disability and have to give advice about recovery opportunities by translating medical findings to functional work abilities[6,7]. A sick leave assessment can be performed with the aim to certify sick leave and to provide advice about sickness absence guidance and vocational rehabilitation to promote return to work ('fit note'), but it can also be performed for the certification of only sickness benefits ('sick note'). In most countries these objectives of sick leave assessments are combined[8,9]: next to their primary curative health care tasks, usually the general practitioner (GP) performs these assessments[10-12]. In contrast, in a few countries, for example the Netherlands, these roles are deliberately separated, where GPs only perform primary curative health care tasks[13]. A sick leave assessment for a 'fit note' is performed by an occupational physician, who is usually employed by a large occupational health service or who is self-employed[13]. The occupational physician assesses sick leave on request of an employer, who has to support and pay the first two years of sick leave of the worker. After these two years of sick leave, or when a 'fit note' for the long term can't be given, a sick leave assessment for certification of a sickness benefit for workers is performed by an insurance physician, usually employed by the social security institute. The rationale behind the separation between these two types of sickness certification, as well as with the curative health care, is to avoid conflicts of interests between the social security perspective, the vocational rehabilitation perspective, and the curative health care perspective[13,14].

Physicians report feelings of conflict between the different kinds of sick leave assessments and their different roles and tasks in the health care system, especially for workers suffering from SHC[15-18]. These different roles and tasks may lead to different advices and assessments of work capacity and lack of progress in the rehabilitation process[19,20]. These differences may be even more noticeable among physicians with different medical expertise or working in different settings with different frames of reference (such as national policies), or with different tasks and roles. A previous study reported that physicians from different European countries indeed differ in the outcome on sick leave assessments of workers with SHC[21]. This study compared the outcome of sick leave assessments of GPs from Sweden, Norway,

Denmark and France, with insurance physicians and occupational physicians in the Netherlands[21]. However, this study did not compare the sick leave assessments of occupational physicians and insurance physicians separately. These medical specialists in the Netherlands have the same national context, availability of guidelines, culture and education in occupational health care, but their perspectives and roles are different. The impact of these different perspectives and roles on the outcome of sick leave assessments has not been studied before. The controlled conditions of the aforementioned study provided an unique opportunity to analyse and compare the possible impact of different perspectives and roles of physicians working in the same occupational health system on the outcome of sick leave assessments.

The aim of this study was to compare sick leave assessments of workers with SHC among occupational physicians and insurance physicians, and we also explored possible determinants for any differences in these assessments. Workers with SHC were chosen as the target group because differences in sick leave assessments between physicians may be more pronounced in workers with SHC, rather than in workers with specific and well defined diagnoses.

Methods

Participants
This study used a cross-sectional approach, to identify differences in sick leave assessments between physicians with different expertise in the occupational health care system. Occupational physicians from one of the largest occupational health care services of the Netherlands, and insurance physicians from six different offices of the Dutch Social Security Institute (UWV), were invited through email to participate in the study. Insurance physicians and occupational physicians in the Netherlands both follow a 4-year in-company training before they can officially be registered as occupational physician or insurance physician. These trainings are rather similar and they both learn how to assess sick leave; however, their perspectives differ. The occupational physicians' training is directed at the sickness absence, guidance and vocational rehabilitation to promote return to work during the first two years of sick leave. The insurance physicians' training is directed at the certification of the work disability claim and the eligibility of a sickness benefit following two years of sick leave.

Settings
Occupational physicians and insurance physicians assessed sick leave of nine video case vignettes with different types of SHC during one continuing medical education training day. The Dutch medical association approved that the study was a free of charge continuing medical education course of 8 hours, making participation more

attractive for physicians. The continuing medical education course day was divided in two parts. During the first part, the researchers gave an introduction, in which they explained the procedures and the objective of the study. After this introduction, nine video case vignettes, which had also been used in an earlier study[22], were shown. After each video case vignette, the physicians were asked to individually assess the need for complete, partial or no sick leave, and they were asked to fill in a questionnaire. For the sick leave assessments, both groups of physicians received the exact same instructions: "Please assess the need for sick leave, without applying any particular policy or company rule related to insurance or disability laws." The second part of the day was dedicated to education and group discussions about SHC and work disability. The study was conducted in March 2015.

Description of materials

The nine video case vignettes were based on real Norwegian general practice consultations of workers with SHC, in which extensive medical investigation had not provided any clear medical cause for the complaints. In one GP practice in Norway in total, 19 workers with SHC gave their consent for filming their consultations. Out of these 19 videos, nine consultations were selected providing the most broad variety in age, gender, jobs, complaints and symptoms. The workers all gave their consent to re-record their consultations with professional actors as workers, and to use the videos for research. Personal information about the real worker was excluded or rewritten. Each video case vignette contained an introduction with a medical history, clinical results of investigations that had been done and a medical consultation of the worker in dialogue with a GP about medical complaints and abilities to work. Duration of the videos was between 5 and 15 minutes per case vignette. The case vignettes were in Norwegian and subtitled in Dutch, translated by a professional translator. A summary of the case vignettes is shown in Table 1. For a more detailed description of the case vignettes, we refer to the study of Maeland[22].

During the continuing medical education course day, a questionnaire was handed out. On the first page of the questionnaire, the physicians were asked to fill in their age, gender, medical specialty, and years of work experience in their specialty. After watching each case vignette, the physicians were asked to individually answer the questionnaire for the particular case vignette. The questionnaire was similar to the one used in previous studies based on this material[22], and contained questions about their opinion on sick leave, diagnoses, functional limitations, cause of complaints and sick leave, health status, work capacity, and treatment options (Appendix A).

Outcome and determinants

The answers of the physicians on the demographic questions age and years of work experience were categorised in three groups of years. Answers on the sick leave

assessment were given on a four-point scale: no sick leave, partial sick leave for worker's own job (can partially perform his/her own job), partial sick leave for another job (can perform only adjusted work tasks), and complete sick leave. For the analyses the two options on partial sick leave were combined. The first diagnosis given by the physicians was categorised according to chapters of the International Classification of Primary Care-2. Answers on possible functional limitations were dichotomized in yes/no per limitation. The statements about the cause of complaints and sick leave, which were given on a five-point scale ranging from 1 'totally agree' to 5 'totally disagree', were dichotomised for the analyses (agree/disagree). The middle option (neither agree nor disagree) was categorised in the disagree group. Answers for the overall health status and work ability, which were given on a five-point scale ranging from 1 'very good and not reduced' to 5 'very poor and very reduced', were also dichotomised for the analyses. The middle options (neither good nor poor and not much reduced), were categorised in the poor overall health status and reduced work ability groups, respectively.

Statistical analyses
Statistical analyses were performed using IBM SPSS Statistics 22.0. Differences in the categorical demographic variables of the occupational physicians and the insurance physicians were tested using Chi-square tests for gender, age and years of work experience in the insurance physician or occupational physician field. Differences in outcome of the sick leave assessments between insurance physicians and occupational physicians for all workers together were tested via a multinomial regression approach, using generalised estimating equations. In the generalised estimating equations analyses sick leave (yes/partial/no) was set as dependent variable, occupational physician/insurance physician as factor, physician as subject, and cases as within subject. No sick leave was set as reference outcome.
Confounding and effect modification were assessed for the background variables of the physician's age, gender, and years of work experience. The confounding variable was added to the crude model if there was a difference with the regression coefficient of the crude model of more than 10%. The effect was shown stratified if the interaction term was significant. Differences between insurance physicians and occupational physicians in the outcome of the sick leave assessments of each case vignette separately were tested using Chi-square tests. Possible associations between the outcome of the sick leave assessments and other variables on the questionnaire were also tested with multinomial regression analyses, using generalised estimating equations. In these generalised estimating equations analyses, sick leave (yes/partial/no) was set as dependent variable, the dichotomised answers of the variables on the questionnaire (described under the above subheading 'outcome and determinants') were individually set as factor, physician was set as subject, and cases as within subject. No sick leave was set as reference outcome. For each of these possible associations,

effect modification on the role of the physician was tested. The occupational physician/insurance physician variable was incorporated in generalised estimating equations analyses as interaction term for each tested dichotomised variable on the questionnaire separately. If the interaction term was significant, the association were stratified for the insurance physician and occupational physician. The level of statistical significance was set at $p<0.05$.

Table 1 Description of the nine video case vignettes

Case Vignette	Gender, age	Demography, work situation and sick leave history	Complaints
1	♀, 25	Single, no children Several short term jobs Several sick leave notes, and currently in a rehabilitation program	Generalised, wide spread pain Neck and back pain Anxiety and depression Respiratory complaints
2	♂, 40	Married, two children Works offshore on an oil platform; two weeks on, four weeks off work Several shorter periods and two long periods of sick leave	Neck and back pain Sleep disturbances due to pain Irritable bowel syndrome
3	♀, 53	Married, five foster care children and two biological children Housewife & foster parent for 20 years No formal education or work experiences outside the home	Generalised wide spread pain Anxiety Fatigue
4	♂, 37	Married, unknown number of children Use to work offshore, but started as self-employed in construction	Severe fatigue Economic burden due to loss of work capacity
5	♂, 42	Married, three children Works as formwork carpenter No previous history of sick leave	Feels physically and mentally exhausted, afraid to collapse He has a 12-year old daughter with behavioural problems He has no energy left to deal with his daughter after work
6	♀, 37	No information on marital status or children Works in a kindergarten One and a half years ago a four month sick leave period for the same complaints	Periodic numbness, starting like a toothache, followed by a headache and a sensation of anaesthesia on the right side of the body
7	♀, 35	No information on marital status or children Works as a teacher in primary school No previous history on sick leave or health complaints	Feeling tired, powerless and weak Does not get things done Has sleep disturbances
8	♂, 36	Married, two small children Works as a teacher and sports trainer; coaches a first division handball team No previous history on sick leave, or psychiatric or somatic disorder	Unspecific pain in jaw neck, head, muscles and stomach
9	♂, 38	Married, no children Works as technician in an event bureau, producing big shows, theatres, and films Commutes 270 km weekly for work	General tiredness from work and commuting, low energy According to his wife, he is irritable, passive, and even aggressive towards her

Results

Fifty occupational physicians and 43 insurance physicians participated in the study. The occupational physicians seemed to have more work experience: 90% of the occupational physicians had worked more than 10 years within their field, compared to 72% in the group of insurance physicians. Age differed significantly between the two groups: the occupational physicians were older than the insurance physicians (Table 2).

Table 2 Demographics of the participating physicians

	Occupational physicians (*n*=50)		Insurance physicians (*n*=43)	
	n	(%)	*n*	(%)
Gender				
Male	24	(48)	28	(65)
Female	26	(52)	15	(35)
Age (years)				
<40	2	(4)	10	(23)
40-60	38	(76)	22	(51)
>60	10	(20)	11	(26)
Work experience (years)				
<10	5	(10)	12	(28)
10-20	26	(52)	17	(39)
>20	19	(38)	14	(33)

Sick leave assessments

For all nine case vignettes together, insurance physicians were more likely to assess no sick leave, while occupational physicians were more likely to assess partial or complete sick leave for workers with SHC. This difference was statistically significant (crude odds ratio (OR) 0.70, 95% confidence interval (CI) 0.52-0.94) (data not shown elsewhere). Figure 1 shows that this difference between the insurance physicians and occupational physicians was mostly based on the dissimilarity in no sick leave and complete sick leave.

When we adjusted for the years of work experience in their insurance physician or occupational physician field, this difference in the sick leave assessment outcomes was slightly reduced, but remained significant (OR 0.74, 95% CI 0.56-0.97). The variables age and gender of the insurance physicians or occupational physicians did not meet the criteria for confounding. All of the other background variables of the insurance physicians and occupational physicians did not meet the criteria for effect modification. On case level, insurance physicians were also more likely to assess no sick leave than occupational physicians. This difference was significant for case vignettes three (*p*=0.011), four (*p*=0.047) and seven (*p*=0.016). Only for case vignette two, the occupational physicians were more likely to assess no sick leave than the insurance physicians (*p*=0.034) (data not shown elsewhere).

Figure 1 Percentages of sick leave assessment outcomes per group of physicians for all nine case vignettes together
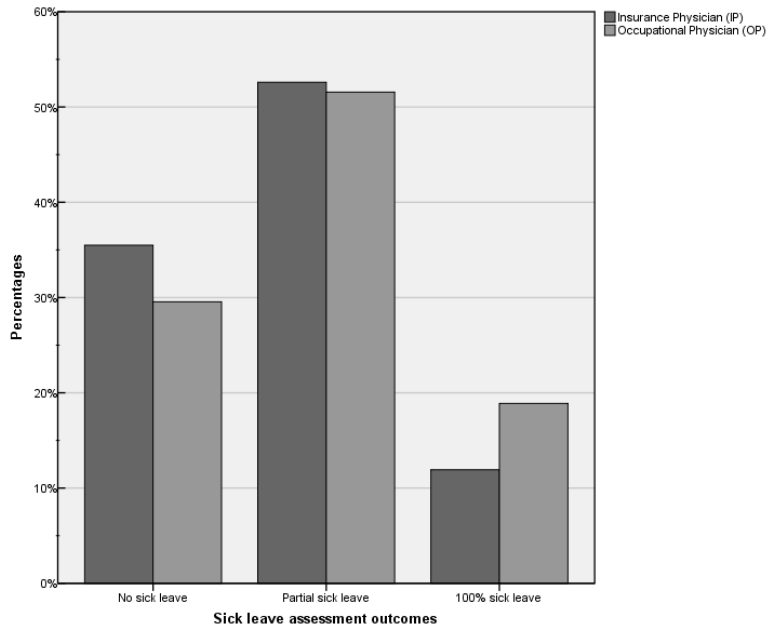
Underlying determinants for assessing no, partial or complete sick leave

The physicians mostly (72%) diagnosed a psychological first cause for the complaints in all case vignettes. Because of this high amount of psychological diagnoses we dichotomised the outcome of this question in psychological diagnoses and other diagnoses for the analyses. All physicians were significantly more likely to assess partial or complete sick leave when they diagnosed a psychological cause in comparison with other diagnoses (OR 0.19, 95% CI 0.14-0.27). This effect was even stronger for occupational physicians compared to insurance physicians (Table 3).

All physicians were also significantly more likely to assess partial or complete sick leave when they considered limitations in personal or social functioning, in static postures, and when they considered a poor overall health status or a reduced work ability. For occupational physicians, considering a reduced work ability had a stronger effect on the assessment outcome than for insurance physicians (Table 3). If the physicians agreed with the statements 'Medical or health-related factors are the main reason for sick listing the worker', 'If the worker is not sick listed, the complaints will worsen or the healing process will be slower', or 'His/her private life is the main reason for the worker's complaints', they were also more likely to assess partial or complete sick leave. Considering private life issues as the main reason for the worker's complaints, had more influence on the sick leave assessment for occupational physicians than for insurance physicians (Table 3). All physicians were significantly more likely to assess no sick leave,

when the physicians agreed with the statement 'The worker is not motivated to work', or when they considered limitations on dynamic movements (Table 3).

Table 3 Probability of assessing no versus partial or complete sick leave by the physicians

Variables on questionnaires; Outcome: No (reference category) vs Yes	No sick leave (reference outcome) vs partial or complete sick leave	Interaction between the occupational and insurance physicians	Occupational physician	Insurance physician
	OR (95% CI)[a]	*p*-value	OR (95% CI)[b]	OR (95% CI)[b]
Psychological diagnoses	0.19 (0.14 – 0.27)	0.001	0.12 (0.08 – 0.18)	0.33 (0.21 – 0.51)
The work situation is the main reason for the worker's complaints	0.91 (0.70 – 1.18)	0.07		
His/her private life is the main reason for the worker's complaints	0.56 (0.44 – 0.71)	0.04	0.46 (0.33 – 0.63)	0.72 (0.51 – 1.02)
Medical or health-related factors are the main reasons for sick listing the worker	0.20 (0.13 – 0.29)	0.80		
The worker is not motivated to work	2.86 (2.17 – 3.78)	0.68		
If the worker is not sick-listed, the complaints will worsen or the healing process will be slower	0.06 (0.03 – 0.09)	0.73		
Poor overall health status	0.30 (0.22 – 0.41)	0.47		
Reduced work ability	0.06 (0.04 – 0.10)	0.01	0.03 (0.02 – 0.05)	0.12 (0.06 – 0.24)
Limitations on personal functioning	0.09 (0.06 – 0.14)	0.11		
Limitations on social functioning	0.14 (0.09 – 0.20)	0.12		
Limitations on dynamic movements	2.12 (1.53 – 2.95)	0.97		
Limitations on static postures	0.49 (0.36 – 0.68)	0.93		
Work environment need to be adjusted for the worker	0.78 (0.54 – 1.13)	0.59		

[a]OR < 1 equals that for the comparison category physicians are less likely to assess no sick leave than for the reference category of that item
[b]Outcome is only shown stratified if the variable being an occupational or insurance physician is an effect modifier

Discussion

The main purpose of this study was to investigate possible differences between insurance physicians and occupational physicians in the outcome of sick leave assessments of workers with SHC (subjective health complaints). Additionally, we wanted to explore possible determinants that may explain these possible differences in sick leave assessments. For all case vignettes, insurance physicians were overall less likely to assess complete sick leave than occupational physicians. The physicians' opinion about several determinants (functional limitations, diagnoses, cause of complaints and sick leave, health status, and work capacity) had an influence on the outcome of the sick leave assessments. A psychological cause according to the physicians, private life issues, and an assessed reduced work ability had more influence on the outcome of the sick leave assessment for occupational physicians than for

insurance physicians. These differences in the outcome of sick leave assessments underscore the influence of different roles, perspectives and tasks of physicians working in the same occupational health care system.

Comparison with literature

We are not aware of any comparable studies that have studied differences in the outcome of sick leave assessments of workers with SHC between different medical specialists, working in the same occupational health care system. However, there are earlier studies that showed differences and high inter-rater variability in sick leave assessments between physicians in the same curative health field, in the same insurance settings or between physicians from occupational health care and curative health care[21-25]. In these studies, it was suggested that these differences were probably due to differences in training between the physicians, in social security legislations, in the availability of guidelines, in the culture or in the organisational settings. Appropriate assessments tools, guidelines, more training, better communication and standard cases are suggested as starting points to reduce these differences and variability[26]. In our study, occupational physicians and insurance physicians have comparable training, skills and knowledge in occupational health care, they work in the same country with the same social security legislation and national context, and they have access to the same guidelines. Besides, they work in a comparable organisational setting, as they both assess sick leave on request of an employer or the social security agency, and usually not directly on request of the worker him- or herself. Despite these similarities of insurance and occupational physicians there are differences in roles, tasks and perspectives, which may explain the differences in the outcome of the sick leave assessments in this study[14,24,27]. Insurance physicians were overall less likely to assess sick leave than occupational physicians.

Studies show that GPs, who have several roles, tasks and perspectives in occupational health care, report difficulties and conflicts in sick leave assessments[28,29]. GPs especially feel conflicts in their relationship with the patient in combination with their different roles of sickness certification, sickness absence guidance and vocational rehabilitation[10,28,30,31]. This is particularly the case when they have to assess the work capacity for workers with SHC[10,17,26,32,33]. GPs find it difficult not to issue a sickness certification, especially when workers claim sickness absence[17,30,32,34]. Occupational physicians in the Netherlands have a rather similar role as GPs in other countries when they assess sick leave to further guide the worker and help promote return to work ('fit note'). They also usually have a long-term relationship with the worker and will continuously assess progress in work ability during the sick leave period[14,35]. Similar to GPs, many Dutch occupational physicians feel the same conflict of interest between the sickness-certifying role and their vocational rehabilitation role[36]. As such the doctor-patient relationship is an important factor in this process[10,28,37-39].

In contrast, insurance physicians assess the sick leave only once for the certification of a sickness benefit ('sick note'), mostly after two years, and have strict rules in the translation of medical findings to functional work ability[14,16]. The sick leave assessment of insurance physicians is therefore more absolute, and the relationship with the worker is minimal. In this respect, this study adds to the literature that the more the physician is involved in a relationship with the worker, the more likely it is for the physician to accept the worker's view on his/her work capacity. The results of this study also show that some other determinants have influence on the outcome of the sick leave assessment, and that the impact of these determinants differ between occupational physicians and insurance physicians.

Strength and limitations
Strength of this study is that we included physicians from the two biggest nationwide occupational health services working all over the Netherlands. All these physicians assessed the same video case vignettes on one day and received the same information. Therefore, the circumstances to assess sick leave were similar for all physicians. Nevertheless, physicians working in occupational health care in the Netherlands also work for many other companies or work as self-employed professional, so the generalisability of the results of this study may be limited. Another limitation in this study is that the duration of 5-15 minutes was shorter than a normal consultation, and the physicians had no possibility to ask follow-up questions. This may cause missing information that cannot be obtained afterwards altering the clinical decisions of the physicians. Furthermore, we used video case vignettes from a general practice from Norway. Although, the video case vignettes were translated by an official translation desk, there is still the risk of not fully understanding the context of the consultation and the nonverbal communication. Although video case vignettes are considered valuable and practical in research[40], a relevant limitation of using (video) case vignettes is that it is still not completely comparable with real consultations. However, the video case vignettes were shown to the insurance physicians as well as the occupational physicians; therefore, we assume that the effect of this limitation on the comparison between the physicians is minimal.

An additional limitation is the multiple tests performed in the statistical analyses. This may have led to some false positives: for every 20 true null hypotheses we can expect one to be falsely rejected. However, as this study is the first study that explores differences in sick leave assessments between occupational physicians and insurance physicians working in the same country, our results provide a basis on which future research can build.

Interpretation of the results
The differences in the sick leave assessments of workers with SHC between the

physicians in this study may indicate that the usual roles and tasks of the physicians influence the outcome of a sick leave assessment when performed in similar, controlled conditions. An underlying factor for this difference may be the different patient-doctor relationship and a different impact of psychosocial factors. In this study, occupational physicians who have the reference to assess sick leave for a 'fit note' and guidance towards return to work are therefore more likely to consider the impact of psychosocial factors. Whereas insurance physicians who have the reference to assess sick leave for a 'sick note', are more likely to consider the perspective of the social security. As a result, the insurance physicians may be stricter in their assessment and have a slightly lower tendency to consider someone unfit to work. Therefore, workers who receive advice from different physicians may risk receiving different advices about work capacity. This may in turn lead to confusion, loss of faith in the advice of physicians and even worsening of the symptoms or lack of progress in the rehabilitation process[19,20].

Implications for practice and future research

Society has to set priorities and has to balance the advantages and disadvantages, when establishing an occupational health system. Previous studies have made suggestions how to reduce differences and conflicts between physicians, for sick leave assessments[31,32,34,41,42]. In some European countries, recommendations were made to separate the public health system from the curative health care, such as the Netherlands[10,26,43]. Additionally, suggestions were made to support physicians more in their sick leave assessments by offering better training in social security legislation[33,38], giving more time for their sick leave assessments, and making guidelines and appropriate assessments tools better available[10,26,43]. This may particularly help in the difficult sick leave assessments for workers with SHC[26,28]. However, the results of this study suggest that these recommendations will not completely resolve the differences in outcome of sick leave assessments between physicians, as differences in perspectives in the occupational health care system also seem to have an important influence on this outcome. Other recommendations are more clarification of the roles and points of view of the physicians[13,28], introduction of independent medical evaluations as a basis for sick leave entitlement and better communication and collaboration between physicians[26,39,44,45]. Another recommendation, based on this study, is to separate tasks of sick leave assessments completely from all tasks in advising and guiding in the rehabilitation process. However, communication between the physicians with different tasks may then become even more important to prevent different advices on functional abilities to workers. A better communication may result in more similar advice to workers[10,26,43,46], which is particularly important for the often complex recovery and rehabilitation process and avoidance of lack of progress in the rehabilitation process of workers with SHC[19,20]. Future studies should

further assess to what extent recommendations on the perspectives, roles and tasks of physicians may help solve the differences in sick leave assessments between physicians and to what extent better communication and collaboration between physicians may help provide similar advice for workers with subjective health complaints.

Conclusion

The direction of the outcome of sick leave assessments in controlled conditions is comparable between physicians working in the same occupational health care system, however insurance physicians are stricter in assessing complete sick leave than occupational physicians. The given diagnosis, private life issues, and the assessed work ability had more influence on the outcome of the sick leave assessment for occupational physicians than for insurance physicians. The difference between these physicians may be based on the different roles, tasks and perspectives of the physician in the occupational health care system, and on the duration or intensity of the physician-worker relationship. Differences in assessment outcomes for workers with subjective health complaints may risk lack of progress in the rehabilitation process. More communication and collaboration may encourage more consensus among physicians working in the same occupational health care system.

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Appendix A Questionnaire

Demographic questions of the physician
- Gender;   Male/Female
- Age;   ....Years
- Medical specialty;   Insurance/Occupational physician
- Work experience in this specialty;   ....Years

Questions to be answered following each of the nine video case vignettes
- Prioritise the most important diagnoses, with a maximum of three;
    1. ....
    2. ....
    3. ....

- From your medical point of view, what would you recommend for this worker?
    □   No sick leave
    □   Partial sick leave –
        can perform his/her own job for......... hours a week
    □   Partial sick leave –
        can perform only adjusted work tasks for...... hours a week
    □   100% (complete) sick leave

- From your medical point of view, how long do you think the sick leave period should last?
    □   Up to one week
    □   1-2 weeks
    □   2-4 weeks
    □   More than 4 weeks

- In your opinion, is the worker experiencing functional limitations within any of the following domains? (you may choose more than one option)
    □   No limitations
    □   Personal functioning
    □   Social functioning
    □   Dynamic movements
    □   Static postures
    □   Work environment need to be adjusted for the worker
    □   Working hours

- Please give your opinion on the following statements; (Response options: totally agree, agree, neither agree nor disagree, partly disagree, totally disagree)
    - The work situation is the main reason for the worker's complaints
    - His/her private life is the main reason for the worker's complaints
    - Medical/health-related factors are the main reasons for sick listing the worker
    - The worker is not motivated to work
    - If the worker is not sick listed, the complaints will worsen or the healing process will be slower

- How would you judge the worker's overall health status?
    - ☐ Very good
    - ☐ Good
    - ☐ Neither good nor poor
    - ☐ Poor
    - ☐ Very Poor

- How would you judge the worker's ability to work?
    - ☐ Very reduced
    - ☐ Much reduced
    - ☐ Not much reduced
    - ☐ Negligibly reduced
    - ☐ Not reduced

- If you would like to refer the patient for treatment or further medical examination, please specify:...

PART II
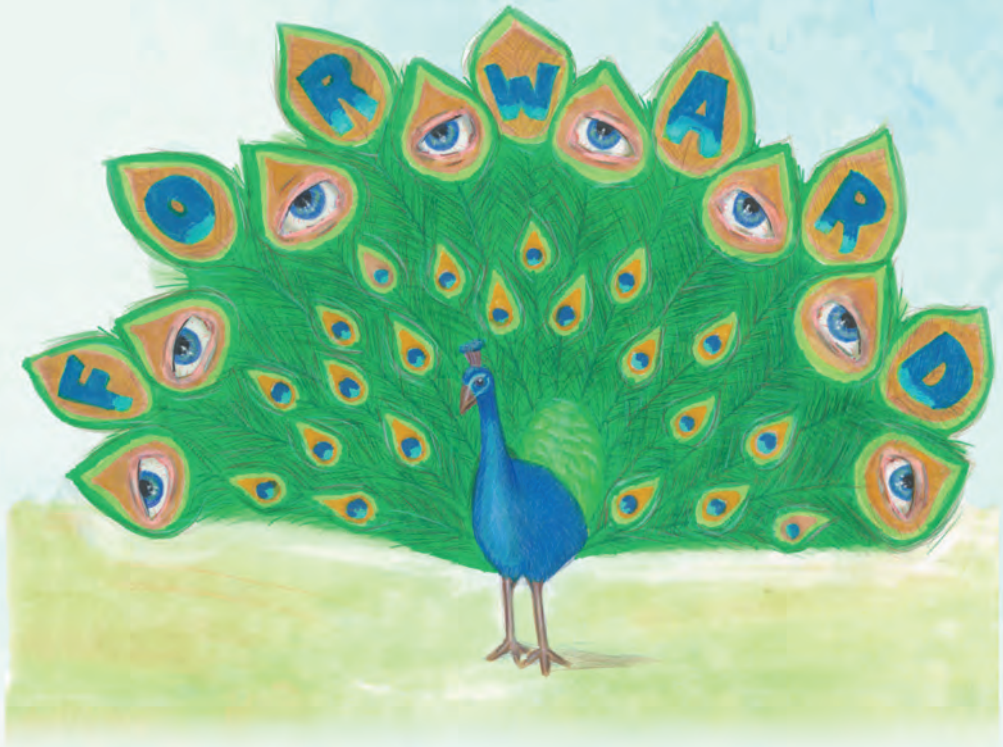
Assessment of the correlation between
self-perceived health and physician-assessed
level of work-related functioning

Chapter 4

Does self-perceived health correlate with physician-assessed functional limitations in medical work disability assessments?

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Abstract

Aim

Our purpose was to obtain information about the correlation between workers' self-perceived health and physician-assessed functional limitations. We also studied whether this correlation differed between workers with subjective health complaints that cannot (SHC) and those that can be explained (non-SHC) by a well-defined medical disease.

Methods

Baseline data of 2040 participants from a prospective cohort study were used for this study. These participants answered a questionnaire on their self-perceived health and received a medical work disability assessment during which physicians reported functional limitations. Pearson correlation analyses were used to calculate correlations between 4 functional limitation factors and 11 self-perceived health factors. For correlations with coefficients ≥0.30, linear regression analyses were performed to assess possible differences between participants with SHC (*n*=363) and those with non-SHC (*n*=1677).

Results

We found correlations ≥0.30 between two functional limitation factors and six self-perceived health factors for all participants. SHC participants showed lower correlations than the non-SHC participants between the physical functional limitation and the SF-36 self-perceived physical health factors (-0.49, 95% CI -0.56 to -0.41 vs. -0.60, 95% CI -0.62 to -0.57) and between the mental functional limitation and the SF-36 self-perceived mental health factors (-0.30, 95% CI -0.39 to -0.20 vs. -0.40, 95% CI -0.44 to -0.36).

Conclusion

Self-perceived health showed overall low to moderate correlations with physician-assessed functional limitations. Some of these correlations were lower for workers with SHC than for those with non-SHC. This may indicate that physicians rely slightly more on well-defined medical complaints within medical work disability assessments.

Introduction

Over the last decades, worker disability policies have been developed to serve as financial protection for economic loss due to sickness[1]. In 2008, up to 10% of the working-age population in Europe received work disability benefits[2]. While the criteria for such work disability benefits differ widely between countries[1,3], the standard procedure in most countries is that all claims require medical assessment by a physician[3-5]. The underlying medical factors on which physicians base their assessment are not completely clear[6-9]. What is known, is that during these assessments, physicians have to link workers' self-perceived health complaints and impairments to medical information in order to explain and justify a probable relation[10]. They also have to test their findings for plausibility and consistency in order to translate them into functional limitations and to evaluate whether workers are legitimately unable to work[11-13]. Despite some commendable efforts[6,7,14,15], there is still a general lack in standardised procedures and guidelines on how to reliably interpret complaints and impairments and unequivocally translate them into functional limitations.

Previous studies have reported that physicians have to rely on workers' self-perceived health to a large extent[13,16]. However, translating self-perceived health into functional limitations can be difficult for physicians, especially when the complaints cannot be fully explained by an underlying well-defined medical disease[7,17]. This is known as subjective health complaints (SHC), and studies have shown that physicians often tend to classify SHC as psychological problems and that they may also underestimate potentially related functional limitations[11,18-21]. Research has suggested that workers with SHC do not necessarily differ in their clinical presentation compared to workers with similar health complaints that can be explained by a well-defined medical disease (non-SHC)[22-26]. In contrast, literature has illustrated that workers with SHC have more difficulties to discuss their concerns and functioning problems[27]. To illustrate, workers with pain due to SHC may need to clarify or even emphasize more how bad their pain is to physicians, compared to workers with pain due to non-SHC. Consequently, workers with SHC more often report negative experiences during medical work disability assessments – such as feelings of not being heard or feeling rejected or ignored – than workers with non-SHC, which may worsen the health condition of workers with SHC[28,29].

Studies have shown that there is a high variation in the opinion about work ability between physicians and workers – workers in general seem to assess their work ability lower than physicians do – but also among physicians themselves[4,10,30-34]. Marfeo et al.[30] have suggested that these levels of agreement are higher for physical health problems compared to mental health problems, because mental diagnosis and functioning problems are typically based on self-reported complaints. Up to now, however, studies have not specifically focused on the agreement between workers'

specific self-perceived health and physician-assessed functional limitations nor on the underlying medical aetiology as a direct possible factor in determining work disabilities. As a low self-perceived health can lead to many functioning problems[23], it is important to know to what extent physicians take self-perceived health into account during their medical work disability assessment and whether this differs between workers with different underlying medical aetiology (SHC vs. non-SHC).

To obtain more insight into the importance of self-perceived health in medical assessments and the role of medical aetiology, we wanted to explore whether self-perceived health of workers correlated with the functional limitations assessed by physicians and, if so, to what extent. In addition, we assessed whether this correlation differed between workers with SHC and those with non-SHC. We feel that more clarity on the extent to which self-perceived health and underlying medical aetiology play a role in assessing medical work disability could be a step towards standardising tools for reliably using self-perceived health in medical assessments.

Methods

Study design

We used the baseline data from a prospective cohort study among long-term sick-listed workers, named the Forward study. Workers were invited for the Forward study if they were older than 18 years and had been registered as sick-listed in the electronic database of the Dutch Social Security Institute (UWV) for at least 84 weeks. A total of 44,379 workers were invited by a postal letter. Workers were asked to fill in a checklist with seven criteria attached by the postal letter if they wanted to participate in the study (Figure 1). Workers could be included in this study if they did not meet one of the criteria on this checklist. Eligible participants were asked to fill in the Patient Health Questionnaire-15 (PHQ-15), that was also attached by the postal letter. The PHQ-15 is a validated questionnaire that can be used to assess the possible presence and severity of somatic symptoms[35]. A score of five on the PHQ-15 represents mild somatic symptoms due to a medical disease, or due to SHC if the medical interview shows no clear well-defined medical disease[36]. Out of the invited group, 3837 workers (9%) responded. Workers with a score of five or higher on the PHQ-15 who did not meet one of the criteria on the checklist (*n*=3392) were asked to fill in an informed consent (IC) and a baseline questionnaire. Of these workers, 2593 workers returned their IC and baseline questionnaire and could thus be included in the Forward study (Figure 1). The inclusion period lasted from June 2014 up to May 2015.

Participants

In the Netherlands, employers have to register their sick-listed workers at UWV in the first 84 weeks of sick leave. If workers are still sick-listed after 84 weeks, they can apply for work disability benefits at UWV, for which an insurance physician (IP) performs the medical assessment. Of the 2593 included participants in the Forward study, 2354 participants (91%) applied for such a work disability benefit, between 84 and 104 weeks of sick leave. No extensive medical work disability assessment was performed for 314 of these participants, as they were too seriously disabled. We used the data of the remaining 2040 participants in the present study.

Figure 1 Flowchart of inclusion and exclusion of workers in the Forward study

```
44,379 workers, who were registered sick-listed ≥ 84 weeks and were ≥ 18 years of age, were sent an
invitation letter, a list with exclusion criteria and the Patient Health Questionnaire (PHQ)-15.

Workers were excluded if they
    -   were no longer sick-listed;
    -   were hospitalised;
    -   had difficulties reading the questionnaire;
    -   were involved in a judicial procedure;
    -   were pregnant within three months of study entry;
    -   had a cancer diagnosis within 12 months of study entry;
    -   or suffered from a psychotic disease or dementia within 12 months of study entry.

40,542 workers met the exclusion criteria        3837 workers did not meet the exclusion criteria
or did not want to participate in the study.     and sent in a filled-in PHQ-15.

No participation in the          3392 workers had a          445 workers did not have a
study.                           PHQ score ≥ 5.              PHQ score ≥ 5.

                                 These workers were sent an          Exclusion from the study.
                                 informed consent form and a
                                 baseline questionnaire.

2593 workers completely filled in the        799 workers did not completely fill in the
informed consent form, sent it back to the   informed consent or did not send it back to
researchers and were included in the study.  the researchers.
```

Description of materials

Participants' self-perceived health

The baseline questionnaire contained open questions about demographics (gender, age, marital status, breadwinner of the family, land of birth and education), health status (treatments, medication and history of sick notes) and work status (returned to work or not). The questionnaire also contained the following validated questionnaires on health complaints and impairments:

- The Short Form Health Survey 36 (SF-36), which contains 36 questions divided into nine subscales; physical and mental functioning, physical and mental role limitations, bodily pain, vitality, mental wellbeing, general health, and health change. The total outcome range lies between 36 and 149 points, with higher scores indicating better levels of functioning and better health[37-40].

- The Well Being Inventory (WBI), which contains 87 questions divided into five subscales; stressors, support, personality/coping, symptoms, and work functioning problems. The total outcome range lies between 87 and 348 points, with higher scores indicating more risk for prolonged work functioning problems[41,42].

- The Hospital Anxiety and Depression Scale (HADS), which contains 14 questions divided into two subscales; anxiety disorder and depressive disorder. The total outcome range lies between 0 and 42 points, with higher scores indicating higher risk for a depressive or anxiety disorder[43-45].

- The Whitely Index (WI), which contains 14 questions converted into one scale about illness beliefs. The total outcome range lies between 0 and 14 points, with higher scores indicating higher risk of severe hypochondria[46].

- One Perceived Prognosis of Work Return subscale, which consists of six questions about possibilities for return to work, derived from the Obstacles to Return to Work Questionnaire (ORQ). The outcome range lies between 0 and 36 points, with higher scores indicating higher self-perceived prognosis of returning to work[47].

- One question of the Work Ability Index (WAI), named the Work Ability Score (WAS). This question asks about self-perceived current work ability compared to the lifetime best. The answer range lies between 0 to 10 points, with higher scores indicating higher self-perceived work ability[48].

Functional limitations and diagnoses assessed by IPs

During medical work disability assessments, IPs use the CAS code list to report diagnoses[49]. The CAS code list is based on the International Classification of Diseases (ICD classification)[50], but it is less detailed. The CAS code list identifies 10 functional somatic syndromes: Somatic (Pain) Syndrome, Somatization disorder, Pelvic Girdle Pain, Tension Headache, Tietze Syndrome, Irritable Bowel Syndrome, Chronic Fatigue syndrome, Fibromyalgia, Whiplash, and Repetitive Strain Injury. It also lists 25 health complaints that match with the 23 (partially) unexplained physical

complaints of the Robbins list[51]. We used the CAS code list to mark participants as SHC or non-SHC in the present study. Participants were included in the SHC group if they had one of the 10 functional somatic syndromes or one of the 25 health complaints of the CAS code list, as recorded by the IP during the medical work disability assessment. All other participants, with other diagnoses, were included in the non-SHC group. In the SHC group, the three most common diagnoses were: non-specific musculoskeletal complaints (n=119, 33%), fibromyalgia (n=116, 32%) and somatization disorder (n=52, 14%). In the non-SHC group, the three most common diagnoses were: cardiovascular disease (n=221, 13%), lumbar herniation with nerve compression (n=162, 10%) and depressive disorder (n=119, 7%).

To report all functional limitations, IPs use the Functional Ability List (FAL) during the medical work disability assessment[52]. The FAL is a standardised format list, derived from the International Classification of Functioning (ICF)[53]. The FAL consists of 106 functioning items, which are categorised into six sections: personal functioning, social functioning, adjusting to the physical environment, dynamic movements, static posture and working hours. Each functioning item in the FAL has an ordinal rating scale, ranging from two to five ordinal scoring options, to assess the extent of limitations in functioning for that item. Higher scores indicate more severe limitations to perform activities[52].

Statistics

Outcome and determinants

For the analyses of the participants' self-perceived health we calculated sum scores based on the answers to the validated questionnaires and as suggested by the developers of these questionnaires[37-48]. These sum scores were then considered as 11 self-perceived health factors:

- two health factors on physical and mental functioning: the physical component score (PCS) and the mental component score (MCS), based on the nine subscales of the SF-36[37-40];
- three health factors on mental fitness, work functioning problems and risk for long-term absenteeism, based on the subscales for these elements of the WBI[41,42];
- three health factors on depressive disorder, anxiety disorder and emotional distress, based on the two subscales of the HADS[43-45];
- one health factor on hypochondria, based on the total score of the WI[46];
- one health factor on possibilities for return to work, based on the subscale Perceived Prognosis of Work Return of the ORQ[47];
- and one health factor on work ability, based on the subscale WAS of the WAI[48].

To define functional limitations assessed by IPs, we used the outcomes of the FAL. For the analyses, we used the factor loadings of Broersen et al.[54,55] to limit the number

of dimensions of the FAL and to calculate the scores of functional limitations. First, we applied Broersen et al.'s first-order factor loads to constrict the number of 106 functioning items of the FAL into fourteen groups of functioning items. Within these fourteen groups, we counted the numbers and scores of the physician-assessed functional limitations and applied the second-order factor loads to further reduce the number of dimensions. This resulted in four functional limitation factors: physical functional limitations, functional limitations in autonomy, psychological functional limitations and functional limitations in manual skills[54,55].

Statistical analyses

We performed Chi-squared tests to analyse differences in demographics, health status and work status between participants with SHC and those with non-SHC. To determine the correlation between the 11 self-perceived health factors and the four functional limitation factors, we first calculated the Pearson correlation coefficients. Effect sizes in Pearson correlation analyses are usually divided into small, moderate and large ranges corresponding to Pearson correlations of 0.10–0.30, 0.30–0.50, and 0.50–1.00, respectively[56]. We considered coefficients with an absolute value ≥0.30 to be acceptable, as the items of the FAL were originally not selected to measure a common dimension. For coefficients ≥0.30, we performed linear regression analyses with the functional limitation factors set as dependent variable and the self-perceived health factors set as independent variable. Further, we added an interaction term to account for possible different associations between participants with SHC, and those with non-SHC. We stratified the association outcome if the interaction term was statistically significant ($p<0.05$). Finally, we performed linear regression analyses with statistically significantly different determinants between the two groups of participants to test for possible confounders. We performed statistical analyses using IBM SPSS Statistics 22.0.

Results

The 2040 participants were divided into two groups, based on their diagnosis: SHC (n=363) or non-SHC (n=1677) (Table 1). The two groups were statistically significantly different in age and gender; participants in the SHC group were younger and were more often women. Participants in the non-SHC group were more often the breadwinner of the family than those in the SHC group. There were no statistically significant differences between the two groups in health and work status (Table 1).

Correlations

We analysed correlations with the self-perceived health factors for each functional limitation factor. For the physical functional limitation factor, we found correlations of

<0.30 with all self-perceived health factors, except for the self-perceived SF-36 physical health component factor, for which we found a significant correlation of -0.59 (CI -0.62 to -0.56) for all participants together, and -0.49 (CI -0.56 to -0.41) for participants with SHC and -0.60 (CI -0.62 to -0.57) for those with non-SHC separately (Table 2). For the psychological functional limitation factor, we found significant correlations for all participants together of ≥0.30 to 0.50 with five self-perceived health factors: the SF-36 mental health component factor -0.38 (CI -0.42 to -0.32), the HADS depressive disorder factor 0.31 (CI 0.26 to 0.35), the HADS anxiety disorder factor 0.32 (CI 0.27 to 0.36), the HADS emotional distress factor 0.34 (CI 0.29 to 0.38) and the WBI mental fitness factor 0.41 (CI 0.37 to 0.45). The correlations were smaller for participants with SHC than for participants with non-SHC (Table 2). For the functional limitation factors in autonomy and manual skills, we found no correlation of ≥0.30 with any of the self-perceived health factors (data not shown).

Table 1 Description of participants

	SHC (n=363)	Non-SHC (n=1677)	p-value
Demographics			
Gender			
Men	126 (35%)	865 (52%)	
Women	237 (65%)	812 (48%)	<.001
Age			
≤ 30 Years	22 (6%)	54 (3%)	
31-40 years	49 (14%)	168 (10%)	
41-50 years	112 (31%)	409 (24%)	
51-60 years	149 (41%)	814 (49%)	
≥ 61 years	31 (8%)	232 (14%)	<.001
Marital status			
Relation	244 (71%)	1202 (72%)	
Single	119 (29%)	473 (28%)	.22
Land of birth			
Netherlands	320 (88%)	1475 (88%)	
Other	42 (12%)	202 (12%)	.86
Breadwinner of the family			
Yes	218 (60%)	1113 (67%)	
No	144 (40%)	557 (33%)	.02
Education			
None/Primary school	45 (12%)	171 (10%)	
Secondary school	129 (36%)	640 (38%)	
High school	119 (33%)	549 (33%)	
Bachelor and Master	70 (19%)	313 (19%)	.58
Health Status			
History of sick notes; same complaints			
Yes	178 (49%)	812 (49%)	
No	182 (51%)	849 (51%)	.86
Treatments in the last 2 years			
Yes	360 (99%)	1648 (99%)	
No	2 (1%)	8 (1%)	.41
Medication			
Yes	314 (87%)	1467 (88%)	
No	49 (13%)	207 (12%)	.55
Work Status			
Returned to work			
Yes	106 (29%)	522 (31%)	
No	256 (71%)	1154 (69%)	.49

Table 2 Pearson Correlation between physician-assessed functional limitations and participants' self-perceived health for all participants together, and for participants with SHC and non-SHC separately

Physician-assessed functional limitation factors	Participants' self-perceived health factors					
	SF-36 physical component[a]	SF-36 mental component[a]	HADS depressive disorder[b]	HADS Anxiety disorder[b]	HADS emotional distress[b]	WBI mental fitness[b]
Total group						
Physical limitations						
Correlation	**-0.59**[c]	0.27	-0.11	-0.20	-0.17	-0.16
95% CI	-0.62 to -0.56	0.22 to 0.31	-0.16 to -0.07	-0.25 to -0.16	-0.21 to -0.12	-0.20 to -0.11
Psychological limitations						
Correlation	0.22	**-0.38**	**0.31**	**0.32**	**0.34**	**0.41**
95% CI	0.17 to 0.26	-0.42 to -0.34	0.26 to 0.35	0.28 – 0.36	0.29 to 0.38	0.37 to 0.45
Participants with SHC[d]						
Physical limitations						
Correlation	**-0.49**	0.15	-0.06	-0.18	-0.13	-0.10
95% CI	-0.56 to -0.41	0.05 to 0.26	-0.16 to 0.04	-0.28 to -0.09	-0.23 to -0.03	-0.20 to 0.00
Psychological limitations						
Correlation	0.04	**-0.30**	**0.30**	**0.30**	**0.32**	**0.40**
95% CI	-0.08 to 0.15	-0.39 to -0.20	0.19 to 0.39	0.20 to 0.40	0.22 to 0.41	0.31 to 0.48
Participants with non-SHC						
Physical limitations						
Correlation	**-0.60**	0.29	-0.13	-0.21	-0.18	-0.18
95% CI	-0.62 to -0.57	0.24 to 0.33	-0.18 to -0.08	-0.26 to -0.16	-0.23 to -0.13	-0.23 to -0.13
Psychological limitations						
Correlation	-0.20	**-0.40**	**0.32**	**0.33**	**0.35**	**0.42**
95% CI	-0.23 to -0.17	-0.44 to -0.36	0.27 to 0.36	0.28 to 0.37	0.31 to 0.39	0.38 to 0.46

[a]=Higher scores indicate better health; [b]=Higher scores indicate lower health; [c]=Numbers in bold indicate coefficients of ≥0.30; [d]=Subjective health complaints

Associations

Linear regression analyses of all functional limitation factors and self-perceived health factors with a correlation coefficient of ≥0.30 showed statistically significant associations for all participants together (Table 3). When we adjusted for age, gender and breadwinner of the family, the strength of these associations slightly reduced but remained statistically significant (Table 3). We observed that the associations with higher scores on all three aspects of the self-perceived HADS and on the WBI mental fitness factor (indicating lower health) and higher scores on the physical and psychological functional limitation factors were statistically significant for all participants together (Table 3). In addition, we observed that lower scores on the self-perceived SF-36 physical or mental health component factors (indicating lower health) resulted in higher scores on the physical and psychological functional limitation factors for all participants together (Table 3).
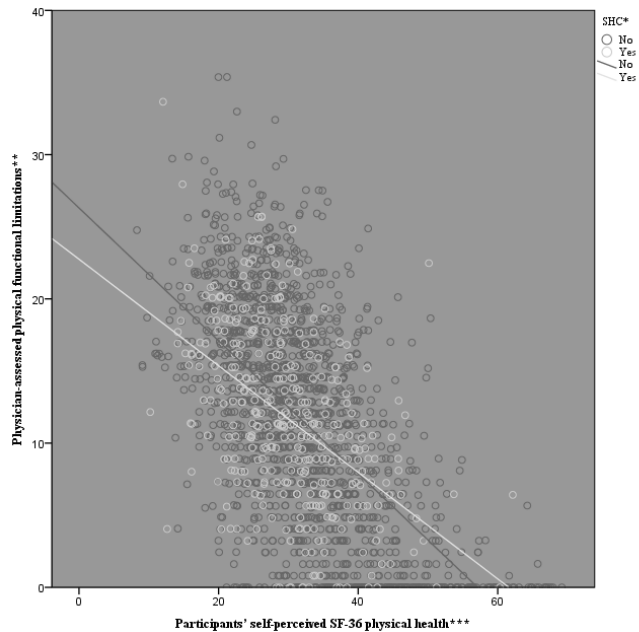
Table 3 Linear regression between physician-assessed functional limitations and participants' self-perceived health for all participants together, and for participants with SHC and non-SHC separately

		Physician-assessed functional limitation factors				
		Physical functional limitations B[b] (95% CI)	Psychological functional limitations B (95% CI)	Interaction term SHC[a]/ non-SHC p-value[c]	SHC B (95% CI)	Non-SHC B (95% CI)
Participants' self-perceived health factors						
SF-36 Physical component[d]	Crude	-0.45 (-0.47 – -0.42)	-	**.03**	-0.37 (-0.44 – -0.30)	-0.46 (-0.49 – -0.43)
	Adjusted[e]	-	-	-	-0.37 (-0.44 – -0.30)	-0.45 (-0.48 – -0.42)
SF-36 Mental component[d]	Crude	-	-0.11 (-0.13 – -0.10)	**.01**	-0.08 (-0.11 – -0.05)	-0.12 (-0.14 – -0.11)
	Adjusted	-	-	-	-0.08 (-0.12 – -0.05)	-0.12 (-0.13 – -0.11)
HADS Depressive disorder[f]	Crude	-	0.26 (0.22 – 0.29)	.24	-	-
	Adjusted	-	0.27 (0.23 – 0.30)	-	-	-
HADS Anxiety disorder[f]	Crude	-	0.28 (0.25 – 0.32)	.15	-	-
	Adjusted	-	0.28 (0.25 – 0.32)	-	-	-
HADS Emotional distress[f]	Crude	-	0.16 (0.14 – 0.18)	.20	-	-
	Adjusted	-	0.16 (0.14 – 0.18)	-	-	-
WBI Mental fitness[f]	Crude	-	0.18 (0.17 – 0.20)	.22	-	-
	Adjusted	-	0.19 (0.17 – 0.21)	-	-	-

[a]=Subjective Health Complaints; [b]=Regression coefficient with 95% confidence interval; [c]=Outcome (in bold) is only shown stratified if the variable SHC/non-SHC is an effect modifier ($p \leq 0.05$); [d]=Higher scores indicate better health; [e]=Adjusted for age, gender, and breadwinner of the family; [f]=Higher scores indicate lower health

We found statistically significant differences between participants with SHC and with non-SHC in the associations between the physical functional limitation factor and the self-perceived SF-36 physical health component factor and between the psychological functional limitation factor and the self-perceived SF-36 mental health component factor (Table 3). These associations were lower for participants with SHC than for those with non-SHC but remained statistically significant for both groups separately. When we adjusted for age, gender and breadwinner of the family, the strength of the associations slightly reduced but remained statistically significant (Table 3). We especially found differences between participants with SHC and with non-SHC for very high and very low scores (Figures 2 and 3).

Figure 2 Association between physician-assessed physical functional limitations and participants' self-perceived SF-36 physical health with SHC and with non-SHC

*=Subjective Health Complaints; **=Higher scores indicate more limitations; ***=Higher scores indicate better health

Figure 3 Association between physician-assessed psychological functional limitations and participants' self-perceived SF-36 mental health with SHC and with non-SHC
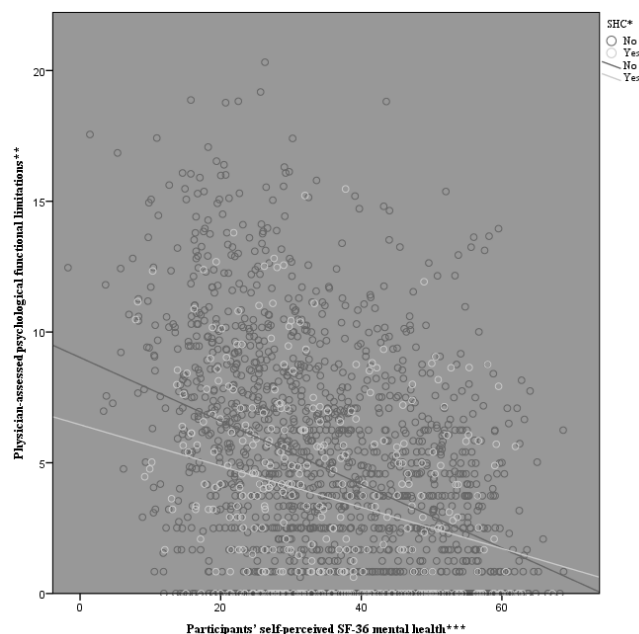
*=Subjective Health Complaints; **=Higher scores indicate more limitations; ***=Higher scores indicate better health

Discussion

The main purpose of this study was to explore correlations between workers' self-perceived health and physician-assessed functional limitations. In addition, we aimed to assess whether these correlations were different between workers with subjective health complaints that cannot be explained by a well-defined medical disease (SHC) and workers with complaints that can be explained by a well-defined medical disease (non-SHC). Overall, we found that correlations were modest between self-perceived health and physician-assessed functional limitations, but that they were a little higher for non-SHC participants than for SHC participants.

We found that two of the four physician-assessed functional limitation factors showed an overall moderate correlation, i.e. 0.30–0.59[56], with six of the 11 self-perceived health factors. We found a moderate to high correlation, i.e. 0.60 between the physical functional limitation factor and the self-perceived SF-36 physical health component factor. We found small to moderate correlations between the psychological functional limitation factor and five self-perceived health factors: SF-36 (mental component), HADS (depressive disorder, anxiety disorder and emotional distress) and WBI (mental fitness). The strength and direction of these correlations were largely comparable for participants with SHC and those with non-SHC, but we did find that the correlations between the physical and psychological functional limitation factors and the self-perceived SF-36 physical and mental component health factors were lower for participants with SHC than for those with non-SHC.

Comparison to the literature

While there are some studies that have focused on agreement on work ability between physicians and workers[30-33,57], none have had a comparable focus on assessing the agreement between self-perceived health and physician-assessed functional limitations. To our knowledge, comparing the strength of this agreement for workers with SHC and workers with non-SHC is also unique to our study.

The literature indicates that workers' self-perceived health remains one of the spare sources on which physicians have to rely on for medial work disability assessments[13,16]. The concept of self-perceived health is based on the experience of health complaints and impairments, and their consequences for the individual[58,59]. These self-perceived health complaints and impairments then have to be translated – in the context of a working environment and based on a medical model for work disability – to assess functional limitations for work[13,59-61]. Difficulties in this translation process may explain the moderate agreement we found in this study between self-perceived limitations and physician-assessed limitations.

However, the literature indicates that physicians do also base their medical work disability assessment on other factors than on the workers' self-perceived health[13,16],

which may further explain the moderate agreement between self-perceived limitations and physician-assessed limitations we found. The differences between workers with SHC and those with non-SHC in the present study illustrate that one of the factors that physicians use is the underlying pathology for self-perceived health impairments. This might support Letrilliart et al.'s[7] argument that physicians may have difficulties to rely on self-perceived health, as clear objective medical findings are usually less pronounced for workers with SHC.

Several studies have shown that if the self-perceived health complaints are in line with a well-defined medical disease, physicians have less need for additional medical information and report less difficulty in relying on self-perceived health during the assessment of work ability[16,62-64]. Marfeo et al.[30] found that the agreement between patients' perception of health problems and the assessment of physicians is generally more pronounced in clear physical disorders than in mental disorders. This is in line with our results, as the highest correlation was found between workers' self-perceived physical health and physician-assessed physical functional limitations, which was in turn more pronounced in workers with non-SHC than in those with SHC.

Interpretation of the results

Our results indicate that physicians take workers' self-perceived health into account to a moderate extent during their medical work disability assessment, irrespective of the underlying medical aetiology. However, we found that the underlying medical aetiology for the complaints and impairments do play a small role in medical work disability assessments, as this overall moderate agreement between self-perceived health and physician-assessed functioning was somewhat lower for workers with SHC. The small to moderate role of workers' self-perceived health and underlying medical aetiology suggests that physicians do not solely base their medical work disability assessments on the workers' self-perceived health and the underlying medical disease. For workers with SHC as well as for workers with non-SHC, the agreement between self-reports on physical complaints and physician's assessment is higher than for mental complaints. In addition, we found that the more complaints workers with SHC stated, the less agreement there was with the physician-assessed functional limitations, making over-reporting another factor on which physicians potentially base their work disability assessment[32,65]. Furthermore, the role of tacit knowledge, legislation criteria, demographics and culture of the assessed workers and physicians, and the national context can also be relevant factors for work ability assessments[66]. The extent to which these underlying factors play a role in these medical assessments and may lead to different work disability assessment outcomes for workers with SHC and those with non-SHC with the same self-perceived impairments will need further research.

Strengths and limitations

The current study included participants from several regions in the Netherlands, making the results generalisable to the Netherlands and useful for comparable Western countries, although it is important to keep differences in legislation, norms and values, and informal hidden rules into account when using the results for other countries[67]. Furthermore, our study did not only compare the broad perception of work ability between workers and physicians, but it also compared between the perception of physicians of workers with SHC and workers with non-SHC.

The response rate of 9% was lower than average[68], which we consider to be a limitation of this study. The low response rate could be due to the manner in which we included participants. Via postal mail we asked workers to fill in a checklist attached by the postal letter. We asked them only to respond if they wanted to participate in the study and if they did not meet one of the criteria on the checklist. With this low response rate, we can assume there is probably some selection bias in this study. Unfortunately, we cannot obtain more information about the non-responders as their data is not available. A further limitation is that we used the FAL to analyse physician-assessed functional limitations in our study. The FAL is an obligatory tool in the Netherlands to report physician-assessed functional limitations in the medico-legal context of work disability assessments[52]. However, the FAL was not developed specifically for the purpose of our study, and it should be noted that the FAL is not a scientifically validated tool. Furthermore, our analyses also used the method of Broersen et al.[54,55], which was based on records of all types of workers between October 2005 and September 2007, to limit the number of dimensions of the FAL and to calculate the scores of functional limitations. As there were no significant changes in legislation or working processes since 2005, we are confident that the methods of Broersen et al.[54,55] are also valid for our study. Another potential limitation may be the decision that coefficients with a correlation score of ≥0.30 to 0.50 in the analysis was considered acceptable. As correlation scores of ≥0.30 to 0.50 indicate only small to moderate correlations in literature this decision can be debated[56]. On the other hand, these correlation scores are not negligible and considered useful in the context of this study.

Implications for practice and future research

The moderate level of agreement between workers' self-perceived health and physician-assessed functional limitations in the present study indicates that workers' self-perceived health remains an important factor for physicians during work disability assessments. However, our results suggest that workers' self-perceived health is not the only factor. Furthermore, the differences between workers with SHC and those with non-SHC in the present study illustrate that another important factor for physicians to rely on during their work disability assessment is the explanation by an underlying

pathology for the self-perceived health impairments. This may be a consequence of the medico-legal criteria for work disability assessments. Still, the moderate correlation and the small difference between workers' self-perceived health and physician-assessed functional limitations for workers with SHC and for those with non-SHC indicate that more factors play a role in the physicians' assessment of work disability.

More research is required to gain better insight into the underlying factors that play a role in medical work disability assessments and to obtain more agreement and transparency on these factors between and among workers and physicians. To examine self-perceived health and functional limitations correctly and consistently, validated instruments should be created based on the underlying factors that play a role in medical work disability assessments. Several studies have already worked on guidelines, protocols and tools[16,61,69], especially for workers with SHC[13,31], but there is still no optimal standard to measure health and functional limitations reliably.

Conclusion

Workers' self-perceived health showed an overall low to moderate correlation with functional limitations assessed by physicians, indicating that physicians only partly rely on workers' self-perceived health during their medical work-disability assessment. The extent of the agreement was somewhat lower for workers with SHC than for workers with non-SHC. This suggests that physicians experience more difficulties in valuing workers' self-perceived health in correspondence with their own findings, and tend to divert more from the perceptions of workers with SHC than from the perceptions of workers with non-SHC.

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PART III
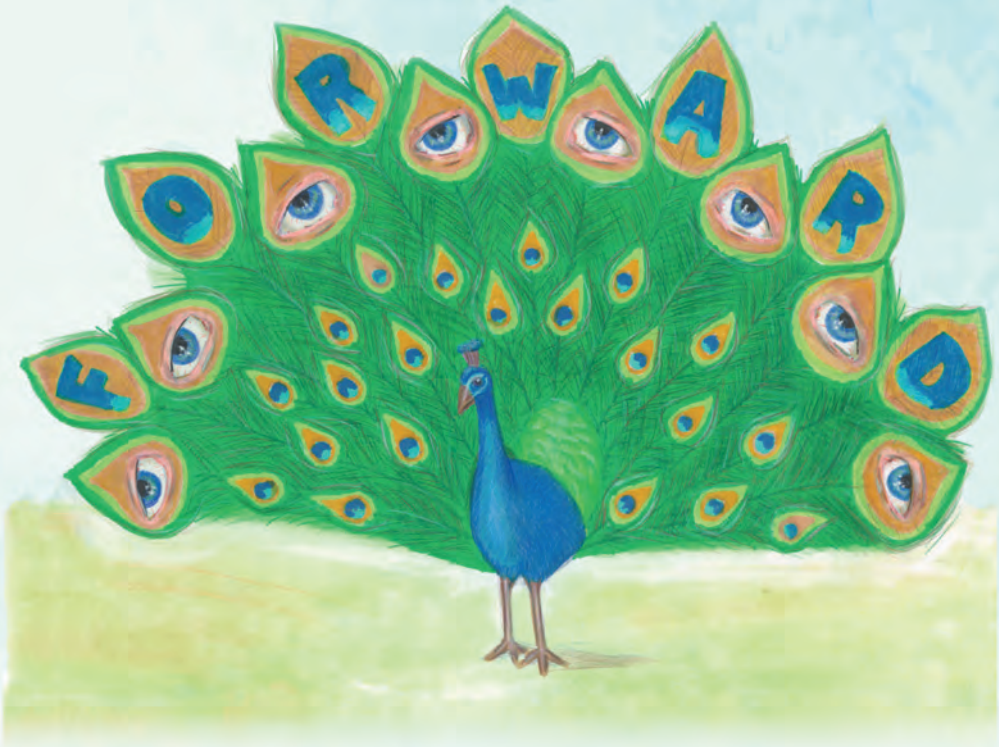
Exploration of important prognostic factors
for returning to work and staying at work
of fully or partially long-term sick-listed
workers with subjective health
complaints and other disorders

Chapter 5

Predicting return to work after long-term sickness absence with subjective health complaints: a prospective cohort study

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Abstract

Aim

Long-term sickness absence results in increased risks of permanent disability and a compromised quality of life. Return to work is an important factor in reducing these risks. Little is known about return to work factors for long-term sick-listed workers with subjective health complaints. The aim of this study was to evaluate prognostic factors for partial or full return to a paid job for at least 28 days for long-term sick-listed workers with subjective health complaints, and to compare these factors with those of workers with other disorders.

Methods

Data from a prospective cohort study of 213 participants with subjective health complaints and 1037 reference participants were used. The participants answered a questionnaire after 84 weeks of sickness absence. Return to work was measured after one and two years. Univariable logistic regression analyses were performed ($p \leq 0.157$) for variables per domain with returning to work (i.e. demographic, socio-economic and work-related, health-related, and self-perceived ability). Subsequently, multivariable logistic regression analyses with backward selection ($p \leq 0.157$) were performed. Remaining factors were combined in a multivariable and final model ($p \leq 0.05$).

Results

Both for workers with subjective health complaints and for the reference group, non-health-related factors remained statistically significant in the final model. This included receiving a partial or complete work disability benefit (partial: OR 0.62, 95% CI 0.26-1.47 and OR 0.69, 95% CI 0.43-1.12; complete: OR 0.24, 95% CI 0.10-0.58 and OR 0.12, 95% CI 0.07-0.20) and having a positive self-perceived possibility for returning to work (OR 1.06, 95% CI 1.01-1.11 and OR 1.08, 95% CI 1.05-1.11).

Conclusion

Non-health-related factors seem to be more important than health-related factors in predicting returning to work after long-term sickness absence. Receiving a work disability benefit and having negative expectations for returning to work seem to complicate return to work most for workers with subjective health complaints. With respect to returning to work predictors, workers with subjective health complaints do not differ from the reference group.

Introduction

Long-term sickness absence is of great concern in the developed industry because of high productivity loss, and high compensation and treatment costs[1]. While most workers return to work (RTW) within the first months of sickness absence, one-third of sick-listed workers remain absent for a much longer period of time[1,2]. The leading causes for long-term sickness absences are chronic disorders, based on mental, musculoskeletal and cardio-vascular health complaints[3]. Most of these health complaints can be explained by well-defined diseases; however, there are also persistent subjective health complaints (SHC) that cannot be fully explained by such well-defined diseases[4]. SHC refer to symptoms (e.g. fatigue, pain, dizziness) and syndromes (e.g. fibromyalgia, irritable bowel syndrome), for which no clear organic cause is currently found after appropriate medical examination. SHC are identical to other common terms, such as medically unexplained physical symptoms (MUPS) or persistent physical symptoms (PPS), which also refer to complaints with an unknown underlying pathology.

Research has suggested that long-term sick-listed workers with SHC have an increased risk of permanent disability, a weakened financial position, social isolation and a compromised quality of life[5,6]. RTW is an important factor in reducing these economic, societal and personal consequences. In most European countries, physicians have to support sick-listed workers in their RTW process[7]. Physicians, however, have reported difficulties in supporting the RTW process of sick-listed workers with SHC in particular, due to the lack of objective medical findings and limited knowledge on relevant factors in long-term sickness absence and RTW for workers with SHC[8].

Most studies on long-term sickness absence and RTW have been performed for workers with well-defined diseases, specific physical symptoms or across several health conditions[9-12]. These studies have revealed that health-related factors, such as the severity of the disease and the symptoms, seem to become less relevant for RTW in long-term sickness absence than for RTW in short-term sickness absence[9-12]. External and psychosocial factors, such as self-perceived health and disability, job demands and strain, claim-related aspects, age, self-efficacy and own expectations for RTW seem to become more important for RTW in the later phases of sickness absence[9–12]. This suggests that the RTW process after long-term sickness absence benefits from a more phase-specific and multifactorial approach across several health conditions.

To date, little attention has been devoted to determine RTW factors for long-term sick-listed workers with SHC, and the evidence that is available is conflicting and of low quality[13]. More knowledge of factors on RTW after long-term sickness absence for workers with SHC is highly relevant for physicians to better identify sick-listed workers with SHC and to better support these workers in their RTW process. Medico-

legal criteria on which disability systems are often based together with the lack of objective medical findings can make it difficult to use SHC to claim work disability benefits[14,15]. The system in the Netherlands, in which a well-defined medical disease is not a prerequisite for a work disability benefit, provides an unique opportunity to analyse relevant prognostic factors for RTW for long-term sick-listed workers with SHC[16].

This study was designed to evaluate the prognostic factors for RTW for workers with SHC after long-term sickness absence (>84 weeks) and to compare these factors with the prognostic factors for RTW for long-term sick-listed workers with other disorders as a reference group. We believe that understanding the most relevant factors for RTW for long-term sick-listed workers with SHC can help reduce sickness absence among these workers and optimise their rehabilitation and RTW process. Our results will give physicians more insight into whether they should give comparable advice and suggest comparable interventions for RTW for long-term sick-listed workers with SHC and for those with other disorders.

Methods

Study population and design

This study used data from the Forward study, a Dutch longitudinal cohort of 2593 out of 44,379 long-term sick-listed workers aged 18-65 years, who had been registered as sick-listed for at least 84 weeks between June 2014 and May 2015 in the electronic database of the Dutch Social Security Institute (UWV). The participants of Forward did not meet the exclusion criteria of Forward (unable to fill in questionnaires; no longer sick-listed; hospitalised; involved in judicial procedures; pregnant in the three months before study entry; suffering from cancer, a psychotic disease or dementia in the twelve months before study entry; and a PHQ-15 score of ≤5)[17]. The Forward study followed the included participants for 24 months after baseline, and measurements with questionnaires were taken at baseline (T0), after one year (T1) and after two years (T2). Further information about the study population of Forward has been described comprehensively elsewhere[18].

Figure 1 shows the flowchart of the study sample for the present study. The present study selected 1250 participants out of the 2593 Forward participants. Participants were included if they were not returned to work at baseline, their work status had been fully documented in the questionnaires during follow-up and if they were clearly diagnosed with SHC (subjective health complaints) or another disorder. Information about diagnoses was derived from medical work disability assessment data of UWV. In the Netherlands, workers who are sick-listed for at least 84 weeks can apply for a medical work disability assessment at UWV. These assessment results in a diagnosis

by an insurance physician (IP) based on the International Classification of Diseases (ICD classification)[19]. IPs can report 10 functional somatic syndromes: Chronic Fatigue syndrome, Fibromyalgia, Irritable Bowel Syndrome, Pelvic Girdle Pain, Repetitive Strain Injury, Somatic (Pain) Syndrome, Somatization disorder, Tension Headache, Tietze Syndrome and Whiplash[20]. IPs can also report one of the 25 functional somatic symptoms that match with the 23 (partially) unexplained physical complaints of the Robbins list[21]. For this study, participants were defined as suffering from SHC if the IP reported a functional somatic syndrome or symptom. All other participants with a clear diagnosis were defined as the reference group.

Measures
Dependent Variable
The primary outcome measure was RTW (returning to work) during follow-up, with RTW defined as a partial or full return to a paid job for a duration of at least 28 days. This outcome measure was based on self-reported answers to the follow-up questionnaires at T1 and T2. The answer options in the questionnaire were:
- partial or full returning to my usual job or another paid job for ≥ 28 days;
- partial or full returning to my usual job or another paid job for < 28 days;
- no returning to a paid job;
- no returning to a job at all.

Participants who had partially or fully returned to their usual or another paid job for < 28 days or who had not returned to a paid job or any job at all were combined into one category.

Independent Variables
The selection of independent variables was based on literature regarding predictors for RTW and work ability outcomes in general[9-12]. The selected variables were divided into domains based on the biopsychosocial model. This is a universal, well-known conceptual framework that focuses on health conditions and internal and external contextual factors. It was chosen for this study as it is useful for assessing all aspects of disability and functioning[15,22]. The independent variables were classified into the following four domains:
1. Demographic
2. Socio-economic and work-related
3. Health-related
4. Self-perceived ability

All variables were collected at baseline via self-reported questionnaires, except for the variable work disability benefits in the socio-economic and work-related domain, which was derived from UWV data after the medical work disability assessment.

Figure 1 Flow chart of the present study population
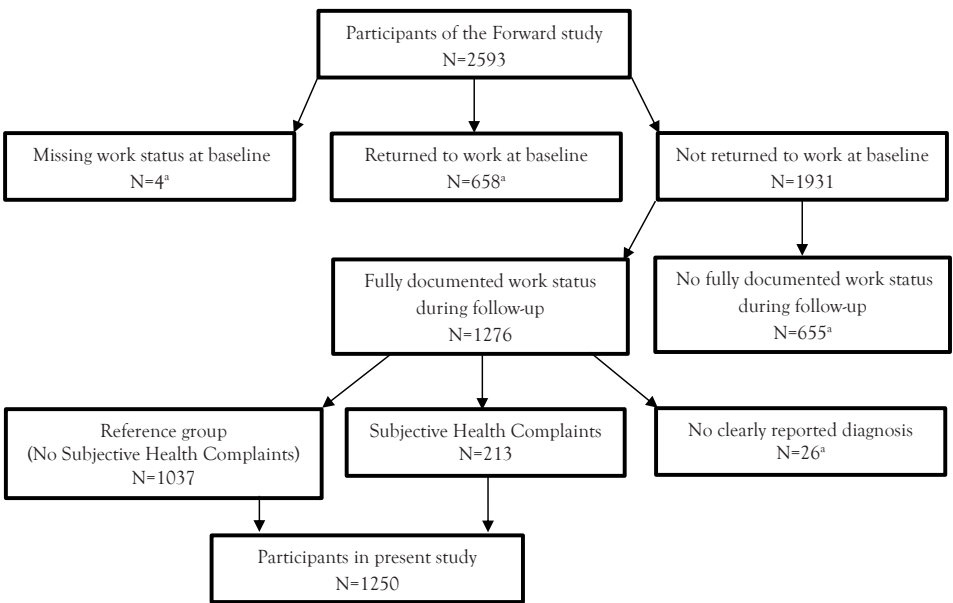
ᵃ1343 participants of Forward did not participate in the present study.

Demographic domain

The demographic domain included answers to questions about age (years), gender (male/female), marital or partner status (yes/no), breadwinner of the family (yes/no), land of birth (the Netherlands or another country), and educational level (primary school/secondary school/high school/bachelor and master).

Socio-economic and work-related domain

The socio-economic and work-related domain contained answers to questions about the participants job and work status: collar job (blue/white/pink), being employed (yes/no), usual working time (hours), regular work schedule (yes/no), managerial position (yes/no), job demands (physical/psychological/ combination of both), and previous absenteeism for the same reason (yes/no). This domain also contained information about work disability benefits (no/partial/complete) and about stressors and support, based on answers to the following validated questionnaire:

• The Work and Well-Being Inventory (WBI) questionnaire. The stressors and support variables were based on two subscales of the WBI. The stressors subscale contains 16 questions, with a scoring range between 16 and 64 (higher scores indicate more stressors); the support subscale contains 21 questions, with a scoring range between 21 and 84 (higher scores indicate better or more support)[23].

Health-related domain

The health-related domain included answers to questions about the use of specialist or psychiatric care in the last two years (yes/no) and the use of medication (yes/no). It also included information on the presence of a depressive or anxiety disorder, the severity of complaints, the physical and mental health, the presence of hypochondria, and symptom scale and coping strategies, based on answers to the following validated questionnaires:

- The Hospital Anxiety and Depression Scale (HADS). The presence of a depressive or anxiety disorder was assessed by using two subscales of the HADS. Each subscale contains seven questions about the presence of a depressive or anxiety disorder, with a scoring range of 0-21 for each separately. Scores of ≤7 mean no disorder (no), scores between 8 and 10 mean a possible disorder (maybe), and scores of ≥11 mean a definite disorder (yes)[24].

- The Patient Health Questionnaire (PHQ-15). The severity of complaints was based on the PHQ-15. This questionnaire contains 15 questions about the severity of complaints, with a scoring range of 5-30. Scores between 5 and 10 represent mild somatic complaints, scores between 10 and 15 represent moderate somatic complaints, and scores of ≥15 represent severe somatic complaints[17].

- The Short Form Health Survey 36 (SF-36). The physical and mental health (PCS and MCS) and the health change (SF-2) were measured by using the SF-36. PCS and MCS were measured by using a validated formula on total scores of the SF-36. The scoring range lies between 0 and 100 for each score separately, with higher scores indicating better levels of mental and physical health and functioning. The SF-2 was compiled from the following question on the SF-36: "How is your health in general compared with a year ago?" We categorised the five answering options of SF-2 into three categories: one category with the answers 'much better' and 'somewhat better' (better), one category with the answer 'no difference' (same), and one category with the answers 'somewhat worse' and 'much worse' (worse) [25,26].

- The Whitely Index questionnaire (WI). The presence of hypochondria was measured with the WI. This questionnaire contains 14 questions, with a scoring range between 0 and 14. Scores between 0 and 8 mean 'no hypochondria' (no) and scores of ≥8 mean 'definitely hypochondria' (yes)[27].

- The WBI questionnaire. The symptom scale and coping strategies were based on two subscales of the WBI. The subscale about the symptom scale contains 20 questions, with a scoring range between 20 and 80 (a higher score means a higher risk for symptoms); the subscale about coping strategies contains 21 questions, with a scoring range between 17 and 68 (a higher score means less coping)[23].

Self-perceived ability domain

The self-perceived ability domain contained one answer to a question about RTW expectations (yes or maybe/no). It also contained answers to the following validated questionnaires about disability, work ability in general and in the context of work load, and possibilities for RTW.

- The WBI questionnaire. Self-perceived disability was based on the disability subscale of the WBI. The subscale contains seven questions, with a scoring range between 7 and 28. Higher scores on this subscale mean more self-perceived disability[23].
- The Work Ability Index (WAI). Perception of work ability in general and in the context of work load were both derived from the WAI. The category about work ability in general, also called The Work Ability Score (WAS), contains one question, with a scoring range between 0 and 10. The category about work ability in the context of work load contains two questions, with a scoring range between 2 and 10. For both categories higher scores indicate higher self-perceived work ability[28].
- The Obstacles to Return to Work Questionnaire (ORQ). The self-perceived possibilities for RTW were derived from the subscale "Perceived Prognosis of Work Return" of the ORQ. This subscale contains six questions, with a scoring range between 0 and 36. Higher scores mean higher self-perceived possibilities for RTW[29].

Statistics

For the analyses, participants were divided into two subgroups: workers with SHC and those with other disorders as the reference group. All further analyses were performed for both groups separately. Firstly, descriptive analyses were used to describe both groups at baseline. Secondly, to obtain information about possible predictors for RTW, univariable logistic regression analyses were performed for all independent variables per domain separately (i.e. demographic, socio-economic and work-related, health-related, and self-perceived ability), with the dependent variable partial or full RTW to a paid job for $\geq$ 28 days.

A cut-off p-value ≤ 0.157 was used for the univariable analyses[30]. Multicollinearity between the variables was checked. Multicollinearity was assumed if the analyses showed variance inflation factor (VIF) scores of ≥ 10[31]. Variables that had a p-value ≤ 0.157 in the univariable analyses and a VIF score of <10 in the correlation analyses were included in a combined multivariable logistic regression analysis with backward selection per domain separately. In the next step, all variables that had a p-value ≤ 0.157 in the combined models per domain were included in one multivariable model. Odds ratios (OR) and 95% confidence intervals (95% CI) were calculated to show associations with RTW in this multivariable model. Subsequently, variables

with a p-value ≤0.05 were combined in a final model. The Hosmer and Lemeshow test was performed and the Nagelkerke's R2 was assessed to measure the overall fit and the overall predictive ability of the final model[31].

The analyses were based on complete case analyses. In complete case analyses, missing data may give bias due to selective loss to follow-up. To explore the robustness of the complete case analyses, missing data sensitivity analyses were also performed by using a multiple imputation approach[32]. The analyses were identical for both approaches. SPSS version 24.0 and R-studio were used for all statistical analyses.

Results

Baseline characteristics of the participants with SHC (subjective health complaints) (*n*=213) and of the reference group (*n*=1037) are shown separately in Table 1. On average, the participants with SHC were more often women, less often the breadwinner of the family, usually worked fewer hours and received less complete work disability benefits than the reference group (Table 1).

Table 1 Baseline characteristics of the study population

		SHCª (N=213)		Other disorders (N=1037)	
Domains	Categories/ Ranges	Mean/Nᵇ	SDᶜ/%	Mean/N	SD/%
Demographic					
Age in years	18-34	16	8%	54	5%
	35-44	36	17%	126	12%
	45-54	75	35%	350	34%
	55-65	86	40%	507	49%
Gender	Male	76	36%	561	54%
Marital status	Married or partner	152	71%	777	75%
Breadwinner of the family	Yes	127	60%	676	65%
Land of birth	The Netherlands	193	91%	947	91%
Educational level	None/Primary school	24	11%	87	8%
	Secondary school	78	37%	419	41%
	High school	68	32%	335	32%
	Bachelor/Master	43	20%	194	19%
Socio-economic and work-related					
Collar job	Blue	60	29%	337	34%
	White	87	42%	336	34%
	Pink	61	29%	316	32%
Employer	Yes	77	36%	366	37%
Usual working time in hours	4-60	31.64	10.34	32.69	10.91
Work schedule	Regular	144	68%	664	64%
Managerial position	Yes	42	20%	227	22%
Job demands	Psychological	48	23%	244	24%
	Physical	77	36%	330	32%
	Psychological and physical	88	41%	456	44%
Stressors	16-64	38.56	9.44	38.27	9.25
Support	21-84	58.20	13.02	58.90	12.73
Previous absenteeism same reason	Yes	109	51%	479	47%
Work disability benefits	No	51	26%	144	14%
	Partial	50	25%	257	26%
	Complete	99	49%	600	60%

Table 1 Continued

Domains	Categories/ Ranges	SHC[a] (N=213)		Other disorders (N=1037)	
		Mean/N[b]	SD[c]/%	Mean/N	SD/%
Health-related					
Use of specialist care last 2 years	Yes	191	90%	879	85%
Use of psychiatric care last 2 years	Yes	120	56%	486	47%
Use of medication	Yes	196	92%	922	89%
Depressive disorder	No	68	32%	383	37%
	Maybe	50	24%	233	23%
	Yes	94	44%	419	40%
Anxiety disorder	No	82	39%	412	40%
	Maybe	44	21%	244	23%
	Yes	86	40%	381	37%
Severity of complaints	Mild	39	18%	344	33%
	Moderate	56	26%	362	35%
	Severe	118	56%	331	32%
Physical Health	0-100	29.73	8.89	31.57	9.79
Mental Health	0-100	33.32	12.58	34.68	13.81
Health change comparing last year	Worse	124	58%	556	54%
	Same	51	24%	306	29%
	Better	37	18%	174	17%
Hypochondria	Yes	155	73%	706	68%
Symptom scale	20-80	46.60	11.16	44.94	12.05
Coping strategies	17-68	43.40	9.77	42.70	9.52
Self-perceived ability					
Return to work expectation	Yes or maybe	148	70%	688	66%
Disability	7-28	25.31	3.50	24.84	3.64
Work ability in general	0-10	1.99	1.78	2.20	1.95
Work ability in context of work load	0-10	4.13	1.50	4.28	1.62
Possibilities for returning to work	0-36	9.83	7.81	9.53	8.15

[a]=Subjective Health Complaints; [b]=Number; [c]= Standard Deviation

RTW (returning to work) predictors for participants with SHC

Of the 213 participants with SHC, 47 participants (22%) returned to work. For RTW after two years of sickness absence we found significant univariable associations ($p \leq 0.157$) in the domains demographic, socio-economic and work-related, health-related and self-perceived ability (Table 2). We found no multicollinearity for any of the variables in the domains (data not shown). We used backward selection and further select one or two variables with a *p*-value ≤0.157 in all four domains, which we combined in a multivariable analysis. One variable in the socio-economic and work-related domain and one variable in the self-perceived ability domain remained statistically significant ($p \leq 0.05$) (Table 3), which we combined in a final multivariable model. In the final model, we found that the chance of RTW after two years of sickness absence decreased if participants obtained a partial (OR 0.62, 95% CI 0.26-1.47) or a complete (OR 0.24, 95% CI 0.10-0.58) work disability benefit after these two years. In addition, we found that a higher self-perceived possibility for RTW increased the chance for RTW after two years of sickness absence (OR 1.06, 95% CI 1.01-1.11). The Hosmer and Lemeshow test was not statistically significant (*p*-value 0.19), indicating that there was a good fit of the final model, and the Nagelkerke's R2 was 0.22.

Table 2 Univariable logistic regression analyses of potential predictors for participants with SHC[a] and other disorders separately

Domains	Categories/Ranges	SHC[a] (N=213)		Other disorders (N=1037)	
		OR[b]	95% CI[c]	OR	95% CI
Demographic					
Age in years	18-34	Reference		Reference[d]	
	35-44	0.48	0.13-1.72	**0.71**	**0.36-1.37**
	45-54	0.32	0.10-1.04	**0.52**	**0.29-0.95**
	55-65	0.54	0.18-1.66	**0.23**	**0.12-0.42**
Gender	Male	Reference		Reference	
	Female	0.87	0.44-1.69	0.87	0.64-1.18
Married or partner	No	Reference		Reference	
	Yes	0.82	0.41-1.65	0.99	0.70-1.41
Breadwinner of the family	No	Reference		Reference	
	Yes	1.41	0.72-2.78	1.10	0.80-1.52
Land of birth	The Netherlands	**Reference**		Reference	
	Other country	**2.63**	**1.01-6.88**	1.48	0.90-2.42
Educational level	None/Primary school	**Reference**		**Reference**	
	Secondary school	**1.27**	**0.33-4.94**	**1.86**	**0.89-3.87**
	High school	**2.71**	**0.73-10.17**	**2.76**	**1.33-5.76**
	Bachelor/Master	**3.03**	**0.77-11.98**	**2.77**	**1.29-5.95**
Socio-economic and work-related					
Collar job	Blue	Reference		Reference	
	White	1.01	0.46-2.24	0.99	0.68-1.43
	Pink	1.08	0.46-2.54	0.99	0.68-1.44
Employer	No	Reference		Reference	
	Yes	1.12	0.57-2.20	1.17	0.86-1.60
Usual working time in hours	4-60	1.00	0.97-1.03	**1.01**	**1.00-1.03**
Work schedule	Irregular	Reference		Reference	
	Regular	0.81	0.41-1.59	0.94	0.69-1.28
Managerial position	No	Reference		**Reference**	
	Yes	1.13	0.51-2.51	**1.72**	**1.22-2.41**
Job demands	Psychological	Reference		Reference	
	Physical	0.67	0.28-1.60	0.81	0.54-1.21
	Psychological and physical	0.94	0.42-2.13	0.88	0.60-1.28
Stressors	16-64	0.99	0.95-1.02	1.01	0.99-1.03
Support	21-84	1.00	0.98-1.03	**0.99**	**0.98-1.00**
Previous absenteeism same reason	No	Reference		Reference	
	Yes	1.10	0.57-2.10	0.92	0.68-1.25
Work disability benefit	No	**Reference**		**Reference**	
	Partial	**0.59**	**0.25-1.38**	**0.62**	**0.41-0.94**
	Complete	**0.19**	**0.08-0.45**	**0.08**	**0.05-0.12**
Health-related					
Use of specialist care last 2 years	No	Reference		**Reference**	
	Yes	0.96	0.33-2.75	**0.54**	**0.37-0.79**
Use of psychiatric care last 2 years	No	Reference		Reference	
	Yes	1.06	0.55-2.04	1.13	0.84-1.53
Use of medication	No	Reference		**Reference**	
	Yes	2.24	0.49-10.14	**0.44**	**0.29-0.67**
Depressive disorder	No	Reference		Reference	
	Maybe	0.42	0.16-1.10	1.45	0.98-2.15
	Yes	0.74	0.36-1.52	1.12	0.79-1.60
Anxiety disorder	No	Reference		Reference	
	Maybe	1.19	0.50-2.80	1.05	0.70-1.57
	Yes	0.94	0.45-1.97	1.23	0.87-1.74
Severity of complaints	Mild	Reference		**Reference**	
	Moderate	1.29	0.48-3.46	**0.83**	**0.58-1.19**
	Severe	1.04	0.43-2.55	**0.66**	**0.45-0.97**
Physical Health	0-100	**1.03**	**0.99-1.06**	**1.05**	**1.03-1.06**
Mental Health	0-100	1.01	0.99-1.04	1.00	0.98-1.01
Health Change comparing last year	Worse	**Reference**		**Reference**	
	Same	0.78	0.32-1.86	1.80	1.26-5.57
	Better	2.84	1.29-6.28	3.13	2.12-4.64

Table 2 Continued

Domains	Categories/Ranges	SHC[a] (N=213)		Other disorders (N=1037)	
		OR[b]	95% CI[c]	OR	95% CI
Hypochondria	No	**Reference**		Reference	
	Yes	**0.57**	**0.28-1.13**	0.92	0.66-1.26
Symptom scale	20-80	0.98	0.95-1.01	1.00	0.99-1.02
Coping strategies	17-68	1.00	0.97-1.04	1.00	0.98-1.01
Self-perceived ability					
Return to work expectation	No	**Reference**		**Reference**	
	Yes or maybe	**2.42**	**1.06-5.53**	**3.47**	**2.32-5.19**
Disability	7-28	**0.91**	**0.84-0.99**	**0.86**	**0.83-0.89**
Work ability in general	0-10	**1.30**	**1.09-1.56**	**1.35**	**1.25-1.46**
Work ability in the context of work load	0-10	**1.26**	**1.01-1.57**	**1.34**	**1.22-1.47**
Possibilities for returning to work	0-36	**1.08**	**1.04-1.12**	**1.13**	**1.11-1.15**

[a]=Subjective Health Complaints; [b]=Odds ratio; [c]=95% confidence intervals; [d]Numbers in bold had a *p*-value of ≤0.157

Table 3 Multivariable logistic regression analysis of all predictors for participants with SHC[a] and other disorders separately

Domains	Categories/Ranges	SHC[a] (N=213)		Other disorders (N=1037)	
		OR[b]	95% CI[c]	OR	95% CI
Demographic					
Age in years	18-34			**Reference[d]**	
	35-44			0.91	0.39-2.16
	45-54			0.72	0.32-1.61
	55-65			**0.39**	**0.17-0.88**
Land of birth	The Netherlands	Reference		Reference	
	Another country	2.61	0.88-7.77	1.14	0.61-2.15
Educational level	None/Primary school	Reference		Reference	
	Secondary school	1.13	0.26-4.95	1.25	0.52-2.99
	High school	1.95	0.45-8.40	1.71	0.71-4.07
	Bachelor/Master	2.22	0.49-10.12	1.52	0.60-3.82
Socio-economic and work-related					
Usual working time in hours	4-60			1.01	0.99-1.03
Managerial position	No			**Reference**	
	Yes			**1.56**	**1.00-2.45**
Work disability benefit	No	**Reference**		**Reference**	
	Partial	**0.71**	**0.29-1.78**	**0.66**	**0.40-1.08**
	Complete	**0.26**	**0.10-0.66**	**0.12**	**0.07-0.20**
Health-related					
Use of medication	No			Reference	
	Yes			0.88	0.51-1.50
Physical Health	0-100			1.00	0.98-1.03
Health Change comparing last year	Worse	Reference		Reference	
	Same	0.51	0.18-1.45	0.98	0.63-1.54
	Better	1.31	0.49-3.51	0.84	0.48-1.48
Self-perceived ability					
Work ability in general	0-10			**1.11**	**1.00-1.24**
Possibilities for returning to work	0-36	**1.05**	**1.00-1.11**	**1.08**	**1.05-1.11**

[a]=Subjective Health Complaints; [b]=Odds ratio; [c]=95% confidence intervals; [d]Numbers in bold had a *p*-value of ≤0.05 and were combined the final model

RTW predictors for the reference group (participants with other disorders than SHC)

In the reference group (*n*=1037), 211 participants (20%) returned to work. We found significant univariable associations (*p*≤0.157) in all four domains for RTW (Table 2), and no multicollinearity in any of the domains (data not shown). After the backward selection, all four domains contained two or more significant variables (*p*≤0.157), which were combined in a multivariable model (Table 3). We analysed the five remaining significant variables (*p*≤0.05) in a final multivariable model. In the final model, the demographic domain showed that older participants were less likely to RTW (OR 0.37, 95% CI 0.16-0.81). For the socio-economic and work-related domain, we found that participants who previously worked in a managerial position were more likely to return to work (OR 1.64, 95% CI 1.06-2.53). If participants received partial or complete work disability benefits, they returned to work less often (OR 0.69, 95% CI 0.43-1.12 and OR 0.12, 95% CI 0.07-0.20). Within the domain of self-perceived ability, those who reported a good self-perceived work ability (OR 1.11, 95% CI 1.00-1.23) and a high possibility to RTW (OR 1.08, 95% CI 1.05-1.11) more often returned to work. The Hosmer and Lemeshow test was not statistically significant (*p*-value 0.82) in the final model, indicating that there was a good fit of the model. The Nagelkerke's R2 was 0.37.

Missing data

Missing data analyses showed that participants with an unknown RTW outcome differed significantly from the participants with a known RTW outcome. Participants with an unknown RTW outcome reported less good health, more complaints, less socio-economic status and less support (Appendix A). Although the sensitivity analyses did not show any differences on regression coefficients in the multivariable and final model (Appendix B), this meant that we could not completely rule out that the missing data was not merely a coincidence[32]. Therefore, we included only the results of the complete case analyses in this study; however, the results of the missing data analyses are presented in the supplementary materials for comparison (Appendix A and B).

Discussion

The main purpose of this study was to evaluate prognostic factors for RTW (returning to work) after long-term sickness absence for workers with SHC (subjective health complaints). In our Dutch population, we found that receiving work disability benefits after two years of sickness absence significantly predicted less RTW, and that high self-perceived possibilities for RTW resulted in more RTW after those two years

for workers with SHC. These prognostic factors for RTW, as well as the number of workers that returned to work, were comparable for the reference group with other disorders; however, we found three additional factors that predicted RTW for the reference group: a lower age, a previous managerial position and a high self-perceived work ability. Our results suggest that non-health-related factors are more important than health-related factors in predicting RTW after long-term sickness absence.

Our results reveal that receiving work disability benefits after two years of sickness absence is negatively related to the chances of returning to work successfully for workers with SHC. While some previous studies have supported that claim-related factors and compensation status are indeed associated with poorer health, longer sickness absence and less RTW[6,33,34], the literature in general has not paid much attention to this topic[35]. It is therefore difficult to determine whether it is poorer health status that leads to compensation and less RTW, or whether receiving compensation is a factor in RTW in and of itself. The literature that is available on this topic seems divided[36-39].

Our results seem to show an anti-therapeutic effect of disability compensation, as not the severity of the complaints but receiving work disability benefits had a negative influence on RTW for workers with SHC. The exact underlying mechanisms of this anti-therapeutic effect, however, are still difficult to determine[34]. Cassidy et al.[36] have argued that it could in part be explained by the theory of financial incentives, or secondary gain, as they found that removing the compensation increased health in workers with SHC. The explanation behind this hypothesis is that workers with SHC focus more on proving that their health complaints are real in the claim process at the expense of their RTW options because they are reluctant to RTW (i.e. less RTW willingness) for fear of losing their compensation and the validation of their being disabled[1,37].

In contrast to the anti-therapeutic effect suggested by Cassidy et al. and others[36,37], it is important to take into account that workers, regardless of their own feelings of recovery status, may be forced to RTW or to seek for another compensation because of financial necessity if they are not eligible for work disability benefits. Although information about the course of those workers is scarce, the limited evidence on this topic revealed a high mental impact[38]. In addition, some studies have suggested that the process of applying for compensation can in fact make people more ill[39-41]. This is explained in terms of the distress caused by these claim settlement processes outweighing the possible positive effect of the expectation of gain[39,40]. Importantly, this is irrespective of the underlying cause of the injury or the underlying pathology of the disease[41]. This is in line with the results of this study where the effect of work disability benefits was not only valid for workers with SHC: we found comparable results for workers with other disorders. The results of this study corroborates the view that the process of applying for or receiving a disability compensation in and

of itself may be a greater risk factor for permanent disability and less RTW than the severity and underlying pathology of the complaints and the health status in and of itself.

We also found that workers' self-perceived possibilities for RTW was one of the most important factors for workers with SHC as well as for workers without SHC after long-term sickness absence. Young et al.[42] state that researchers have assumed that health-related factors, which were found as important factors for RTW in short-term sickness absence, remain the most relevant predictors for RTW after long-term sickness absence. However, a body of evidence supports the theory that for several chronic disorders, including persistent SHC, the importance of precipitating factors for RTW shifts during the sickness absence process[9,10,12,43]. In fact, some studies on RTW after long-term sickness absence have indeed highlighted the workers' own expectations for RTW as an important factor[9-12] and have shown that health-related factors become less important during sickness absence[13]. The present study indicates that this effect on RTW is indeed true for all workers: health-related factors, such as the underlying pathology and the severity of the disorder, became less relevant, and the non-health-related factors, such as the self-perceived expectations, became more relevant, for RTW after long-term sickness absence. In addition, factors that seem to be especially important for RTW for workers with other disorders than SHC, can also be classified as non-health-related factors. Contrasting to our expectations based on the literature beforehand[5-8], we found similar rates in RTW for workers with SHC and those with other disorders, which also corroborates the comparable results between these two groups in the present study.

Strengths and limitations

The main strengths of this study were the use of broad data from participants from all regions of the Netherlands, which increases generalisability, and its prospective design. We asked workers to participate in the study when they were already sick-listed for two years, but just before their medical work disability assessment. We followed them for another two years, even if they were not granted for work disability benefits. This provided a unique opportunity to follow workers on RTW after long-term sickness absence, and to include the effect of work disability benefits.

There are also some weaknesses in the present study. The first is the small response rate, due to the manner in which we included the participants. Because of stringent privacy regulations, we were not able to make a selection of workers beforehand. Therefore, we asked all 44,379 workers in the electronic database of UWV (the Dutch Social Security Institute) who were registered as sick-listed for ≥84 weeks to participate in the study. They were asked to fill in a checklist without assistance and to respond only if they did not meet one of the criteria on the checklist and wanted to participate in the study. Out of the approached workers 9% responded, which is

lower than average[44].

A second weakness follows from the first: we could not obtain more information about the non-responders as their data was not available. While it is certain that many workers who received a participation letter would normally not have been contacted, we may still assume – based on the high rate of non-response – that the characteristics of the study population may have caused some selection bias. It is possible that the non-responders were unhealthier than the responders, with possibly as result more positive outcomes in the present study. We did find, however, that the study sample was quite comparable with earlier studies on RTW for workers with other chronic diseases[13].

A further conceivable weakness is that as an outcome measure in research, data on sickness absence gathered from data files is preferable to data based on questionnaires[45]. However, questionnaires may still be considered a valuable source of information on overall sickness absence, and we had to use the questionnaires for the outcome measure due to the fact that this data on RTW after long-term sickness absence was not available in the UWV records.

In addition, missing follow-up questionnaires and missing answers in submitted questionnaires led to the exclusion of one-third of the respondents. However, the sensitivity analyses between the complete case analyses and the multiple imputation analyses for all participants showed comparable results on the regression coefficients in the final models. We take this to mean that there is missing at random (MAR), and that the data in the complete case analyses is robust, unselective and also representative for other workers.

Implications for practice and future research

Based on the present study, support of RTW after long-term sickness absence has to be based especially on modifiable non-health-related factors, irrespective of the underlying pathology of the disorder. Previous studies have reported that delayed recovery could be improved by the implementation of more assistance, less medical assessments that have no therapeutic value, more personalised assessments, and more clarity in decision making in order to reduce the stressfulness for workers in the claim management process[39,46,47]. In addition, previous studies have reported that behaviour change interventions and interventions on self-efficacy may have the potential of optimizing the RTW process[48,49]. However, more research is required to better examine the important underlying factors for positive RTW expectations and which interventions can help to change negative expectations for RTW into positive ones.

Conclusion

Not receiving work disability benefits and having positive expectations for RTW are the most important factors in RTW successfully after long-term sickness absence, both for workers with SHC as for those with other disorders. This suggests that non health-related factors are more important than health-related factors to predict RTW after long-term sickness absence.

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Appendix A Missing data analyses of the baseline characteristics of the present study population

Domains	Categories/ Ranges	Cases with missing outcome[a] (N=655)		Cases with no missing outcome[b] (N=1276)		Chi-square or T-test
		Mean/N[c]	SD[d]/%	Mean/N	SD/%	P-value
Demographic						
Age in years	18-34	84	13%	70	6%	0.00
	35-44	97	15%	166	13%	
	45-54	235	36%	435	34%	
	55-65	239	36%	605	47%	
Gender	Male	302	46%	652	51%	0.04
Marital status	Married or partner	433	66%	949	74%	0.00
Breadwinner of the family	Yes	398	61%	817	64%	0.91
Land of birth	The Netherlands	529	81%	1163	91%	0.00
Educational level	None/Primary school	102	16%	112	9%	0.00
	Secondary school	251	38%	507	40%	-
	High school	219	34%	413	32%	-
	Bachelor/Master	81	12%	242	19%	-
Socio-economic and work-related						
Collar job	Blue	220	36%	405	33%	0.33
	White	196	32%	431	35%	-
	Pink	197	32%	387	32%	-
Employer	Yes	202	33%	463	38%	0.04
Usual working time in hours	4-60	32.49	10.68	32.50	10.77	0.98
Work schedule	Regular	399	61%	825	65%	0.12
Managerial position	Yes	135	21%	273	21%	0.68
Job demands	Psychological	119	18%	301	24%	0.01
	Physical	243	37%	414	33%	-
	Psychological and physical	290	45%	554	44%	-
Stressors	16-64	39.15	9.53	38.23	9.31	0.05
Support	21-84	57.28	12.70	58.85	12.76	0.01
Previous absenteeism same reason	Yes	331	52%	601	48%	0.09
Work disability benefit	No	152	25%	197	16%	0.00
	Partial	105	17%	310	26%	-
	Complete	355	58%	703	58%	-
Health-related						
Use of specialist care last 2 years	Yes	544	83%	1093	86%	0.13
Use of psychiatric care last 2 years	Yes	316	48%	620	49%	0.89
Use of medication	Yes	575	88%	1143	90%	0.25
Depressive disorder	No	190	29%	465	37%	0.00
	Maybe	147	23%	288	23%	-
	Yes	315	48%	520	41%	-
Anxiety disorder	No	218	33%	509	40%	0.00
	Maybe	132	20%	291	23%	-
	Yes	304	47%	475	37%	-
Severity of complaints	Mild	165	25%	390	31%	0.01
	Moderate	212	32%	430	34%	-
	Severe	278	42%	456	36%	-
Physical Health	0-100	30.36	8.96	31.26	9.62	0.04
Mental Health	0-100	33.20	13.33	34.56	13.61	0.04
Health change comparing last year	Worse	359	55%	695	55%	0.11
	Same	203	31%	361	28%	-
	Better	89	14%	218	17%	-
Hypochondria	Yes	489	75%	872	69%	0.00
Symptom scale	20-80	47.87	12.65	45.16	11.91	0.00
Coping strategies	17-68	42.60	9.70	42.77	9.56	0.72
SHC[e]	Yes	127	20%	213	17%	0.17

Domains	Categories/ Ranges	Cases with missing outcome[a] (N=655)		Cases with no missing outcome[b] (N=1276)		Chi-square or T-test
		Mean/N[c]	SD[d]/%	Mean/N	SD/%	P-value
Self-perceived ability						
Return to work expectation	Yes or maybe	462	71%	858	67%	0.11
Disability	7-28	24.78	3.89	24.89	3.65	0.56
Work ability in general	0-10	2.27	2.13	2.18	1.93	0.41
Work ability in context of work load	0-10	4.16	1.62	4.26	1.61	0.20
Possibilities for returning to work	0-36	9.39	7.89	9.67	8.14	0.50

[a]=No fully documented work status during follow-up; [b]=Fully documented work status during follow-up; [c]=Number; [d]=Standard Deviation; [e]=Subjective Health Complaints.

Appendix B Multivariable logistic regression multiple imputation analysis (pooled data) of all potential predictors for participants with SHC[a] and other disorders separately

Domains	Categories/Ranges	SHC[a] OR	95% CI	Other disorders OR	95% CI
Demographic					
Age in years	18-34			Reference	
	35-44			0.75[b]	0.34-1.67
	45-54			0.61	0.28-1.33
	55-65			0.32	0.15-0.68
Land of birth	The Netherlands	Reference		Reference	
	Another country	2.18	0.76-6.24	1.33	0.76-2.32
Educational level	None/Primary school	Reference		Reference	
	Secondary school	1.35	0.32-5.79	1.09	0.53-2.24
	High school	2.32	0.55-9.78	1.26	0.61-2.58
	Bachelor/Master	2.60	0.59-11.55	1.01	0.47-2.18
Socio-economic and work-related					
Employer	No			Reference	
	Yes			1.21	0.84-1.74
Manegerial position	No			Reference	
	Yes			1.65	1.10-2.47
Work disability benefit	No	Reference		Reference	
	Partial	0.65	0.27-1.58	0.73	0.47-1.13
	Complete	0.22	0.09-0.57	0.13	0.08-0.22
Health-related					
Use of medication	No			Reference	
	Yes			1.01	0.61-1.68
Physical Health	0-100			1.01	0.99-1.03
Health Change comparing last year	Worse	Reference		Reference	
	Same	0.45	0.17-1.21	0.97	0.63-1.48
	Better	1.17	0.46-2.94	0.78	0.46-1.33
Self-perceived ability					
Work ability in general	0-10			1.12	1.01-1.25
Possibilities for returning to work	0-36	1.06	1.01-1.11	1.08	1.05-1.10

[a]=Subjective Health Complaints; [b]=Odds ratio; [c]=95% confidence intervals; [d]Numbers in bold had a *p*-value of ≤0.05 and were combined the final model

Chapter 6

Prognostic factors for staying at work for partially sick-listed workers with subjective health complaints: a prospective cohort study

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Abstract

Aim
Examination of prognostic factors for staying at work for long-term sick-listed workers with subjective health complaints (SHC) who partially work in a paid job, and to evaluate whether these factors are comparable with those of workers with other disorders.

Methods
We used data of 86 partially sick-listed workers with SHC (57 females, 29 males, mean age 47.1 years) and 433 with other disorders (227 females, 206 males, mean age 50.9 years), from an existing prospective cohort study consisting of 2593 workers aged 18–65 years and registered as sick-listed with different health complaints or disorders for at least 84 weeks in the database of the Dutch Social Security Institute. We performed univariable logistic regression analyses ($p \leq 0.157$) for all independent variables with the dependent variable staying at work for the workers with SHC. We then performed multivariable logistic regression analyses with forward selection ($p \leq 0.157$) and combined the remaining factors in a final, multivariable model ($p \leq 0.05$), which we also used for logistic regression analysis in the workers with other disorders.

Results
The following factors were significant prognostic factors for staying at work for workers with SHC: full work disability benefits (odds ratio (OR) 0.07, 95% confidence interval (95% CI) 0.01–0.64), good mental health (OR 1.08, 95% CI 1.02–1.14), positive expectations for staying at work (OR 6.49, 95% CI 2.00–21.09), previous absenteeism for the same health complaint (OR 0.31, 95% CI 0.10–0.96) and good coping strategies (OR 1.13, 95% CI 1.04–1.23). For workers with other disorders, full work disability benefits, good mental health and positive expectations for staying at work were also prognostic factors for staying at work.

Conclusion
Individual and policy factors seem to be important for staying at work of sick-listed workers with SHC and those with other disorders alike, but several biopsychosocial factors are particularly important for workers with SHC.

Introduction

Subjective health complaints (SHC) for which no pathological cause can be found after adequate physical examination are common in the general public and workforce of industrialized countries[1]. SHC is an umbrella term for health complaints (e.g., pain and dizziness) and syndromes (e.g., fibromyalgia and irritable bowel syndrome) that cannot be fully explained by a well-defined organic disease, comparable to other well-known terms such as medically unexplained physical symptoms and bodily distress disorder[2]. Approximately 30–70% of the working age population report at least one SHC during their working life[3,4]. In most cases, workers with SHC have only mild health complaints and can manage to stay productive at work, or they recover quickly and can return to work after a short period[3]. In 20–40% of the workers with SHC, however, the health complaints may become chronic, and the workers have persistent difficulties in meeting work demands[4,5]. This can lead to an increased risk of occupational dysfunction, long-term sickness absence and permanent exit from paid work[6].

Most research on workers with SHC has focused on identifying which workers are at increased risk of sickness absence, and on finding ways for absent workers to return to work[7-9]. This research has revealed that psychosocial and work-related factors in particular, such as mental distress, self-perceived disability, self-efficacy and expectations, social support, work demands, and compensation status, are associated with sickness absence and possibilities for returning to work[7-9]. Many researchers have argued that modification of these factors may help to prevent sickness absence and to support full return to work[10,11]. A key problem is that after long-term sickness absence, workers with SHC can partially return to work but may still experience difficulties in maintaining their work productivity and may be confronted with increased workload due to their chronic health complaints[12]. This group of workers therefore remains at increased risk for recurrent sickness absence and, ultimately, permanent exit from paid work[10,12]. As it is well known that early exit from paid work leads to a poorer quality of life[13], knowledge is needed on how to support staying at work for this group of workers.

To date, knowledge on factors that play a role in staying at work for workers with SHC is limited. The few studies that have examined work functioning and staying at work after return to work have mostly focused on well-defined chronic health complaints, or on a mixture of several chronic disorders[14,15], but not on SHC specifically. In many countries, it is difficult to examine long-term partially sick-listed workers with SHC, as the criteria for work disability benefits for this group of workers are mostly very strict. The conditions for work disability benefits in the Netherlands, however, do not distinguish between SHC and other disorders. We, therefore, investigated prognostic factors for staying at work for partially sick-listed workers with SHC who managed to stay at work (at least partially), as well as for workers with other disorders,

to gain insight into which factors may be modified with timely interventions to avoid recurrent sickness absence after return to work and to determine whether these factors are different for workers with SHC and workers with other disorders.

Methods

Study design and study population
We selected participants from the Forward cohort, which is a prospective cohort study performed among workers aged 18–65 years and registered as sick-listed for at least 84 weeks in the electronic database of the Dutch Social Security Institute between June 2014 and May 2015. The Forward cohort primarily aimed to find prognostic factors for return to work and included 2593 workers who met all inclusion criteria and returned a filled-in baseline questionnaire (T0) and a signed informed consent. We followed the included participants for 24 months with questionnaires after one year (T1) and two years (T2) from baseline. The flowchart in Figure 1 describes the design of the Forward cohort and the study population of the present study.

For the present study, we selected 519 participants from the Forward cohort who were still partially at work at baseline (n=658), despite a medical condition (n=595), and who had a fully documented work status during follow-up (n=519). Information about work status was derived from the questionnaires, and information about the medical condition from the medical work disability assessments at the Dutch Social Security Institute, for which workers who are still sick-listed after 84 weeks can apply in the Netherlands. Insurance physicians, who perform these assessments, report diagnoses by using a code list[16], which is based on the International Classification of Diseases (ICD classification)[17]. If the insurance physician reported one of the 10 functional somatic syndromes (somatic (pain) syndrome; somatization disorder; pelvic girdle pain; tension headache; Tietze syndrome; irritable bowel syndrome; chronic fatigue syndrome; fibromyalgia; whiplash; and repetitive strain injury) or one of the 25 health complaints that matches with the 23 (partially) unexplained physical complaints of the Robbins list[18], then participants were indicated as having SHC (subjective health complaints). If the insurance physician reported another diagnosis, participants were indicated as having other disorders than SHC, and were used in the present study as a reference group.

Measures
Dependent variable
The primary outcome measure was staying at work. Staying at work was assumed if participants, who were on long-term sickness absence, worked partially in a paid job at baseline (T0) and reported that they continued work participation in paid work,

independent of the number of working hours, during the whole follow-up period (i.e., at T1 as well as T2). Participants who reported that they worked partially in a paid job at baseline, but not anymore during any of the follow-up measurements, were categorised as not staying at work.

Figure 1 Flow chart of the study design of the Forward cohort and the study population of the present study

Forward study

44,379 workers aged 18-65 years, who had been registered as sick-listed ≥ 84 weeks, were invited.

Workers were excluded if they were:
- unable to fill in questionnaires;
- no longer sick-listed;
- hospitalised;
- involved in a judicial procedure;
- pregnant in the three months before study entry;
- suffering from cancer, a psychotic disease or dementia in the twelve months before study entry.

40,542 workers were excluded or did not want to participate in the study.

3837 workers could be included and sent in a filled-in Patient Health Questionnaire (PHQ-15) and an informed consent.

No participation in the Forward cohort.

445 workers had a PHQ-15 score < 5.

3392 workers had a PHQ-15 score ≥ 5.

799 workers did not return a filled-in baseline questionnaire.

Workers were sent a baseline questionnaire.

2593 workers returned a filled-in baseline questionnaire and were included in the Forward cohort.

Present study

658 workers were partially at work at baseline.

595 workers with a documented diagnosis at baseline.

519 workers had a fully documented work status during follow-up.

Independent variables

The independent variables were collected from data of the Dutch Social Security Institute after the medical work disability assessment and via self-reported answers on general questions in the questionnaires at baseline (Appendix A) and validated questions in the questionnaires at baseline. We based the selection of variables on literature[7,8,14,15], and we used the biopsychosocial model to categorise the variables because it is a broad model that focuses on all aspects of functioning[17,19]. The validated questions were based on the following validated questionnaires:

1. The work and well-being inventory (WBI) questionnaire with 85 questions and five subscales[20]:
   - The stressors subscale with a scoring range of 16–64 (higher scores indicate more stressors).
   - The support subscale with a scoring range of 21–84 (higher scores indicate better support).
   - The symptom subscale with a scoring range of 20–80 (higher scores indicate more symptoms).
   - The coping strategies subscale with a scoring range of 17–68 (higher scores indicate better coping).
   - The self-perceived disability subscale with a scoring range of 7–28 (higher scores indicate more self-perceived disability).

2. The hospital anxiety and depression scale (HADS) with 14 questions and two subscales[21]:
   - The depressive disorder subscale with a scoring range of 0–21 (higher scores indicate a higher risk for a depressive disorder).
   - The anxiety disorder subscale with a scoring range of 0–21 (higher scores indicate a higher risk for an anxiety disorder).

3. The patient health questionnaire (PHQ-15) with 15 questions and one scale[22]:
   - The severity of complaints scale with a scoring range of 5–30 (higher scores indicate more severe complaints).

4. The short form health survey 36 (SF-36) with 36 questions and three subscales[23,24]:
   - The physical health subscale (PCS) with a scoring range of 0–100 (higher scores indicate better levels of physical health and functioning).
   - The mental health subscale (MCS) with a scoring range of 0–100 (higher scores indicate better levels of mental health and functioning).
   - The health change subscale (SF-2), which was derived from the following question on the SF-36: "How is your health in general compared to a year

ago?" We categorised the five answering options into two categories: 'same or better' and 'worse'.

5. The Whitely index questionnaire (WI) with 14 questions and one scale[25]:
    *   The hypochondria scale with a scoring range of 0–14 (higher scores indicate a higher risk for hypochondria).

6. The work ability index (WAI) with three questions and two subscales[26]:
    *   The work ability in general subscale with a scoring range of 0–10 (higher scores indicate higher self-perceived work ability).
    *   The work ability in the context of work load subscale with a scoring range of 2–10 (higher scores indicate higher self-perceived work ability in the context of work load).

7. The obstacles to return to work questionnaire (ORQ) with six questions and one scale[27]:
    *   The perceived prognosis of work return scale with a scoring range of 0–36 (higher scores indicate higher self-perceived possibilities for returning to work).

Statistics

We divided the participants into one subgroup with SHC and one subgroup with other disorders (reference group). We divided the independent variables into four domains (i.e., demographic, socio-economic and work-related, health-related, and self-perceived ability) based on the biopsychosocial framework[17,19]. For all variables, we analysed the descriptives for both groups separately. We started further analyses with the SHC group. To analyse possible prognostic factors for staying at work for this group, we first checked for multicollinearity between the independent variables. Variables that had a variance inflation factor (VIF) of <10 and a Pearson correlation of <0.8 were included in the analyses[28]. For all included independent variables, we performed univariable logistic regression analyses, with the dependent variable staying at work. We performed multivariable logistic regression analyses with forward selection per domain separately with all independent variables that had a p-value ≤ 0.157 in the univariable analyses[29]. We used this Akaike information criterion of p ≤ 0.157 for the selection of predictors as it is widely used and also particularly recommended in the TRIPOD statement for a small data set[29,30]. Next, we combined all variables with a p-value ≤ 0.157 in the logistic regression analyses per domain in one multivariable logistic regression analysis with Forward selection. Subsequently, we analysed all variables that remained with a p-value ≤ 0.05 in a combined final logistic model. To evaluate the overall fit and predictive ability, we analysed the

Hosmer–Lemeshow and Nagelkerke's R2 Value of the final model[28]. We assessed the discrimination possibilities of the final model for the SHC group by applying the same final SHC model in the group with other disorders. We calculated the odds ratios (OR), 95% confidence intervals (95% CI), the Hosmer–Lemeshow and Nagelkerke's R2 to compare the outcomes with the outcomes of the SHC group. We used SPSS version 24.0 and R-studio for all statistical analyses.

Results

Table 1 shows the baseline characteristics of the study population. A total of 86 workers with SHC (subjective health complaints) and 433 workers with other disorders (reference group) participated in the present study, with 44 participants (51%) in the SHC group and 242 participants (56%) in the reference group staying at work during the follow-up of two years. Overall, the baseline characteristics were comparable between the two groups, but in all four domains we found some differences between participants with SHC and those with other disorders. Participants with SHC were somewhat younger, more often female and less often the breadwinner of the family. They also had more psychologically than physically demanding jobs and received full work disability benefits less often than those with other disorders. Furthermore, participants with SHC tended to have more complaints and less self-perceived ability and positive expectations to function than participants with other disorders (Table 1).

Staying at work predictors for participants with SHC
We included all independent variables in the univariable logistic regression analyses as we found VIF scores of <10 and correlations of < 0.8 for all variables and did not assume multicollinearity (Appendix B and C). Univariable logistic regression analyses showed 17 potential predictors ($p \leq 0.157$) for staying at work, divided over all four domains (i.e., demographic, socio-economic and work-related, health-related and self-perceived ability) (Table 2). Multivariable logistic regression analyses with separate forward selection per domain showed that 11 of these 17 potential predictors remained statistically significant ($p \leq 0.157$) (Table 3). We then combined these 11 potential predictors in one multivariable logistic regression analysis and found five statistically significant predictors ($p \leq 0.05$) after forward selection, which we combined in the final model (Table 4). In this final model for workers with SHC, previous absenteeism for the same health complaint (OR 0.31, 95% CI 0.10–0.96) and full work disability benefits (OR 0.07, 95% CI 0.01–0.64) reduced the probability of staying at work. We also found that the chance of staying at work increased if participants reported a good mental health (OR 1.08, 95% CI 1.02–1.14), good coping strategies (OR 1.13, 95% CI 1.04–1.23) and positive expectations for staying at work (OR 6.49, 95% CI

2.00–21.09). We found a good fit for this final model: the Hosmer–Lemeshow was not statistically significant (*p*-value 0.57) and the Nagelkerke's R2 was 0.51.

Table 1 Baseline characteristics of the study population

Domains	Categories / Ranges	SHC[1] (N[2] = 86) Mean/N	SD[3]/%	Other disorders (N = 433) Mean/N	SD/%
Demographic					
Age in years	18–65	47.12	10.46	50.90	9.21
Gender	Male	29	34%	206	48%
Married or partner	Yes	69	80%	321	74%
Breadwinner of the family	Yes	49	57%	296	68%
Land of birth	The Netherlands	78	91%	393	91%
Educational level	Primary / Secondary school	33	38%	170	39%
	High school	27	32%	145	34%
	Bachelor's / Master's degree	26	30%	118	27%
Socio-economic and work-related					
Collar job	Blue	14	16%	105	24%
	White	31	36%	158	37%
	Pink	41	48%	170	39%
Employed	Yes	75	87%	378	87%
Usual working time in hours	4–60	30.84	8.31	33.20	8.69
Regular work schedule	Yes	59	69%	309	71%
Managerial position	Yes	15	17%	62	14%
Job demands	Psychological	20	23%	154	36%
	Physical	36	42%	132	30%
	Combination of both	30	35%	147	34%
Stressors[4]	16–64	35.84	9.11	35.64	8.39
Support[4]	21–84	60.79	10.49	61.41	11.38
Previous absenteeism for the same health complaint	Yes	39	45%	230	53%
Work disability benefits	No / Partial	73	85%	301	70%
Adjustments at work	Yes	70	81%	360	83%
Interventions at work (e.g., job coaching)	Yes	77	89%	392	91%
Health-related					
Use of specialist care in the last 2 years	Yes	73	85%	363	84%
Use of psychiatric care in the last 2 years	Yes	52	61%	213	49%
Use of medication	Yes	61	71%	368	85%
Depressive disorder[5]	0–21	7.60	4.10	7.66	4.62
Anxiety disorder[5]	0–21	7.40	4.06	8.07	4.17
Severity of complaints[6]	5–30	11.83	5.04	10.91	4.37
Physical health[7]	0–100	31.96	8.58	34.29	9.59
Mental health[7]	0–100	40.78	12.48	38.63	13.07
Health compared to a year ago[7]	Worse	28	33%	163	38%
Hypochondria[8]	0–14	5.28	2.93	5.38	2.98
Symptom scale[4]	20–80	41.01	9.20	41.37	10.39
Coping strategies[4]	17–68	40.68	9.37	41.17	9.51
Self-perceived ability					
Positive expectations for staying at work	Yes / Inconclusive	43	50%	271	63%
Disability[4]	7–28	21.70	4.65	20.54	4.90
Work ability in general[9]	0–10	4.14	2.04	4.64	1.96
Work ability in the context of work load[9]	2–10	5.82	1.52	6.15	1.50
Possibilities for returning to work[10]	0–36	15.00	8.85	14.77	9.54

[1] SHC = subjective health complaints; [2] N = number; [3] SD = standard deviation; [4] based on the work and well-being inventory questionnaire (WBI); [5] based on the the hospital anxiety and depression scale (HADS); [6] based on the patient health questionnaire (PHQ-15); [7] based on the short form health survey 36 (SF-36); [8] based on the Whitely index questionnaire (WI); [9] based on the work ability index (WAI); [10] based on the obstacles to return to work questionnaire (ORQ).

Table 2 Univariable logistic regression analyses of all potential predictors for staying at work for participants with subjective health complaints (SHC)

Domains	Categories / Ranges	OR [1]	95% CI [2]	p
Demographic				
Age in years	18–65	0.99	0.95–1.03	0.51
Gender	Male	Reference	-	
	Female	0.97	0.40–2.37	0.94
Married or partner	No	Reference	-	
	Yes	0.92	0.32–2.65	0.87
Breadwinner of the family	No	Reference	-	
	Yes	1.19	0.51–2.81	0.69
Land of birth	The Netherlands	Reference	-	
	Other country	0.29	0.05–1.50	0.14
Educational level	Primary / Secondary school	Reference	-	
	High school	2.55	0.90–7.24	0.08
	Bachelor's / Master's degree	2.80	0.97–8.10	0.06
Socio-economic and work-related				
Collar job	Blue	Reference	-	
	White	1.62	0.45–5.78	0.46
	Pink	1.40	0.41–4.76	0.59
Employed	No	Reference	-	
	Yes	0.56	0.15–2.06	0.38
Usual working time in hours	4–60	1.03	0.98–1.08	0.30
Regular work schedule	No	Reference	-	
	Yes	0.77	0.31–1.93	0.58
Managerial position	No	Reference	-	
	Yes	1.11	0.36–3.39	0.85
Job demands	Psychological	Reference		
	Physical	1.02	0.34–3.07	0.97
	Combination of both	0.63	0.20–1.96	0.42
Stressors[3]	16–64	0.98	0.94–1.03	0.41
Support[3]	21–84	1.03	0.99–1.08	0.14
Previous absenteeism for the same health complaint	No	Reference	-	
	Yes	0.32	0.13–0.77	0.01
Work disability benefits	No / Partial	Reference		
	Full	0.06	0.01–0.47	0.01
Adjustments at work	No	Reference	-	
	Yes	1.44	0.48–4.30	0.51
Interventions at work (e.g., job coaching)	No	Reference	-	
	Yes	0.82	0.21–3.29	0.78
Health-related				
Use of specialist care for the last 2 years	No	Reference	-	
	Yes	0.88	0.27–2.88	0.83
Use of psychiatric care for the last 2 years	No	Reference	-	
	Yes	0.89	0.37–2.11	0.79
Use of medication	No	Reference	-	
	Yes	0.22	0.08–0.63	0.01
Depressive disorder[4]	0–21	0.89	0.80–0.99	0.05
Anxiety disorder[4]	0–21	0.94	0.85–1.05	0.28
Severity of complaints[5]	5–30	0.85	0.77–0.94	0.002
Physical health[6]	0–100	1.03	0.98–1.09	0.21
Mental health[6]	0–100	1.04	1.00–1.07	0.05
Health compared to a year ago[6]	Worse	Reference	-	
	Same / Better	3.21	1.24–8.32	0.02
Hypochondria[7]	0–14	0.82	0.70–0.97	0.02
Symptom scale[3]	20–80	0.96	0.91–1.00	0.07
Coping strategies[3]	17–68	1.05	1.00–1.10	0.06
Self-perceived ability				
Positive expectations for staying at work	No	Reference	-	
	Yes / Inconclusive	3.87	1.58–9.46	0.003
Disability[3]	7–28	0.92	0.83–1.01	0.08

Table 2 Continued

Domains	Categories / Ranges	OR [1]	95% CI [2]	p
Work ability in general[8]	0–10	1.25	1.00–1.56	0.05
Work ability in the context of work load[8]	2–10	1.36	1.00–1.85	0.05
Possibilities for returning to work[9]	0–36	1.02	0.97–1.07	0.54

[1] OR = odds ratio; [2] 95% CI = 95% confidence intervals; [3] based on the work and well-being inventory questionnaire (WBI); [4] based on the the hospital anxiety and depression scale (HADS); [5] based on the patient health questionnaire (PHQ-15); [6] based on the short form health survey 36 (SF-36); [7] based on the Whitely index questionnaire (WI); [8] based on the work ability index (WAI); [9] based on the obstacles to return to work questionnaire (ORQ).

Table 3 Multivariable logistic regression analyses of 11 remaining potential predictors for staying at work for participants with subjective health complaints (SHC) per domain separately

Domains	Categories / Ranges	OR [1]	95% CI [2]	p
Demographic				
Educational level	Primary / Secondary school	Reference	-	
	High school	2.55	0.90–7.24	0.08
	Bachelor's / Master's degree	2.80	0.97–8.10	0.06
Socio-economic and work-related				
Support[3]	21–84	1.04	0.99–1.09	0.11
Previous absenteeism for the same health complaint	No	Reference	-	
	Yes	0.33	0.13–0.87	0.03
Work disability benefits	No / Partial	Reference	-	
	Full	0.06	0.01–0.48	0.01
Health-related				
Use of medication	No	Reference	-	
	Yes	0.40	0.12–1.31	0.13
Severity of complaints[4]	5–30	0.90	0.79–1.03	0.12
Mental Health[5]	0–100	1.05	1.00–1.11	0.07
Health compared to a year ago[5]	Worse	Reference	-	
	Same / Better	2.77	0.87–8.80	0.08
Coping strategies[3]	17–68	1.08	1.01–1.15	0.02
Self-perceived ability				
Positive expectations for staying at work	No	Reference	-	
	Yes / Inconclusive	3.44	1.38–8.58	0.01
Work ability in the context of work load[6]	2–10	1.27	0.92–1.74	0.14

[1] OR = odds ratio; [2] 95% CI = 95% confidence intervals; [3] based on the work and well-being inventory questionnaire (WBI); [4] based on the patient health questionnaire (PHQ-15); [5] based on the short form health survey 36 (SF-36); [6] based on the work ability index (WAI).

Staying at work predictors for participants with other disorders (reference group) than SHC

We applied the same variables of the final model for the SHC group to the group with other disorders and found statistically significant ($p \leq 0.05$) associations with staying at work for three out of the five variables (Table 4). In the socio-economic and work-related domain, we found that full work disability benefits (OR 0.13, 95% CI 0.08–0.21) reduced the probability of staying at work. Within the health domain, we found that if participants reported a good mental health (OR 1.03, 95% CI 1.01–1.05), they were more likely to stay at work. The domain of self-perceived ability showed that participants who reported positive expectations for staying at work (OR 3.15, 95%

CI 2.00–4.97) stayed at work more often than those with negative expectations for staying at work. The Nagelkerke's R2 was 0.33 and the Hosmer–Lemeshow was not statistically significant (*p*-value 0.66), indicating that there was also a good fit for the model for workers with other disorders than SHC.

Table 4 Final model of all remaining predictors for staying at work for participants with subjective health complaints (SHC) and other disorders separately

Domains	Categories / Ranges	SHC (No [1] = 86)			Other disorders (No = 433)		
		OR [2]	95% CI [3]	*p*	OR	95% CI	*p*
Socio-economic and work-related							
Previous absenteeism for the same health complaint	No	Reference			Reference		
	Yes	0.31	0.10–0.96	0.04	0.72	0.46–1.13	0.16
Work disability benefits	No / Partial	Reference			Reference		
	Full	0.07	0.01–0.64	0.02	0.13	0.08–0.21	0.000
Health-related							
Mental Health[4]	0–100	1.08	1.02–1.14	0.01	1.03	1.01–1.05	0.002
Coping strategies[5]	17–68	1.13	1.04–1.23	0.004	1.02	1.00–1.04	0.23
Self-perceived ability							
Positive expectations for staying at work	No	Reference			Reference		
	Yes / Inconclusive	6.49	2.00–21.09	0.002	3.15	2.00–4.97	0.000

[1] no = number; [2] OR = odds ratio; [3] 95% CI = 95% confidence intervals; [4] based on the short form health survey 36 (SF-36); [5] based on the work and well-being inventory questionnaire (WBI).

Discussion

The primary aim of this prospective cohort study was to analyse prognostic factors for staying at work for partially sick-listed workers with SHC (subjective health complaints). The secondary aim was to analyse if these factors were also valid for partially sick-listed workers with other disorders. Our study showed that five factors across the biopsychosocial model were associated with staying at work for workers with SHC. We found that previous absenteeism for the same health complaint, poor coping strategies and full work disability benefits were negatively related to staying at work, and that a good mental health and positive expectations for staying at work were positively related to staying at work. Three of these five factors were also valid for workers with other disorders than SHC, which suggests that the mechanism underlying staying at work in workers with SHC are mostly comparable to those of workers with other disorders.

Although the present study was mainly based on workers with SHC who were able to work partially, eligibility for full work disability benefits still lead to a decreased chance of staying at work. The exact underlying mechanism that leads to this effect is difficult to extract directly from our results. As the severity of the complaints did not show a significant impact on staying at work, it seems unlikely that health status

itself played a major role. Instead, an anti-therapeutic effect of full work disability benefits, as reported by Murgatroyd et al.[31], may play a role. Workers who receive full work disability benefits do not have the obligation to work and may fear losing their work disability status when staying at work. This concurs with the work of Cassidy et al.[32] and the OECD[33], which suggest that eligibility for full compensations is indeed associated with less work participation. Cassidy et al.[32] argue that this may be due to financial incentives or secondary gain, especially for workers with SHC as they may be more focused on proving that their health complaints are real. However, we found that a decreased chance for staying at work was also valid for workers with other disorders who were able to work partially but were also eligible for full work disability benefits. This apparent contrast might be explained by an underlying mechanism: workers who are not eligible for compensation may effectively be forced to stay at work due to financial necessity, even if this exceeds their self-perceived work capacity and even if they have not recovered sufficiently[34]. Keeping in mind that we found that no or partial eligibility for work disability benefits positively impacted on staying at work, it should be possible to find a way in which partial work disability benefits can be granted that are better adapted to the individual needs and capacities of both SHC workers and workers with other disorders[33].

The importance to adapt to individual needs and capacities is further underpinned by our results, which indicate that a good mental health and positive expectations for staying at work are important factors for staying at work for both workers with SHC as for those with other disorders. This suggests that there is a possible relation between good mental health and positive expectations on the one hand and better capacities to deal with health complaints and meeting work demands on the other. This relation has also been addressed by other studies[7,8,35-37]. Some of these studies have even reported that the way in which workers respond and act in their rehabilitation process is largely based on good mental health and positive expectations, and they suggest that interventions focused on the individual capacities and needs in the working context decrease distress and may increase the mental capacity and expectations for workers at risk for sickness absence and permanent exit from paid work[35-37].

We found that workers with SHC with previous absenteeism for the same health complaint were less able to stay at work, which may suggest they are less able to deal with their complaints and to adjust to the specific demands of their job. We found that good coping strategies (e.g., good personal control) were associated with better possibilities for staying at work for workers with chronic SHC. It seems that those workers are better able to adjust to the specific demands of their job. A possible explanation is that those workers are better able to change cognitive and behavioural efforts and can adopt various strategies to deal with their complaints[38]. Our findings are consistent with those of a previous study that reported that non sick-listed women with fibromyalgia, who adopted successful strategies to cope with their problems,

managed to continue to work without sickness absence[39]. Other studies have also showed that workers with effective coping strategies have better outcomes in their work functioning[8,40,41]. In addition, workers with good coping strategies seem to have a better self-efficacy, are more resilient and are better able to use past experiences to adapt their strategies[42]. Our results support the need for interventions aimed at enhancing coping skills (i.e. counselling programs and support systems) for workers with SHC, to improve their coping abilities and enhance their work ability and staying at work[43].

Strengths and Limitations

Our study design made it possible to evaluate the influence of work disability benefits over time on staying at work because we included workers after two years of sickness absence, just before their medical work disability assessment. The design of our study also made it possible to analyse the influence of these work disability benefits for workers with SHC and other common chronic disorders separately. The results from this Dutch cohort are useful for comparable Western countries whose legislation makes it especially difficult to examine workers with chronic SHC. Furthermore, our use of the biopsychosocial model[17,19] made it possible to study long-term effects of demographic, personal, health and work-related factors on staying at work equally, and gave us the opportunity to focus on all aspects and the synergy of multiple factors that play a role in work functioning and staying at work.

Unfortunately, our study only included a small number of workers, especially workers with chronic SHC. This could be a consequence of the manner in which we included participants and the fact that the Forward cohort primarily aimed to find prognostic factors for returning to work. Via postal mail, we asked all registered sick-listed workers at the Dutch Social Security Institute whether they wanted to participate in the study, if they were still sick-listed and planning to apply for work disability benefits. We suspect that most workers who were partially sick-listed did not see themselves as sick-listed or were unsure if they would apply for a work disability assessment at all. Because we could only obtain information on work status and diagnosis after the work disability assessment, we could also not fully foresee the number of workers with SHC and other disorders. However, taking into account that approximately 15–20% of long-term sick-listed workers are sick-listed due to SHC[44], the distribution of workers in our study (SHC 17% and other disorders 83%) can be considered as representative. Still, the somewhat limited number of included workers is likely to have caused some selection bias. Unfortunately, we cannot obtain more information about the direction of bias, because data of workers who did not respond is unavailable due to privacy policies.

Additionally, there could be differences in the number of working hours between workers, also potentially leading to selection bias. Because of the use of self-reported

outcome measures, it was difficult to compare hours at work. Therefore, we included all workers that were at work at baseline and at follow-up, irrespective of the number of hours at work. Despite the fact that questionnaires are valid and valuable sources of information, data gathered from objective registrations is preferable to data based on questionnaires[45]. However, we mostly used questionnaires to obtain information on predictor and outcome variables, and the sometimes incomplete questionnaires resulted in the exclusion of another 13% of the original participants. To assess if this biased our results, we performed a missing data analysis. Although workers with an unknown staying at work outcome differed in health compared to the workers with a known staying at work outcome, sensitivity analyses did not show any differences on regression coefficients in the final model. Therefore, we assumed that there is missing at random data and that the data in the complete case analyses is robust, unselective and representative for other workers[46]. We included only the results of the complete case analyses in this study; however, the missing data analyses, including the recommended missing data handling method multiple imputation, are presented in the supplementary materials for comparison (Appendix D and E).

Implications for Policy, Practice and Future Research
To support partially long-term sick-listed workers with SHC for staying at work, our research suggests that stakeholders could focus on a multilevel solution. On the level of the individual worker, focus on the individual capacities and needs of the worker in the working context seems beneficial, with particular focus on improving self-management strategies and resilience of the worker. On a societal level, modifying the policies regarding the social security systems, particularly rules and regulations around work disability benefits, is advisable to avoid permanent exit from the workforce of workers with SHC. Further research is however needed to examine in which way these particularly rules and regulations have to be modified. It seems that this multilevel solution is also a good option for workers with other chronic disorders.
Other researchers have recommended comparable solutions for staying at work or returning to work, once workers are absent[33,43]. However, those recommendations and intervention studies are mostly based on a one-level solution and did not take into account the synergy of multiple factors[33,43]. More research is required to better examine the effect of a combination of supporting individual capacities and needs in the working context and modifying the policies of the social security systems for workers with several chronic disorders.

Conclusion

Staying at work for partially sick-listed workers with chronic subjective health complaints was associated with several biopsychosocial factors. We found similar factors for partially sick-listed workers with other chronic disorders. We therefore suggest a focus on multilevel solutions—supporting individual capacities and needs in the working context and modifying the policies of the social security systems—to support staying at work for sick-listed workers. Further research is needed to investigate in which way policy rules and regulations have to be modified and whether these suggested solutions can be implemented and evaluated in practice.
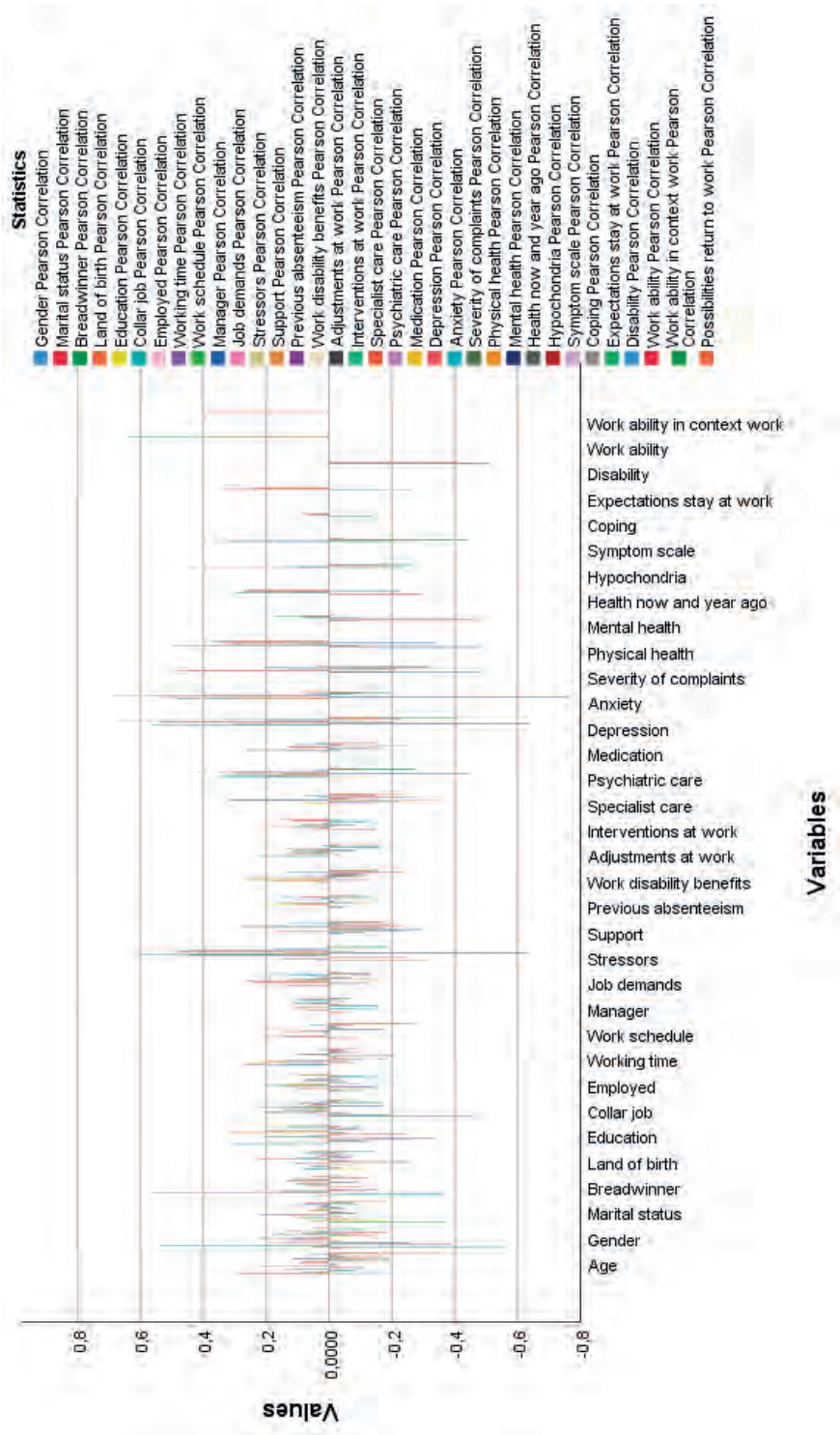
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Appendix A General questions and collected data from the Dutch Social Security Institute

Domains	Categories / Ranges	General questions from the questionnaires at baseline (T0)	Data from the Dutch Social Security Institute
Participants' demographics			
Age in years	18-65	X	X
Gender	Male / Female	X	X
Marital status (married or partner)	Yes / No	X	X
Breadwinner of the family	Yes / No	X	
Land of birth	The Netherlands / Other country	X	
Educational level	Primary or Secondary school / High school / Bachelor's or Master's degree	X	
Participants' socio-economic and work-related status			
Collar job	Blue / White / Pink	X	
Employed	Yes / No	X	
Usual working time in hours	4-60	X	
Regular work schedule	Yes / No	X	
Managerial position	Yes / No	X	
Job demands	Psychological / Physical / Combination of both	X	
Previous absenteeism for the same health complaint	Yes / No	X	
Work disability benefits	No or Partial / Full		X
Adjustments at work	Yes / No	X	
Interventions at work (e.g. job coaching)	Yes / No	X	
Participants' health			
Use of specialist care in the last 2 years	Yes / No	X	
Use of psychiatric care in the last 2 years	Yes / No	X	
Use of medication	Yes / No	X	
Subjective health complaints (SHC)	Yes / No		X
Participants' self-perceived ability			
Positive expectations for staying at work	Yes or Inconclusive / No	X	

Appendix B Multicollinearity analyses for workers with subjective health complaints (SHC)

Statistics

- Gender Pearson Correlation
- Marital status Pearson Correlation
- Breadwinner Pearson Correlation
- Land of birth Pearson Correlation
- Education Pearson Correlation
- Collar job Pearson Correlation
- Employed Pearson Correlation
- Working time Pearson Correlation
- Work schedule Pearson Correlation
- Manager Pearson Correlation
- Job demands Pearson Correlation
- Stressors Pearson Correlation
- Support Pearson Correlation
- Previous absenteeism Pearson Correlation
- Work disability benefits Pearson Correlation
- Adjustments at work Pearson Correlation
- Interventions at work Pearson Correlation
- Specialist care Pearson Correlation
- Psychiatric care Pearson Correlation
- Medication Pearson Correlation
- Depression Pearson Correlation
- Anxiety Pearson Correlation
- Severity of complaints Pearson Correlation
- Physical health Pearson Correlation
- Mental health Pearson Correlation
- Health now and year ago Pearson Correlation
- Hypochondria Pearson Correlation
- Symptom scale Pearson Correlation
- Coping Pearson Correlation
- Expectations stay at work Pearson Correlation
- Disability Pearson Correlation
- Work ability Pearson Correlation
- Work ability in context work Pearson Correlation
- Possibilities return to work Pearson Correlation

Variables

Work ability in context work
Work ability
Disability
Expectations stay at work
Coping
Symptom scale
Hypochondria
Health now and year ago
Mental health
Physical health
Severity of complaints
Anxiety
Depression
Medication
Psychiatric care
Specialist care
Interventions at work
Adjustments at work
Work disability benefits
Previous absenteeism
Support
Stressors
Job demands
Manager
Work schedule
Working time
Employed
Collar job
Education
Land of birth
Breadwinner
Marital status
Gender
Age

Values

0,8
0,6
0,4
0,2
0,0000
-0,2
-0,4
-0,6
-0,8

Appendix C variance inflation factor (VIF) multicollinearity scores for workers with subjective health complaints (SHC)

Variable	VIF score	Variable	VIF score
Age	1.654	Interventions at work	1.662
Gender	3.664	Specialist care	1.641
Marital status	2.104	Psychiatric care	2.164
Breadwinner	4.405	Medication	1.903
Land of birth	1.760	Depressive disorder	4.977
Education	2.152	Anxiety disorder	4.529
Collar job	2.653	Severity of complaints	3.617
Employed	1.594	Physical health	4.397
Working time	3.914	Mental health	9.376
Work schedule	1.582	Health compared to a year ago	2.240
Managerial position	1.696	Hypochondria	2.707
Job demands	1.843	Symptom scale	6.470
Stressors	4.320	Coping	2.222
Support	1.760	Expectations staying at work	1.947
Previous absenteeism for the same health complaint	1.581	Disability	2.427
Work disability benefits	1.727	Work ability in general	3.386
Adjustments at work	1.990	Work ability in the context of work load	3.248
		Possibilities for returning to work	2.430

Appendix D Missing data analyses of the baseline characteristics of the present study population

Domains	Categories/ Ranges	Cases with missing outcome [1] (No [2]= 87)		Cases with no missing outcome [3] (No =571)		Chi-square or T-test
		Mean/No	SD [4]/%	Mean/No	SD/%	p
Demographic						
Age in years	18-65	48.46	10.06	50.49	9.50	0.07
Gender	Male	42	48%	261	46%	0.66
Marital status	Married or partner	54	63%	426	75%	0.02
Breadwinner of the family	Yes	65	75%	379	67%	0.13
Land of birth	The Netherlands	75	86%	520	91%	0.15
Educational level	Primary / Secondary school	42	48%	225	39%	0.21
	High school	29	34%	191	34%	-
	Bachelor's / Master's degree	15	18%	152	27%	-
Socio-economic and work-related						
Collar job	Blue	27	32%	119	21%	0.04
	White	30	37%	204	37%	-
	Pink	25	31%	236	42%	-
Employed	Yes	73	85%	500	89%	0.27
Usual working time in hours	4-60	32.43	8.77	32.71	8.72	0.78
Regular work schedule	Yes	56	64%	405	71%	0.21
Managerial position	Yes	13	15%	82	14%	0.89
Job demands	Psychological	20	23%	189	33%	0.17
	Physical	33	38%	187	33%	-
	Combination of both	34	39%	195	34%	-
Stressors[5]	16-64	35.53	8.77	35.67	8.56	0.89
Support[5]	21-84	59.60	13.00	61.26	11.53	0.22
Previous absenteeism for the same health complaint	Yes	35	41%	288	51%	0.08
Work disability benefits	No / Partial	67	77%	424	74%	0.58
Adjustments at work	Yes	66	76%	464	81%	0.49
Interventions at work (e.g. job coaching)	Yes	71	82%	513	90%	0.08
Health-related						
Use of specialist care in last 2 years	Yes	74	85%	480	84%	0.81
Use of psychiatric care in last 2 years	Yes	38	44%	286	50%	0.27
Use of medication	Yes	71	83%	473	83%	0.95
Depressive disorder[6]	0-21	9.29	4.60	7.65	4.52	0.002
Anxiety disorder[6]	0-21	8.95	4.31	7.96	4.15	0.04
Severity of complaints[7]	5-30	11.56	4.73	11.07	4.52	0.34
Physical health[8]	0-100	33.87	8.91	34.04	9.46	0.88
Mental health[8]	0-100	35.89	13.01	38.98	12.94	0.04
Health compared to a year ago[8]	Worse	34	39%	207	36%	0.62
Hypochondria[9]	0-14	6.29	3.41	5.32	2.99	0.01
Symptom scale[5]	20-80	42.79	11.60	41.21	10.24	0.19
Coping strategies[5]	17-68	40.34	10.16	41.13	9.37	0.47
Subjective health complaints (SHC)	Yes	17	22%	86	17%	0.21
Self-perceived ability						
Positive expectations for staying at work	Yes / Inconclusive	46	53%	351	62%	0.13
Disability[5]	7-28	21.13	4.97	20.56	4.98	0.33
Work ability in general[10]	0-10	4.34	2.24	4.60	1.99	0.28
Work ability in the context of work load[10]	2-10	5.86	1.71	6.11	1.51	0.16
Possibilities for returning to work[11]	0-36	15.04	8.58	15.30	9.59	0.81

[1]no fully documented work status during follow-up; [2]no = Number; [3]fully documented work status during follow-up; [4]SD = Standard Deviation; [5]based on the work and well-being inventory questionnaire (WBI); [6]based on the hospital anxiety and depression scale (HADS); [7]based on the patient health questionnaire (PHQ-15); [8]based on the short form health survey 36 (SF-36); [9]based on the Whitely index questionnaire (WI); [10]based on the work ability index (WAI); [11]based on the obstacles to return to work questionnaire (ORQ).

Appendix E Multivariable logistic regression multiple imputation analysis (pooled data) of all final potential predictors for staying at work for participants with subjective health complaints (SHC) and other disorders separately

Domains	Categories/Ranges	SHC (No [1]=86)			Other disorders (No=433)		
		OR [2]	95% CI [3]	p	OR	95% CI	p
Socio-economic and work-related							
Previous absenteeism for the same health complaint	No	**Reference**			Reference		
	Yes	**0.29**[6]	**0.10-0.85**	0.02	0.69	0.44-1.09	0.11
Work disability benefits	No / Partial	**Reference**			**Reference**		
	Full	**0.06**	**0.01-0.57**	0.01	**0.13**	**0.08-0.22**	0.000
Health-related							
Mental health[4]	0-100	**1.07**	**1.02-1.13**	0.01	**1.03**	**1.01-1.05**	0.001
Coping strategies[5]	17-68	**1.10**	**1.02-1.19**	0.01	1.02	1.00-1.04	0.15
Self-perceived ability							
Positive expectations for staying at work	No	**Reference**			**Reference**		
	Yes / Inconclusive	**4.44**	**1.47-13.45**	0.01	**2.88**	**1.85-4.49**	0.000

[1]no = Number; [2]OR = odds ratio; [3]95% CI = 95% confidence intervals;
[4]based on the short form health survey 36 (SF-36); [5]based on the work and well-being inventory questionnaire

Chapter 7

General discussion

Despite the fact that there have been some commendable efforts to support them[1-5], physicians report difficulties with the assessment of work-related functioning for long-term sick-listed workers with subjective health complaints (SHC) in particular[6-8]. They also report difficulties with providing those workers with support and advice on their recovery, rehabilitation and participation in paid work during the medical work disability assessment[6-8]. This can result in disagreements among physicians, and between physicians and patients regarding perspectives on the potential level of functioning, sickness absence, and support and advice on participation in paid work[9-11]. Knowledge on this topic is required to give advice on how the process around work disability assessments may have to be adjusted to better support physicians and long-term sick-listed workers with SHC in particular. The main aim of this thesis was therefore to obtain insight into the work-related functioning of long-term sick-listed workers with SHC and additionally to evaluate whether the same outcomes of work-related functioning were observed in long-term sick-listed workers with other disorders as well.

This final chapter presents the main findings of this thesis and discusses its methodological considerations. It will also consider the results and contributions of this thesis in a broader perspective. Based on our reflections on the findings, we will discuss the implications of the studies in this thesis and make recommendations for practice, policies and future research.

Main findings

Part I: Evaluation of similarities and differences between physicians in their assessment on the level of work-related functioning and sickness absence
The first objective of this thesis was to explore similarities and differences in assessments between physicians with different medical expertise and in different health care systems regarding the level of work-related functioning and the amount of sickness absence for long-term sick-listed workers with SHC, and to reach consensus on the level of work-related functioning. Our results indicate that physicians are able to translate their findings to work-related functioning and to reach consensus to a large extent on the level of work-related functioning for workers with SHC (Chapter 2). In addition, the direction of the outcome of medical assessments on sickness absence was comparable between physicians (Chapter 3). However, physicians consistently differed in their advice on the level of functioning in working hours for workers with SHC (Chapter 2). Our results further indicate that a psychological cause for the health complaints, private life issues and an assessment of reduced work ability provided more ground for occupational physicians to advise full sickness absence than for insurance physicians (Chapter 3).

Part II: Assessment of the correlation between self-perceived health and physician-assessed level of work-related functioning

For the second objective of this thesis, we evaluated the correlation between self-perceived health of long-term sick-listed workers with SHC and other disorders on the one hand, and physician-assessed work-related functioning on the other (Chapter 4). We found modest correlations between the level of self-perceived physical and mental health and physician-assessed physical and mental functioning for workers with SHC and other disorders. The strength and direction of these correlations were largely comparable, but the correlations were somewhat stronger for workers with other disorders than SHC (Chapter 4).

Part III: Exploration of important prognostic factors for returning to work and staying at work of fully or partially long-term sick-listed workers with subjective health complaints and other disorders

The third objective of this thesis was to explore prognostic factors for returning to and staying at work for fully or partially long-term sick-listed workers with SHC. We compared these outcomes to those of workers with full or partial long-term sickness absence due to other disorders and found that both workers with SHC and those with other disorders were less able to return to work when they received work disability benefits and were better able to return to work when they reported high possibilities for returning to work themselves (Chapter 5). Workers with other disorders than SHC were better able to return to work if they were younger, previously held a managerial position or reported high self-perceived work ability (Chapter 5). We found that workers with SHC who reported a previous episode of sickness absence for the same health complaints or who had poor coping strategies were less able to stay at work (Chapter 6). Workers with SHC who did not receive full work disability benefits, who reported good mental health or who had positive expectations for staying at work all had a better chance for staying at work (Chapter 6). The mechanisms for staying at work for workers with SHC and those for workers with other disorders generally seemed comparable, as most of the prognostic factors were valid for both groups of workers.

Methodological considerations

Methodological strengths and limitations have already been addressed for each of the studies in previous chapters. In this section, we will therefore describe and discuss additional methodological considerations related to the inclusion of participants, the use of a longitudinal study design and the measurements and missing data of the prospective cohort study (the Forward cohort) we performed, as data of that study were used for most chapters of this thesis.

Participants

The manner in which participants were recruited and classified in the Forward cohort resulted in a group of participants with long-term sick-listed workers with SHC and with other disorders. While the primary approach of the Forward cohort was to include long-term sick-listed workers with SHC we could not select and classify on the characteristics and diagnoses of workers beforehand due to privacy rules. We tried to overcome this, at least in part, by inviting all workers who were registered as sick-listed for ≥84 weeks in the electronic database of the Dutch Social Security Institute (UWV). We asked them to determine whether they could participate in the study through self-assessment and to fill in and send back the PHQ-15 patient health questionnaire only if they were planning to qualify for work disability benefits[12,13]. This allowed us to exclude workers who did not at least have mild somatic symptoms, as the PHQ-15 can be used to assess the presence of such symptoms[12,13]. However, the PHQ-15 cannot make a distinction between SHC and other disorders without a medical assessment[12,13], so we could only classify participants as workers with SHC through medical assessment after they were already included in the study. This manner of inclusion resulted in a group of participants with long-term sick-listed workers with SHC and with other disorders as well. Although this was not the primary intent of the Forward cohort, it eventually gave us not only the opportunity to evaluate and analyse the impact of long-term sickness absence on workers with SHC but also to compare this impact with workers with other disorders.

The manner in which we included the participants of the Forward cohort might also explain the relatively small number of responders in general: 9% of the approached workers. This is lower than average and could have contributed to some selection bias in the Forward cohort[14]. Due to stringent privacy regulations, we were unable to perform a non-response analysis, which made it difficult to obtain information about the direction of the possible selection bias. However, we can safely assume that this limitation did not overly harm the results as the design of the Forward cohort made it possible to include a broad variety of workers from all regions of the Netherlands, and the demographics and distribution of the participants were comparable to the general UWV population and participants of earlier studies in this field[15-17]. Nonetheless, we would still recommend future studies to find other recruitment methods in order to prevent similar possible selection biases.

Longitudinal study design

The longitudinal study design of the Forward cohort gave us the unique opportunity to prospectively follow workers on returning to and staying at work after they had already been on sickness absence for ≥84 weeks. Furthermore, we had the opportunity to be explorative by investigating the impact of multiple factors – including the effect of work disability benefits – on future participation in paid work for workers with SHC as well

as for those with other disorders. Unfortunately, the specific chosen time point of ≥84 weeks after the first day of sickness absence did make it impossible to analyse the impact of determinants in the first 84 weeks of sickness absence, so we were therefore unable to compare prognostic factors for participation in paid work for short-term and long-term sickness absence. Furthermore, when using self-reported questionnaires it is inevitable to limit the number of questions to keep the participants on board of the study[18], so the explorative character of the study forced us to make choices in advance about which prognostic factors to explore. Although we did base the selection of independent variables on the literature on predictors for participation in paid work[19-21], our choices may have resulted in missing important causal factors related to participation in paid work.

Measurements and missing data

We used self-reported and register-based data for the independent measures and self-reported data for the outcome measures of the analyses. Both data sources are considered to be valuable in research, but register-based data are preferable[22]. This is particularly true for outcome measures on participation in paid work as where self-reported data may be less accurate, has not been validated as an outcome measure in research for long-term sick-listed workers and may have a higher risk for recall bias and incompleteness than objective register-based data. Unfortunately, however, the outcome measures for participation in paid work were not recorded completely in the UWV records, so we had to resort to self-reported outcome measures of the Forward cohort. To maximally reduce the possible impact of selection bias due to missing data in the self-reported outcome measures, we sent multiple reminders to participants who did not respond to follow-up. Still, one-third of follow-up data was missing from the self-reported questionnaires due to non-response, for unknown reasons. This may have led to selective follow-up data, as we found that participants who were unhealthier at baseline in particular did not respond to follow-up. This may not only implicate that the outcomes of the Forward cohort are not fully representative for long-term sick-listed workers, but it might also have resulted in a biased view of the outcome measures. To verify a possible effect on the outcomes, we performed multiple imputation techniques and sensitivity analyses and found no statistical differences between respondents and non-respondents on follow-up[23], indicating that the missing data did not have a large impact (Chapters 5 and 6).

Results in a broader perspective

The results of this thesis indicate that, in general, psychosocial factors are more important than biomedical factors in predicting returning to and staying at work of long-term sick-listed workers (Chapter 5 and 6). This is the case for workers with SHC

as well as for those with other disorders. The impact of psychosocial factors on the development of chronicity and long-term incapacity is supported by the literature, since it has been reported that biomedical factors become less relevant for specific disorders in the later phases of sickness absence[24-26]. We found that one of the most important psychosocial factors was receiving work disability benefits: workers who received full work disability benefits had less chance to return to work or to stay at work. Based on the fact that psychosocial factors, especially receiving work disability benefits, seem to play a defining role in long-term sickness absence, we suggest that insurance physicians should have the opportunity to focus on these factors in their work disability assessments. However, the policies and frameworks of the Dutch social security system seem to leave little room to include the psychosocial factors we found to be relevant in medical work disability assessments, let alone to include advice and support related to these psychosocial factors in order to stimulate participation in paid work[27-33]. The work disability assessment in the Netherlands is now mostly focused on whether workers are eligible for work disability benefits, which is based on a medical and labour expert assessment: insurance physicians have to assess the level of work-related functioning, and labour experts assess whether workers are eligible for work disability benefits on the basis of this level of work-related functioning[27-30].

The biomedical perspective in the Dutch social security system

Our results indicate that the medical disability criterion[5], which is incorporated in the policies of the Dutch social security system, and the framework of the functional ability list (FAL)[28], which insurance physicians use during their assessment of work-related functioning, give insurance physicians the opportunity to take workers' self-perceived health into account during their work disability assessment, irrespective of the underlying pathology, albeit to a moderate extent and under specific conditions (Chapter 4). In addition, we found that the FAL, subsequently gives physicians the opportunity to assess, structure and describe the level of work-related functioning of workers with several types of SHC in a comparable and transparent way, despite the lack of a clear underlying pathology for these complaints (Chapter 2).

However, our results show that physicians still have difficulties in taking psychosocial factors into account during their work disability assessment and in achieving agreement between their assessment of work-related functioning, support and advice about work opportunities and participation in paid work, especially regarding working hours and the amount of sickness absence for workers with SHC (Chapters 2 and 3). The literature has revealed that this also applies to other disorders[10,34-36]. In the Netherlands, this is most likely due to the policies and frameworks of the Dutch social security system as they still give the biomedical model a dominant position in the assessments, and both the medical disability criterion and the FAL were originally designed as decision and classification tools to determine whether workers are eligible

for work disability benefits[5,27-31]. The current Dutch approach is thus not suited to take psychosocial factors into account to help physicians give advice about work opportunities or workers' individual needs and capacities in relation to participation in paid work, both for long-term sick-listed workers with SHC and other disorders.

Previous research has found that such a biomedical and unilateral focus of policies might also result in difficulties for physicians in their assessment and for workers in using their remaining functional abilities at work[37-40]. There therefore seems to be a clear need for a more central role for biopsychosocial factors and a more bilateral focus on participation in paid work in combination with benefits in the policies and frameworks of the Dutch social security system in general. Such a shift may not only help physicians in supporting workers better, but also in achieving more agreement in the advice they give regarding the possibilities, needs and capacities of workers; furthermore, it may also help improve the communication and cooperation among physicians from various medical specialties and health care settings[9-11,34-36]. This holds for workers with SHC as well as for those with other disorders.

From a biomedical perspective to a psychosocial perspective in the Dutch social security system

The results of this thesis suggest that one practical way to achieve a more central role for biopsychosocial factors and a more bilateral focus in the policies and frameworks of the Dutch social security system is to work on a modification of the framework and policies themselves (Chapter 2, 5 and 6). Such modifications could be implemented in such a way that the framework of the FAL focuses more on external and personal (i.e. psychosocial) factors and the policies focus more on participation in paid work in combination with the eligibility of benefits. Indeed, it has already been suggested that modifications of the FAL could be based on the international classification of functioning (ICF), which is based more on the biopsychosocial model[41-43]. However, despite the fact that the ICF is based on the biopsychosocial model to a larger extent, the literature has shown that this framework is still not optimal in the present form as the ICF is not completely suited to provide advice about work opportunities and support towards the participation in paid work[42,44-46].

The results further clearly indicate that the Organisation for Economic Co-operation and Development (OECD) and other studies are right in recommending that the policies around work disability assessments should be designed in such a way that work disability benefits are better adapted to the workers' needs and capacities and that they are more flexible, as a temporary reduction in working hours (i.e. partial work disability benefits) may sometimes be better for participation in paid work than full-time sickness absence (i.e. full work disability benefits)[47-51]. Our results further corroborate the OECD's argument that policies around work disability assessments should be designed in such a way that workers must have the same access to necessary

interventions and support to successfully participate in paid work[48].

The results of Chapter 5 and 6 indicate that taking psychosocial factors into account in the frameworks and policies could help physicians identify which workers are at increased risk for permanent exit from the work force and support the process towards participation in paid work with interventions that focus on dealing with these factors. We found that workers' self-perceived mental health and their self-perceived possibilities for returning to and staying at work had a great influence on opportunities for participation in paid work (e.g. returning to or staying at work) after long-term sickness absence. Other scholars have argued that both these psychosocial factors have a great impact on the way workers respond and act in their process towards participation in paid work and on how they are able to deal with health complaints and work demands[52-54]. We also found that coping strategies (e.g. personal control) were positively related to participation in paid work for workers with SHC and that positive self-perceived work ability showed this positive relation for workers with other disorders, which is in line with the suggestion by Laisne et al.[55] that workers with a good personal control are likely better able to change their cognitive and behavioral efforts and to adopt various strategies to deal with their health complaints and work demands. Based on the relation between psychosocial factors and the possibility to deal with health complaints and work demands, some studies have suggested that interventions that focus on these factors in the participation process may decrease distress and increase the self-efficacy and resilience of workers at risk of recurrent sickness absence or permanent exit from paid work, with better participation opportunities as a consequence[56-60].

Recommendations for practice, policies and research

The current policies and frameworks within the Dutch social security system are mostly based on a biomedical model[27,28,30-33]. Within this biomedical model, physicians have the opportunity to take self-perceived health into account and to assess the level of work-related functioning for workers with SHC and those with other disorders in a comparable way (Chapters 2 and 4). However, physicians do not have much room to take psychosocial factors into account nor to give advice and support towards participation in paid work[27,28,30-33]. The results of this thesis suggest that modifying policies and frameworks within the Dutch social security system, particularly around assessing and receiving work disability benefits, could support the process towards participation in paid work for long-term sick-listed workers with SHC as well as for those with other disorders (Chapters 3, 5 and 6). Modifying the policies and frameworks towards a biopsychosocial model could contribute to a bilateral focus on advice and support towards participation in paid work in combination with work

disability benefits. This is to assure that the system as a whole is better adapted to workers' individual needs and capacities, both for workers with SHC and for those with other disorders. We believe the best option would be to focus on a multilevel solution within a biopsychosocial perspective: on a societal level and on the level of the insurance physician. Further research is, however, needed to examine more closely which exact modifications are needed and which advice and support towards participation in paid work physicians should give and how these recommended changes can be implemented in practice.

Recommendations on the level of society

On a societal level, we recommend modifying the policies and frameworks regarding work disability assessments to a bilateral focus that allows more personalised work disability benefits in order to prevent permanent exit from the workforce. As a first step towards this bilateral focus, policymakers could adapt rules and regulations regarding the social security system in order to facilitate modifications within the Dutch social security system. The next step should then be the actual modification of the policies and frameworks within this system towards a biopsychosocial model. As a final step, insurance physicians could be facilitated to incorporate the modified policies and frameworks in an optimised and practical manner during their medical work disability assessment.

Recommendations on the level of the insurance physician

On the level of the insurance physician, we recommend modifying the policies and frameworks regarding the possibilities to give advice on work opportunities and support in the process towards participation in paid work to create more focus on workers' individual needs and capacities in the occupational context. An increased focus on the biopsychosocial model can assist insurance physicians in better identifying workers at high risk for permanent exit from the workforce and in responding to workers' individual needs and capacities more effectively, with advice on work opportunities and interventions and support in the process towards participation in paid work. The identification of high risk workers and better advice for interventions may increase workers' chances of returning to or staying in paid work. The results of this thesis indicate a need to focus on effective interventions for all long-term sick-listed workers, both with and without SHC, to improve their mental capacity, their expectations for returning to or staying at work, their coping skills and their work ability, as these factors are all important in the participation to paid work process. Such a response to workers' individual needs and capacities may also be useful in improving the personal skills of workers and their opportunities to better deal with health complaints and work demands, and should therefore be better implemented in practice and made available for all workers.

Recommendations for future research

A good starting point for creating more biopsychosocial frameworks is to use existing frameworks that are based on the biopsychosocial model and that are more focused on external and personal factors than the FAL. With the knowledge and support of physicians, policymakers can further evaluate which work-related functioning items, psychosocial factors and advice towards participation in paid work have to be taken into account during medical work disability assessments and which of these elements have to be incorporated in the new frameworks. Subsequently, further research is needed to investigate whether new frameworks are indeed effective in improving opportunities to participate in paid work for long-term sick-listed workers and to investigate how the modified frameworks can be implemented in practice.

Recommendations for policies and practice:
- <u>Policymakers</u> should adapt the rules and regulations of the Dutch social security system so that it facilitates taking into account workers' individual needs and capacities.
- Within the <u>Dutch social security system</u> the policies and frameworks regarding work disability assessments should be modified to include a biopsychosocial perspective.
- Modification of the policies and frameworks within the Dutch social security system towards a biopsychosocial model will enable <u>insurance physicians</u> to better identify workers at high risk for permanent exit from the workforce and to respond effectively with advice on work opportunities and interventions in order to increase chances of returning to paid work or staying in paid work.

Recommendations for future research:
- <u>Research</u> is needed to examine the effect and impact of modified policies and frameworks on the process around work disability assessments and on the opportunities of long-term sick-listed workers to participate in paid work.
- <u>Research</u> is needed to investigate potential barriers and facilitators in daily practice and to investigate whether the modified policies and frameworks are suitable for the Dutch social security system.

Conclusion

The results of this thesis indicate that psychosocial factors are particularly important for work-related functioning of long-term sick-listed workers with persistent subjective health complaints. Additionally, these psychosocial factors seem equally important for work-related functioning of long-term sick-listed workers with health problems that are medically more well-defined. The biomedical model, which is mostly used in current insurance medicine, does not allow much room for the psychosocial perspective of health complaints and therefore seems less suitable for the assessment and support of long-term sick-listed workers with either subjective health complaints or other disorders. The biopsychosocial model includes both biomedical and psychosocial factors and may therefore be better suited for the assessment of work-related functioning and provides more opportunity for support of returning to or staying in paid work. We recommend a multilevel solution in which the policies and frameworks of the Dutch social security system are modified towards a biopsychosocial model that supports workers' individual capacities and needs, with a focus on the support towards participation in paid work in combination with the eligibility of (partial) work disability benefits. Further research is needed to get better insight into how policies and frameworks need to be modified exactly, how individual capacities and needs can be optimally supported, and what the effect of such modifications and support will be on participation in paid work of long-term sick-listed workers.

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Chapter 8

English summary

Persistent health complaints are common, global health issues that are related to functional impairments, decreased work productivity, long-term sickness absence, and high utilisation of healthcare resources. These health complaints are known as "subjective health complaints" (SHC) if they cannot be sufficiently explained by a conventional pathophysiological mechanism after thorough medical examination. These health complaints are also known as "medically unexplained physical symptoms" (MUPS), which is a more commonly used term. However, the term SHC is more neutral and better accepted by patients and physicians, and therefore predominantly used in this thesis.

The lack of a biomedical explanation for SHC may cause uncertainty and varying ideas about functioning possibilities, for both patients and physicians. Physicians have reported difficulties in their assessment on the level of work-related functioning and their advice and support in the rehabilitation and participation process of long-term sick-listed workers with SHC. Patients with SHC have reported difficulties in dealing with the legitimacy of their complaints, which in turn can lead to problems in legitimisation of the illness and the sick role, to obstacles in the recovery, rehabilitation and participation process, and to inconsistent advice from health care professionals, including occupational physicians and insurance physicians.

The problems that physicians and patients with SHC encounter seem to arise due to rules and regulations in health care systems that are mostly based on a biomedical model and due to the lack of general advice on rehabilitation and participation possibilities for these patients. These problems make it clear that the rules, regulations and guidelines in health care systems, especially in the social security system, may have to be adapted. Knowledge is therefore needed about the assessments, advice and support for long-term sick-listed workers with SHC in different health care systems, and about the legitimisation, recovery, rehabilitation and participation process for those workers. Furthermore, it would be good to obtain insight into whether these outcomes are different for long-term sick-listed workers with disorders that are more well-defined. This knowledge may help give advice on how to adjust the rules, regulations and guidelines in such a way that physicians are better assisted in how to assess, support and give advice about the level of functioning, recovery, rehabilitation and participation possibilities for sick-listed workers with SHC in particular.

The main aim of this thesis was therefore to obtain insight into the work-related functioning of long-term sick-listed workers with SHC, and additionally, to evaluate whether these work-related functioning outcomes were observed in long-term sick-listed workers with other disorders as well, with the following three specific objectives:

1. To evaluate similarities and differences between physicians from several medical specialties in different health care systems in their assessment on the level of work-related functioning and sickness absence of long-term sick-listed workers

with SHC, and to reach consensus on this topic.

2. To assess the correlation between self-perceived health of long-term sick-listed workers with SHC and other disorders and physician-assessed level of work-related functioning in medical work disability assessments.

3. To explore important prognostic factors for returning to and staying at work of fully or partially long-term sick-listed workers with SHC, and to compare the outcomes with fully or partially long-term sick-listed workers with other disorders.

The **first part** of this thesis, and the main focus of Chapters 2 and 3, was to evaluate the similarities and differences between the assessments of the level of work-related functioning and sickness absence by physicians from different medical specialties in different health care systems, and to reach consensus on the level of work-related functioning.

Chapter 2 describes a modified Delphi study with two email rounds and one meeting with 15 physicians of five different medical specialties, in which the physicians prioritised the level of functioning for 78 work-related functioning items for four different cases of workers with SHC. The physicians reached consensus on the level of functioning for 49 items in all four cases, but they could not reach consensus in their advice on the level of functioning in the category of working hours and there was also a difference in the number and level of functioning of the remaining work-related functioning items between the four cases. However, physicians were able to reach consensus for a substantial part on work-related functioning for sick-listed workers with several kinds of SHC.

Chapter 3 describes a cross-sectional study among 50 occupational and 43 insurance physicians in the Netherlands in order to obtain more insight into differences in sickness absence assessments of workers with SHC. All physicians watched nine video case vignettes of workers with SHC and gave their opinion on the amount of sickness absence, and its relation with the health complaints and health status of these case vignettes. The results of this study showed that insurance physicians advised full sick leave less often than occupational physicians. Furthermore, it seemed that insurance physicians deemed psychological diagnoses, private issues and reduced work ability less important than occupational physicians in their sick leave advice. These differences between insurance physicians and occupational physicians may be explained by their differences in roles, tasks and perspectives.

The **second part** of this thesis assessed the correlation between workers' self-perceived health and physician-assessed level of work-related functioning during medical work disability assessments and to obtain information about whether this correlation differed between workers with SHC and other disorders. This is also the main focus of **Chapter 4**. This chapter describes a prospective cohort study (the Forward

study). Eleven self-perceived health factors of the baseline questionnaires of 2040 participants of the Forward cohort were used and then compared with four work-related functioning item clusters assessed by insurance physicians during their medical work disability assessment. The results showed low to moderate correlations between two out of the four work-related functioning item clusters and six out of the eleven self-perceived health factors for all participants. Some of these correlations were lower for workers with SHC than for workers with other disorders, which may indicate that insurance physicians rely slightly more on well-defined medical diagnoses to weigh complaints within medical work disability assessments.

The **third part** of this thesis explored important prognostic factors for returning to work and staying at work of fully or partially long-term sick-listed workers with SHC and other disorders. This is the main focus of Chapters 5 and 6. In these chapters baseline and follow-up data of the prospective cohort study described in Chapter 4 were used together with register based data of the Dutch social security institute (UWV).

In **Chapter 5**, prognostic factors were examined for partial or full return to work for long-term sick-listed workers with SHC (213 workers) and other disorders (1037 workers). The results showed that for both workers with SHC and for workers with other disorders, the most important prognostic factors for returning to work were "not receiving a work disability benefit" and "having a positive self-perceived possibility for returning to work", which are both not traditionally regarded as health-related factors. The study thus found that workers with SHC did not differ from workers with other disorders with respect to prognostic factors for returning to work.

In **Chapter 6**, prognostic factors were examined for staying at work for long-term sick-listed workers with SHC who were still partially working (86 workers) and evaluated whether these factors were comparable with workers with other disorders (433 workers). The examination showed that most important prognostic factors for staying at work for both groups of workers were "not receiving full work disability benefits", "good mental health" and "positive expectations for staying at work". Other prognostic factors that seemed important for staying at work for workers with SHC were "no previous absenteeism for the same health complaints" and "good coping strategies".

The final chapter, **Chapter 7**, contains the general discussion. The results of this thesis indicate that psychosocial factors are important factors for work-related functioning after long-term sickness absence, both for workers with SHC and for those with other disorders. Irrespective of the underlying disorder, physicians should therefore also focus on psychosocial factors in their assessment, support and advice about the level of functioning, recovery, rehabilitation and participation possibilities. To give physicians

better opportunities to focus on these psychosocial factors, modification of the policies and frameworks of the Dutch social security system towards a biopsychosocial model with a bilateral focus seems warranted. Consequently, workers' individual capacities and needs could play a more central role, with support by (partial) work disability benefits. Further research is needed to detail the exact modifications to the policies and frameworks that are necessary, in order to make use of the new insights into important factors in returning to and staying at work for workers both with and without SHC.

Chapter 9

Nederlandse samenvatting

Aanhoudende gezondheidsklachten komen wereldwijd veel voor en kunnen leiden tot beperkingen in het functioneren, verminderde arbeidsproductiviteit, langdurig ziekteverzuim en veelvuldig gebruik van de gezondheidszorg. Als voor deze gezondheidsklachten geen onderliggende afwijking kan worden gevonden bij aanvullend medisch onderzoek, worden deze klachten ook wel aangeduid als "aanhoudende lichamelijke klachten" (ALK). Deze gezondheidsklachten staan ook wel beter bekend als "somatisch onvoldoende verklaarde lichamelijke klachten" (SOLK). De term ALK is echter neutraler en beter geaccepteerd door patiënten en artsen dan SOLK en wordt daarom gebruikt in dit proefschrift.

Het ontbreken van een duidelijke medische onderliggende afwijking voor ALK kan, zowel voor patiënten als artsen, zorgen voor onzekerheid en verschil van inzicht over de mogelijkheden in het functioneren. Artsen hebben dan ook aangegeven problemen te ervaren bij het beoordelen van werk-gerelateerde functionele mogelijkheden. Ook geven artsen aan problemen te ondervinden bij het begeleiden en bij het geven van advies in het kader van de re-integratie naar werk en het participatie proces aan werkenden die langdurig verzuimen met ALK. Patiënten met ALK ervaren zelf problemen in de erkenning en acceptatie van hun klachten bij ziekteverzuim en re-integratie naar werk. Zij krijgen ook te maken met inconsistente adviezen van verschillende professionals, waaronder bedrijfsartsen en verzekeringsartsen.

De problemen die zowel artsen als patiënten met ALK ervaren lijken te ontstaan doordat de meeste regels en voorschriften in de gezondheidszorg zijn gebaseerd op een biomedisch model en er een gebrek is aan richtlijnen op het gebied van re-integratie en participatie voor patiënten met ALK. Deze problemen maken duidelijk dat de regels, voorschriften en richtlijnen in de gezondheidszorg mogelijk aanpassing behoeven. Dit betreft vooral het systeem van de sociale zekerheid. Om aanpassingen te kunnen bewerkstelligen is kennis nodig over het herstel, de re-integratie en participatiekansen van werkenden die langdurig verzuimen met ALK, en over de beoordeling, begeleiding en het advies dat artsen verlenen in verschillende gezondheidszorgsectoren aan deze werkenden. Dit kan vervolgens worden vergeleken met werkenden die langdurig verzuimen met duidelijk omschreven medische aandoeningen. Op basis van deze kennis kan advies gegeven worden over hoe de regels, voorschriften en richtlijnen in de gezondheidszorg zouden kunnen worden aangepast. Artsen zouden dan meer handvatten hebben en beter in staat zijn om de functionele mogelijkheden te beoordelen en begeleiding en adviezen te geven over herstel, re-integratie en participatiekansen aan werkenden die langdurig verzuimen met ALK in het bijzonder.

Het hoofddoel van dit proefschrift was dan ook het verkrijgen van meer inzicht in het werk-gerelateerd functioneren van werkenden die langdurig verzuimen met ALK en daarbij werd gekeken of de gevonden inzichten in het werk-gerelateerd functioneren ook gelden voor langdurig verzuimende werkenden met andere aandoeningen. Het

hoofddoel is onderverdeeld in drie subdoelen:

1. Het evalueren van overeenkomsten en verschillen in de beoordeling en het bereiken van consensus over de werk-gerelateerde functionele mogelijkheden en de mate van arbeidsongeschiktheid tussen artsen van verschillende specialismen in verschillende gezondheidszorgsectoren voor langdurig verzuimende werkenden met ALK.
2. Het onderzoeken van de correlatie tussen de zelf ervaren gezondheid door langdurig verzuimende werkenden met ALK of andere aandoeningen en de door de arts beoordeelde werk-gerelateerde functionele mogelijkheden tijdens de arbeidsongeschiktheidsbeoordeling.
3. Het onderzoeken van belangrijke prognostische factoren om terug te keren naar werk en aan het werk te blijven voor langdurig gedeeltelijk of volledig verzuimende werkenden met ALK en de verschillen en overeenkomsten hierin voor langdurig verzuimende werkenden met andere aandoeningen.

Het **eerste deel** van dit proefschrift en tevens de belangrijkste focus van de hoofdstukken 2 en 3, betreft het evalueren van overeenkomsten en verschillen en het bereiken van consensus in het beoordelen van werk-gerelateerde functionele mogelijkheden en de mate van arbeidsongeschiktheid voor langdurig verzuimende werkenden met ALK tussen artsen van verschillende specialismen in verschillende gezondheidszorgsectoren.

Hoofdstuk 2 beschrijft een gemodificeerde Delphi studie met 15 artsen uit vijf verschillende specialismen. De artsen beoordeelden het niveau van functioneren voor 78 werk-gerelateerde functionele mogelijkheden voor vier verschillende ALK casussen gedurende twee rondes per email en één bijeenkomst. Voor 49 van de 78 werk-gerelateerde functionele mogelijkheden bereikten de artsen consensus over het niveau van functioneren voor alle vier de casussen. Voor de overige werk-gerelateerde functionele mogelijkheden hadden de artsen nog geen consensus bereikt over het niveau van functioneren voor alle vier de casussen. De artsen konden geheel geen consensus bereiken in hun advies over de functionele mogelijkheden gerelateerd aan werkuren. De uitkomsten van het onderzoek laten zien dat artsen goed in staat zijn tot consensus te komen voor een groot deel van de werk-gerelateerde functionele mogelijkheden bij ziek gemelde werkenden met verschillende vormen van ALK.

Hoofdstuk 3 beschrijft een dwarsdoorsnede studie met als doel meer inzicht te krijgen in de verschillen tussen artsen bij het beoordelen van de mate van arbeidsongeschiktheid voor werkenden met ALK. Aan deze studie werkten 50 bedrijfsartsen en 43 verzekeringsartsen uit Nederland mee, waarbij alle artsen de mate van arbeidsongeschiktheid beoordeelden voor negen video casussen van werkenden met ALK. Zij gaven daarnaast hun mening over de impact van de klachten en de gezondheid op hun beoordeling van de arbeidsongeschiktheid. De

resultaten van het onderzoek laten zien dat verzekeringsartsen minder vaak volledige arbeidsongeschiktheid adviseren dan bedrijfsartsen. Tevens laten de resultaten zien dat verzekeringsartsen in mindere mate psychologische diagnosen stellen, en daarnaast privéproblematiek en een verminderd werkvermogen minder laten meewegen in hun beoordeling dan bedrijfsartsen. Deze verschillen tussen verzekeringsartsen en bedrijfsartsen kunnen mogelijk verklaard worden door de verschillende rollen, taken en perspectieven die de artsen hebben.

Het **tweede deel** van dit proefschrift is gericht op het bepalen van de correlatie tussen de zelf ervaren gezondheid van werkenden en de door de arts beoordeelde werk-gerelateerde functionele mogelijkheden ten tijde van de arbeidsongeschiktheidsbeoordeling. Verder wordt in dit deel onderzocht of deze correlatie verschilt tussen werkenden met ALK en andere aandoeningen. Dit is de belangrijkste focus van **hoofdstuk 4**. Dit hoofdstuk beschrijft een prospectief cohort onderzoek, ook wel het Forward cohort genoemd, van waaruit 11 factoren zijn gebruikt van de gemeten zelf ervaren gezondheid van 2040 participanten. Deze 11 factoren zijn vergeleken met vier groepen van geclusterde werk-gerelateerde functionele mogelijkheden beoordeeld door de verzekeringsarts ten tijde van de arbeidsongeschiktheidsbeoordeling. Uit deze analyse bleek voor beide groepen werkenden een lage tot matige correlatie tussen twee van de vier groepen geclusterde werk-gerelateerde functionele mogelijkheden en zes van de 11 factoren van de zelf ervaren gezondheid. Een aantal van deze correlaties was iets lager voor werkenden met ALK dan voor werkenden met andere aandoeningen. Dit zou kunnen betekenen dat verzekeringsartsen hun beoordeling iets meer baseren op de zelf ervaren gezondheid van werkenden met duidelijk omschreven medische aandoeningen, dan op die van werkenden met ALK.

Het **derde deel** van dit proefschrift, en tevens ook de focus van de hoofdstukken 5 en 6, is gericht op het onderzoeken van belangrijke prognostische factoren voor terugkeer naar werk en aan het werk blijven voor langdurig gedeeltelijk of volledig verzuimende werkenden met ALK en andere aandoeningen. Voor dit doel is gebruik gemaakt van de data van het Forward cohort, welke is beschreven in hoofdstuk 4, en registerdata van het Uitvoeringsinstituut Werknemersverzekeringen (UWV).
In **hoofdstuk 5** zijn prognostische factoren onderzocht voor gedeeltelijke of volledige terugkeer naar werk na langdurig verzuim voor 213 werkenden met ALK en 1037 werkenden met andere aandoeningen. Hieruit bleek dat de meest belangrijke prognostische factoren voor terugkeer naar werk "het niet hebben van een arbeidsongeschiktheid uitkering" en "het zelf hebben van een positieve inschatting voor terugkeer naar werk" waren. Deze factoren worden beide vaak gezien als niet medische factoren. De resultaten laten zien dat er geen groot verschil is in de prognostische factoren voor terugkeer naar werk na langdurig verzuim tussen

werkenden met ALK en werkenden met andere aandoeningen.

In **hoofdstuk 6** zijn de prognostische factoren onderzocht voor aan het werk blijven na langdurig gedeeltelijk verzuim voor 86 werkenden met ALK en is geanalyseerd of deze vergelijkbaar waren voor 433 werkenden met andere aandoeningen. Hieruit bleek dat de meest belangrijke prognostische factoren voor aan het werk blijven voor beide groepen waren: "het niet hebben van een arbeidsongeschiktheid uitkering", "een goede mentale gezondheid" en "het zelf hebben van een positieve inschatting voor aan het werk blijven". Andere belangrijke prognostische factoren voor werkenden met ALK voor aan het werk blijven waren: "geen verzuimgeschiedenis voor dezelfde klachten" en "goede coping mechanismen".

Het laatste hoofdstuk, **hoofdstuk 7**, bevat de algemene discussie van dit proefschrift. De resultaten van het proefschrift laten zien dat psychosociale factoren belangrijk zijn voor het werk-gerelateerd functioneren na langdurig verzuim. Dit geldt voor verzuimende werkenden met ALK, als ook voor werkenden met andere aandoeningen. Artsen zouden daarom de mogelijkheid moeten hebben om, ongeacht de onderliggende afwijking, ook te kunnen focussen op psychosociale factoren, zowel tijdens hun beoordeling van de functionele mogelijkheden als ook voor de begeleiding en ondersteuning bij het herstel, de re-integratie en het participatieproces. Om dit te bewerkstelligen lijkt het goed om het beleid en de kaders van het Nederlandse sociale zekerheidssysteem om te zetten naar een meer biopsychosociaal model, dat wil zeggen een model waarin de modelijkheden en behoeften van verzuimende werkenden meer centraal komen te staan en het ontvangen van een uitkering meer als ondersteuning dient. Als aanvulling op deze nieuwe inzichten voor langdurig verzuimende werkenden met ALK en andere aandoeningen is verder onderzoek nodig om beter in beeld te krijgen hoe het beleid en de kaders exact aangepast dienen te worden.

Chapter 10

List of publications
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List op publications

International publications

Werner EL, Merkus SL, Mæland S, Jourdain M, Schaafsma FG, Canévet JP, **Weerdesteijn KHN**, Rat C, Anema JR. Physicians' assessments of work capacity in patients with severe subjective health complaints: a cross-sectional study on differences between five European countries. BMJ Open. 2016 Jul 14;6(7):e011316. Doi: 10.1136/bmjopen-2016-011316. PMID: 27417198; PMCID: PMC4947783.

Merkus SL, Hoedeman R, Mæland S, **Weerdesteijn KHN**, Schaafsma FG, Jourdain M, Canévet JP, Rat C, Anema JR, Werner EL. Are there patient-related factors that influence sickness certification in patients with severe subjective health complaints? A cross-sectional exploratory study from different European countries. BMJ Open. 2017 Jul 21;7(7):e015025. Doi: 10.1136/bmjopen-2016-015025. PMID: 28733298; PMCID: PMC5642667.

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National publications
Merkus SL, **Weerdesteijn KHN**, Schaafsma FG, Maeland S, Jourdain M, Canévet JP, Rat C, Anema JR, Werner EL. Beoordeling van arbeidsongeschiktheid bij SOLK: een vergelijking tussen 5 Europese landen. Ned Tijdschr Geneeskd. 2017;161:D1163.

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Dankwoord

Na inmiddels een verhuizing, verbouwing, bruiloft, opleiding, zwangerschap en bevalling verder, is het dan eindelijk zover: mijn proefschrift! Alhoewel, mijn?! Ik heb het namelijk niet alleen gedaan. Dit proefschrift was er nooit gekomen zonder de directe ondersteuning van meerdere personen, waaronder enkelen in het bijzonder. Ik wil hen dan ook heel graag persoonlijk bedanken.

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About the author

Kristel Helma Nicole Weerdesteijn was born in The Hague, the Netherlands on 5 September 1985. After she finished high school at the Christelijk Gymnasium Sorghvliet in The Hague in 2003, she went to medical school at the University of Leiden and obtained her medical degree in 2009.

Before she started her residency in insurance medicine at the social medical affairs (SMZ) department of the Dutch social security institute (UWV) in 2012, Kristel worked as an intern at the Urology department of the Haga hospital and Amsterdam UMC. During her residency in insurance medicine, Kristel's interest for science and subjective health complaints (SHC) was sparked by the discovery that she had many questions around these health complaints that could not be answered. She started her PhD study at the department of Public and Occupational Health of the Amsterdam UMC in 2013, with the goal to help physicians work in a more evidence-based manner regarding SHC in the social security setting.

During her PhD research, Kristel acted as a reviewer for several academic journals and held several presentations at international conferences. Her presentation "Do self-perceived impairments correlate with physician assessed functional limitations in workers with subjective health complaints and other disorders?" was nominated for the Dr. Patrick. Loisel Award for best presentation. Kristel additionally gave lectures and tutorials on occupational and insurance health and attended several courses in English writing and in Epidemiology at postgraduate level. Kristel finished her residency in insurance medicine in 2018. The results of her PhD research are presented in this thesis.

Kristel now works as an insurance physician at the SMZ department of UWV and as an instructor at the education department of UWV. She also educates residents in insurance medicine and occupational health on how to assess and support sick-listed workers with SHC and how to give them advice about their level of functioning and their recovery, rehabilitation and participation possibilities in an evidence-based manner. When she is not working, Kristel can be found walking around or drinking coffee in the Dutch dunes or on the beach. Kristel currently lives in The Hague with her lovely husband and son.