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EXPECTATIONS AND ILLNESS PERCEPTIONS AS PREDICTORS OF WORK PARTICIPATION AMONG WORKERS WITH COMMON MENTAL DISORDERS

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Abstract

Objective

Common mental disorders (CMDs) are among the leading causes of sick leave, and more knowledge on factors related to Return-to-Work (RTW) in CMDs is needed. The aim of this study was to investigate RTW-expectations and illness perceptions as predictors of non-RTW in CMDs.

Design

Study participants were enrolled in a randomized controlled trial and reported CMDs as a main obstacle for work participation. Baseline questionnaire data and registry data at 6 months were used to investigate predictors of non-RTW. Non-RTW was operationalized as being on sick leave or long-term benefits at 6 months follow-up. Three pre-specified sub-groups were included: people on sick leave, people at risk of going on sick leave, or people on long-term benefits (>12 months).

Results

In this study, uncertain and negative RTW-expectations were strong predictors of non-RTW at 6 months follow-up. Maladaptive illness perceptions predicted non-RTW in the unadjusted model, but not in the fully adjusted model. In the sub-group on sick leave, both uncertain and negative RTW-expectations predicted non-RTW, while in the sub-group of people at risk of going on sick leave, negative RTW-expectations predicted non-RTW. In the sub-group on long-term benefits only female gender predicted non-RTW.

Conclusion

Uncertain and negative RTW-expectations predict non-RTW in CMDs. The RTW-expectations vary depending on sick leave status and seem specifically important to target in those at risk of going on sick leave, or currently on sick leave, due to CMDs. RTW-interventions in CMDs should consider targeting RTW-expectations early, even prior to actual sick leave episodes.

Strenghts and limitations of this study:

- Sick leave status was highly heterogeneous in our study population. This allowed investigation of the chosen factors as predictors of work participation across various sick leave statuses.
- Actual work participation (primary outcome) was measured using registry based data on sick leave and long-term benefits.
- Although return-to-work expectations were found to be strong predictors of work participation within this study population, generalization of our results may be difficult as an expressed wish to work was one of the criteria for inclusion.
- A version of B-IPQ using the generic term “your illness” rather than “common mental disorders” was used. Hence, participants may have given responses based on illnesses other than CMDs.
- RTW-expectations are not as predicative of work participation as RTW self-efficacy. Including measures on RTW self-efficacy in future studies would possibly add to the present findings.

INTRODUCTION

Background

Work contributes to financial stability and offers a structure to everyday life, possibilities for personal development and social interaction; all factors found to promote good mental health and well-being[1]. In societies where work is the norm, having a job to go to on a regular basis is an important part of life, and assumed to be beneficial for the individual[1].

Common mental disorders (CMDs) - most often symptoms of anxiety and depression – pose a specific threat to work participation by restricting individuals' employability, reducing functionality, and thereby also negatively affecting income, self-esteem and quality of life[2, 3]. A recent study from the U.S. found a lifetime prevalence of 33.7% for any anxiety disorder and 21.4% for any mood disorder, and in comparison to other major public health challenges, CMDs commonly occur in working age[4]. CMDs account for a large proportion of all long-term sick leave[5]. Of those sick listed with CMDs for more than 6 months, only 50% manage to return-to-work (RTW)[6]. CMDs increase risk for prolonged sick leave[7] and work disability[8], and as disability pensions for CMDs on average are awarded at a younger age, the affiliated loss of working years is immense[9]. In Norway CMDs account for approximately 20% of sick leave episodes and about one third of all disability pensions[10]. Thus, CMDs are not only costly for the individual but for the greater society as well. Considering the high prevalence of CMDs, and their disabling and potentially catastrophic occupational outcomes, CMDs represent a major challenge to occupational health.

The volume of studies on what hinders and facilitates work participation in MHPs is growing. Findings show that predictors of RTW in CMDs are both wide ranging and many[6, 11, 12] covering factors such as gender, self-rated health status, illness duration, and symptom severity[13]. Factors related to work, health risk behaviours, social status as well as medical factors have also been found to prevent RTW after episodes of poor mental health[6]. In

recent years, several studies have pointed out that RTW following sickness absence is a multifaceted and complex process[14, 15].

Self-efficacy, defined as "the belief in ones' abilities to organize and execute the courses of action required to produce given attainments"[16] is central to initiation and perseverance of behaviour[17]. Recent studies have therefore looked at behaviour-specific self-efficacy beliefs such as RTW self-efficacy (RTW-SE)[18] and found this to strongly predict RTW in CMDs[19]. Return-to-Work expectations are closely related to RTW–SE, and in a study on sick-listed temporary agency workers it was found that expecting a full RTW, as well as perceiving ones' own health as moderate to good, strongly predicted actual RTW[20].

In other health conditions such as myocardial infarction and musculoskeletal disorders, complex psychological constructs such as people's beliefs about their illness or diagnosis ("illness perceptions") have been found to predict RTW[21]. Illness perceptions consist of cognitive and emotional representations that guide health behaviours and have been suggested to impact on the transition from disease to health and work-related outcomes[22].

Although the relation between illness perceptions and work participation has been investigated in other health conditions, little is known about the impact these self-regulatory processes have on actual RTW in CMDs[21, 23]. A recent cross-sectional study of the association between illness perceptions and RTW-expectations in CMDs found a strong and salient relationship between the two[24]. Maladaptive illness perceptions were associated with uncertain- and negative RTW-expectations, with stronger associations for the negative RTW-expectations.

To the best of our knowledge, the impact of illness perceptions on sickness absence in CMDs has not been studied longitudinally.

Although some interventions aiming to increase RTW in CMDs exist[25], there still is a need for more knowledge concerning specific factors to target and modify in order to continue the development and improvement of successful RTW-interventions in CMDs.

Objectives

The aim of this study was to examine if RTW-expectations and illness perceptions predicted non-RTW in a population struggling with work participation due to CMDs, and whether the predictors differed in the three pre-specified sub-groups (on sick leave, at risk of going on sick leave, or on long-term benefits).

The specific aims were to i) examine if RTW-expectations and illness perceptions predicted non-RTW 6 months later, and in each separate sub-group; ii) examine how uncertain and negative RTW-expectations predicted non-RTW, iii) examine how each component of illness perceptions individually predicted non-RTW and iv) investigate the relative predictive contribution of illness perceptions and RTW-expectations when adjusting for relevant confounders.

We hypothesized that uncertain or negative RTW-expectations and maladaptive illness perceptions would predict non-RTW in all participants. In other words, we hypothesized that perceiving illness to have more and severe consequences and having negative RTW-expectations would predict non-RTW at 6 months follow-up.

METHODS

Design

The At Work and Coping trial (AWaC) (Trial registration - http://www.clinicaltrials.gov, NCT01146730) is a randomized controlled multicentre trial evaluating the effect of Work-focused Cognitive Behavioural Therapy (CBT) and an adaptation of Individual Placement and

Support (IPS) on RTW in CMDs. The trial commenced in June 2010 and includes 1193 participants. Participants were referred to the trial from their General Practitioners (GPs) or local national insurance offices, but also by self-referral after receiving information through websites or advertisement posters in GPs offices. A detailed overview of participant flow and enrolment has previously been published[24]. In the AWaC trial, an important criterion for inclusion was the participants' own experience of CMDs as an obstacle for work participation regardless of actual sick leave status. This was clearly stated in brochures, posters and on websites. Hence, the AWaC trial included participants self-reporting to be at risk of going on sick leave, currently on sick leave or on long-term benefits due to CMDs.

Prior to inclusion, all participants underwent a 30-minute interview where they were screened for eligibility and given more detailed information about the study. Eligible and willing participants provided informed consent and filled in the baseline questionnaire. This questionnaire included various measures on demographic variables and measures on mental and somatic health complaints. The trial had two arms where the control condition consisted of usual care, mainly follow-up from GPs, other RTW-interventions or occupational health care. No effect of the intervention was found on RTW at 6 months follow up. For the purpose of this study, the groups were not analysed separately, but group allocation (intervention versus control) was included as a covariate in the logistic regression models.

In the current study, we applied a longitudinal design with 6 months follow-up. Study procedures were reviewed and approved by The Regional Ethics Committee and all Helsinki declaration principles were followed.

Statistical analysis

Binary logistic regression analysis was used to examine RTW-expectations (uncertain and negative) and illness perceptions as predictors of non-RTW. First, we examined RTW-expectations and illness perceptions as individual predictors along with relevant confounders in a model applying the full sample regardless of sick leave status at baseline. Second, all significant predictors of non-RTW together with basic demographic variables (gender, age and educational level) were included in an adjusted model. We then repeated these analyses stratified on the three pre-specified groups: those at risk of going on sick leave, those sick-listed, and finally those on long-term benefits. Data from national registries on sick leave episodes and benefits supplied information on whether a participant was currently working, on sick leave or on long-term benefits at baseline and were used to sort all participants into the three pre-specified groups.

Confounders

Instruments measuring health status included the Hospital Anxiety and Depression scale (HAD)[26] for CMDs and the SHC inventory[27] for subjective health complaints. Self-reported health status was measured by one question in the wording "How would you describe your own health?" with answers ranging from "Very good" to "Very poor" on a five point Likert scale. Illness duration was measured by a single item asking participants how long they had had mental health problems (in years). Beliefs concerning the impact of work participation on MHPs were assessed by asking participants "If you continue working, how do you think it will affect your complaints?". Answers were given on a five point Likert scale ranging from "It will worsen my condition" to "It will be very beneficial". Participants were also asked if they had signed private disability insurance agreements (yes/no). A Norwegian standard for classification of occupations was used to group self-reported occupational titles

into either blue- or white-collar work. This standard complies with the ISCO-88 (COM) standards.

Predictors

Return-to-Work Expectations

RTW-expectations were assessed by asking participants to respond to the following statement: "I expect to be back at work within the next few weeks". Thus, for the sub-group at risk of going on sick leave, the response to this item would imply "staying at work", as opposed to falling out of work and onto sick-leave, whilst for the other two sub-groups (sick-listed and on long-term benefits), the response to this item would imply "returning to work". For the purposes of this paper, however, the responses from all participants were labelled "RTW-expectations". Participants responded on a five point Likert scale ("strongly agree" to "strongly disagree"). Responses were grouped in three comprising those who strongly agreed or agreed into positive RTW-expectations, those answering "neither agree nor disagree" into uncertain RTW-expectations, and those either disagreeing or strongly disagreeing into negative RTW-expectations.

Illness perceptions

Illness perceptions were measured using the Brief Illness Perception Questionnaire[28]. This nine-item questionnaire provides a rapid and reliable measurement of illness perceptions. Items 1 through 8 are rated on a 0-10 response scale. The ninth B-IPQ item is open-ended and registers attribution of causal mechanisms. All nine items were analysed separately in the current study.

Primary outcome measure

A dichotomous variable from national registries consisting of information on sick leave episodes and benefits for all participants was used as primary outcome measure in this study. The variable was dichotomized so that those sick-listed or on long-term benefits were separated from those working at 6 months follow up.

RESULTS

Clinical and demographic characteristics of study population

The study population consisted of more women than men (67.1%), and was characterized by a mean age of 40.4 years and education at university or postgraduate levels (60.5%). More people scored above the clinical cut-off for anxiety (78%) compared to depression (53%) on the HADS questionnaire, and self-reported average illness duration was 8.6 years.

In Table 1 we present a full overview of demographic and clinical characteristics, including RTW-expectations and illness perceptions, of those at risk of going on sick leave, sick-listed or on long-term benefits.

Table 1: Baseline demographic and clinical characteristics of participants

		Baseline job-status			
Continuous variables	Total	Working (n=334)	Sick listed (n=529)	Receiving benefits (n=330)	
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	F
Age	40.4 (9.7)	40.4 (9.9)	40.3 (9.4)	40.5 (9.8)	0.3
Subjective Health Complaints (SHC)					
Total score	20.5 (10.6)	19.2 (10.4)	20.9 (10.4)	21.3 (11.1)	4.0*
Hospital Anxiety and Depression Scale					
Total score	18.8 (6.9)	18.3 (6.8)	19.1 (6.9)	18.5 (6.8)	1.6
The Brief-Illness Perception Questionnaire (0 – 10)					
Consequences[1]	7.1 (1.9)	6.6 (2.1)	7.2 (1.8)	7.3 (1.8)	15.6*
Timeline[1]	5.9 (2.4)	6.0 (2.5)	5.5 (2.3)	6.5 (2.5)	16.7*
Personal control	4.1 (2.2)	4.1 (2.2)	4.1 (2.1)	4.3 (2.2)	0.6
Treatment control	6.9 (2.1)	6.9 (2.1)	7.0 (2.0)	6.6 (2.2)	3.7*
Identity[1]	6.6 (2.1)	6.3 (2.2)	6.6 (2.0)	6.9 (2.0)	8.2*
Illness concern[1]	6.5 (2.3)	6.3 (2.4)	6.5 (2.3)	6.5 (2.2)	0.7
Understanding	6.2 (2.4)	6.0 (2.5)	6.0 (2.4)	6.4 (2.5)	2.3
Emotional response[1]	7.7 (2.0)	7.6 (2.1)	7.6 (2.0)	7.8 (1.9)	1.3
Illness duration (years)	8.6 (9.7)	8.9 (9.7)	6.5 (8.5)	11.6 (10.8)	23.8*
Self-reported health status (1-5)[2]	2.7 (0.8)	2.6 (0.8)	2.7 (0.8)	2.9 (0.8)	10.9*
Work and health (1-5)[3]	2.9 (1.5)	3.2 (1.4)	2.5 (1.4)	3.1 (1.5)	22.7*
Categorical variables					
	N (%)	N (%)	N (%)	N (%)	χ
Return-to-Work Expectations					
Positive	326 (32.3)	110 (10.9)	155 (15.4)	61 (6.1)	55.3*
Uncertain	312 (31.0)	63 (6.3)	160 (15.9)	89 (8.8)	0.1
Negative	370 (36.7)	37 (3.7)	197 (19.5)	136 (13.5)	48.1*
Gender					
Female	800 (67.1)	197 (16.5)	375 (31.4)	228 (19.1)	13.9*
Education					
University/Postgraduate college	722 (60.5)	213 (17.9)	327 (27.5)	182 (15.3)	5.5
Blue collar workers	391 (33.9)	90 (7.8)	166 (14.4)	135 (11.7)	16.6*
Private disability insurance	294 (26.2)	83 (7.4)	147 (13.1)	64 (5.7)	7.5*
Mental health status, HADS, (cut off=>8)					
Anxiety	926 (78.2)	255 (21.5)	421 (35.6)	250 (21.1)	2.2
Depression	633 (53.5)	162 (13.7)	294 (24.8)	177 (14.9)	4.3

[1]=Higher score indicates more maladaptive illness perceptions
*=significant at the .05 level
[2]=Lower score indicates better self-reported health status
[3]=Higher score indicates perceiving work participation as more beneficial for health (mental health problems)

Predictors of return to work at 6 months follow-up

Both uncertain and negative RTW-expectations predicted non-RTW at 6 months follow-up (Table 2). The fully adjusted model showed that other statistically significant predictors of non-RTW were gender (female), illness duration (longer) and self-reported health status (moderate to poor). In the unadjusted model, illness perceptions pertaining to *consequences* (more and severe) and *timeline* (long lasting), ascribing many experienced symptoms to the illness (*identity*), being concerned about the illness (*illness concern)*, and experiencing emotional distress (*emotional response*), also predicted non-RTW.

Table 2. Logistic regression results of return-to-work expectations and illness perceptions as predictors of non-RTW at 6 months follow-up regardless of sick leave status at baseline

	Predictor variables	Unadjusted model OR (95% CI)	*p-value*	Adjusted model OR (95% CI)	*p-value*
Basic demographics	Gender	1.18 (0.93 to 1.51)	0.171	1.55 (1.10 to 2.18)	0.011
	Age	1.00 (0.98 to 1.01)	0.963	1.00 (0.98 to 1.02)	0.529
	Educational level	0.79 (0.62 to 1.00)	0.051	0.99 (0.68 to 1.43)	0.968
Return-to-work expectations[1]	Uncertain	1.84 (1.33 to 2.53)	0.001	2.07 (1.39 to 3.06)	<0.001
	Negative	3.99 (2.91 to 5.47)	0.001	3.89 (2.61 to 5.79)	<0.001
Illness Perceptions					
	Consequences	1.17 (1.10 to 1.25)	<0.001	1.11 (0.98 to 1.25)	0.078
	Timeline	1.10 (1.05 to 1.16)	<0.001	1.03 (0.95 to 1.11)	0.414
	Personal control*	0.98 (0.93 to 1.03)	0.527		
	Treatment control*	0.97 (0.91 to 1.02)	0.260		
	Identity	1.16 (1.09 to 1.22)	<0.001	1.09 (0.98 to 1.21)	0.083
	Illness Concern	1.06 (1.01 to 1.11)	0.017	0.97 (0.89 to 1.06)	0.977
	Understanding*	1.00 (0.963 to 1.05)	0.713		
	Emotional response	1.05 (1.00 to 1.12)	0.049	0.90 (0.81 to 1.00)	0.066
Causal attributions	Work	0.82 (0.62 to 1.08)	0.173		
	Stress	0.91 (0.62 to 1.32)	0.625		
	Personal relationships	0.83 (0.59 to 1.16)	0.294		
Mental health status	HADS total score	1.02 (1.00 to 1.04)	0.009	0.99 (0.96 to 1.02)	0.993
Subjective health complaints	SHC total score	1.02 (1.01 to 1.03)	<0.001	1.00 (0.98 to 1.01)	0.975
	Illness duration (in years)	1.02 (1.01 to 1.04)	<0.001	1.03 (1.01 to 1.05)	<0.001
	Group allocation (intervention vs. control)	1.03 (0.82 to 1.29)	0.774		
	Blue-collar workers	1.51 (1.18 to 1.93)	0.001	1.44 (0.98 to 2.10)	0.057
	Private disability insurance	1.15 (0.88 to 1.50)	0.292		
	Work and health[2] (1-5)	0.89 (0.82 to 0.97)	0.008	0.94 (0.85 to 1.05)	0.317
	Self-reported health status[3] (1-5)	1.43 (1.24 to 1.65)	<0.001	1.26 (1.02 to 1.57)	0.033

[1] Reference category: Positive RTW-expectations. [2] Higher score indicates perceiving work as having more positive effects on health. [3]Higher score indicates worse self-reported health status. *Higher score indicates more adaptive illness perceptions.

Return-to-work at 6 months follow up was experienced by 264 (79.0%) of those working but at risk of going on sick leave, by 288 (54.4%) of those sick-listed and by 73 (22.1%) of those on long-term benefits.

Group I: Working at baseline

For those working but at risk of going on sick leave, negative RTW-expectations and illness duration (in years) were the only significant predictors of non-RTW at 6 months follow-up in the unadjusted model. In the fully adjusted model, negative RTW-expectations remained the single significant predictor for non-RTW (Table 3).

Group II: Sick-listed at baseline

In the unadjusted model for those who were sick-listed at baseline, both uncertain and negative RTW-expectations predicted non-RTW at 6 months follow-up. The illness perception components *consequences*, *timeline* and *identity*, were all individual predictors of non-RTW in the unadjusted model. Additionally, self-reported poor health, perceiving work as detrimental for health, higher scores on mental health status (HADS), subjective health complaints (SHC), occupational grade (blue collar work), and lower education were also predictors of non-RTW. In the fully adjusted model only uncertain and negative RTW-expectations remained significant predictors of non-RTW (Table 3).

Group III: On long-term benefits at baseline

In those on long-term benefits, only negative RTW-expectations predicted non-RTW in the unadjusted model. In the fully adjusted model negative RTW-expectations was borderline significant (p=0.050) while female gender significantly predicted non-RTW (Table 3).

Table 3. Significant predictors of non-RTW in adjusted logistic regression models for subgroups working but at risk of sick leave (n=334), on sick leave (n=529) or on long-term disability benefits (n=330).

Predictor variables[1]		Working* (at risk of sick leave) OR (95%CI)	On sick leave** OR (95%CI)	On long-term benefits*** OR (95%CI)
Basic demographics	Gender	1.83 (0.89 to 3.78)	1.59 (0.99 to 2.56)	**0.37 (0.17 to 0.79)**
	Age	0.99 (0.95 to 1.03)	0.99 (0.97 to 1.02)	0.99 (0.96 to 1.02)
	Educational level	1.06 (0.51 to 2.19)	0.71 (0.45 to 1.10)	1.46 (0.79 to 2.69)
Return-to-work expectations[2]	Uncertain	1.92 (0.85 to 4.33)	**2.62 (1.47 to 4.67)**	0.61 (0.28 to 1.30)
	Negative	**3.03 (1.22 to 7.53)**	**3.78 (2.11 to 6.76)**	2.19 (1.00 to 4.79)
Illness Perceptions				
	Consequences		1.10 (0.94 to 1.29)	
	Timeline		1.01 (0.91 to 1.13)	
	Personal control*			
	Treatment control*			
	Identity		1.03 (0.90 to 1.18)	
	Illness Concern			
	Understanding*			
	Emotional response			
Causal attributions	Work			
	Stress			
	Personal relationships			
Mental health status	HADS total score		0.99 (0.95 to 1.03)	
Subjective health complaints	SHC total score		1.00 (0.98 to 1.03)	
	Illness duration (in years)	1.03 (0.99 to 1.06)	1.02 (0.99 to 1.05)	
	Group allocation (intervention vs. control)			
	Blue-collar workers		1.09 (0.65 to 1.84)	
	Private disability insurance			

Work and health[3] (1-5)	0.87 (0.75 to 1.02)
Self-reported health status[4] (1-5)	1.24 (0.93 to 1.66)

[1]Investigated in unadjusted logistic regression models for all three sub-groups, significant predictors carried forward to adjusted models: *Adjusted for demographic variables gender, age educational level, illness duration and RTW-expectations, **Adjusted for demographic variables gender, age educational level, RTW-expectations, illness perception components *consequences*, *timeline*, *identity*, mental health and subjective health complaints, illness duration, occupational grade, beliefs concerning the effect of work on health and self-reported health status ***Adjusted for demographic variables gender, age educational level and RTW-expectations.

[2] Reference category: Positive RTW-expectations. [3] Higher score indicates perceiving work as having more positive effects on health. [4]Higher score indicates worse self-reported health status. [*]Higher score indicates more adaptive illness perceptions.

Significant predictors highlighted in bold.

DISCUSSION

Main findings

In this study we investigated return-to-work expectations and illness perceptions as predictors of non-RTW in people with CMDs struggling with work participation. We further investigated RTW-expectations and illness perceptions as predictors of non-RTW in three pre-specified sub-groups based on participants' sick leave status; working but at risk of sick leave, currently sick-listed, or on long-term benefits. Both uncertain and negative RTW-expectations were strong predictors of non-RTW in our study population as a whole, as well as in the sub-group of those currently sick-listed. Negative RTW-expectations predicted non-RTW in workers at risk of sick leave, while in those receiving long-term benefits, only female gender predicted non-RTW at the 6-months follow-up. Negative RTW-expectations was borderline significant in those on long-term benefits. Maladaptive illness perceptions concerning consequences, timeline, identity, illness concern and emotional response were all significant predictors of non-RTW in the unadjusted logistic regression model for the full sample as well as the sub-group of sick-listed participants. Illness perceptions did, however, not predict non-RTW in the fully adjusted models for any of the three sub-groups.

Predictors of non-Return to Work

Illness perceptions

Previous studies have shown that illness perceptions predict RTW after myocardial infarction and in musculoskeletal disorders[21, 29]. Furthermore, one study found beliefs about duration and consequences of illness acting as perpetuating factors in long-term sick leave for patients

with a variety of disorders[30].Our findings thus concur with these previous studies, although the associations in the current study were not maintained in the fully adjusted models.

None of the illness perceptions significantly predicted non-RTW in the adjusted model for those on sick leave, whilst uncertain and negative RTW-expectations did. From our previous study, we saw that some of the illness perceptions were particularly strongly associated with the uncertain and negative RTW-expectations[24]. We therefore find it plausible to assume that although not statistically significant predictors of non-RTW in this study, illness perceptions may still be part of the underlying factors comprising RTW-expectations. It appears intuitively and clinically sound that perceiving ones' illness as having more severe consequences and affecting more life domains might impact on the RTW-process. One such impact could be asserted on beliefs or decisions related to work participation, for instance when deciding on readiness to RTW. Furthermore, believing that illness will last for a longer time is likely to impact on how a person perceives the future possibilities for RTW, something that could be involved in the construction and reporting of RTW-expectations. Future studies on RTW in workers sick listed with CMDs would benefit from including assessments on illness perceptions in order to gain more knowledge on the role these psychological processes might play.

Return-to-Work Expectations

Our findings show that psychological factors such as ones' own uncertain or negative RTW – expectations are strong predictors of non-RTW in CMDs. This corresponds with previous research showing RTW-expectations to repeatedly predict actual RTW[31-33].

Previous research findings suggest that health improvement alone is not enough to RTW, and that psychological factors as well are of importance in RTW [34]. Self-efficacy, defined as "the belief in one's abilities to organize and execute the courses of action required to produce given attainments"[16] is essential in the processes that make us initiate and later sustain our behaviours[17]. Considering RTW-expectations, these would depend on a persons' belief in the ability to RTW. In our study, RTW-expectations predicted non-RTW more strongly than symptom severity of CMDs as measured by HADS. This finding contrasts previous research where symptom severity has been found to be an important predictor of RTW in study populations similar to the one studied here[12]. This may be due to the simple fact that previous studies did not include RTW-expectations in their models. We therefore suggest that future studies on RTW in CMDs include systematic evaluation of participants' RTW-expectations.

In our study, negative RTW-expectations predicted non-RTW in those not yet sick listed, but self-reporting to struggle with work participation. This finding stresses the importance of identifying negative RTW-expectations early in cases where CMDs represent a barrier to optimal work participation. In an occupational health care setting, such early identification followed by modification of negative RTW-expectations might prevent future sick-leave episodes and disability.

Another important finding of this study was that in those sick-listed, uncertain RTW-expectations predicted non-RTW, although not as strongly as negative RTW-expectations. This corresponds with a previous study where uncertain RTW-expectations were associated with a longer time to RTW in workers with soft tissue injuries, with an even stronger association for negative RTW-expectations [35].

A persons' own predictions, as well as RTW-expectations, have been shown to be better predictors of RTW than the opinion of health care professionals[32], and we therefore suggest that addressing RTW-expectations in occupational health care would be a helpful approach.

An important characteristic of our study population was that participants' sick leave statuses varied from "working but at risk of going on sick leave" to "sick-listed and" and "on long-term benefits". This heterogeneity allowed for investigation of RTW-expectations and illness perceptions across sick leave status. As a result we were able to reveal that the predictive value of RTW-expectations may vary dependent on sick leave status, thus adding to the literature. Further, the B-IPQ, a reliable and rapid measure, was used to assess the participants' illness perceptions. The use of this measure allowed for comparison with other study populations using the B-IPQ, and ensured that we measured the participants' actual illness perceptions. The procedure of a one-item measurement of RTW-expectations has previously been demonstrated to be sufficient[36] and the single item used to measure RTW-expectations in the present study has been found to measure important aspects of RTW-expectations in low back pain patients[37]. Additionally, we have previously used this item to investigate the association between illness perceptions and RTW-expectations within the same study population as in the current study[24]. The use of registry based data to measure RTW and hence securing complete follow-up on all participants in our sample is also a considerable strength of the study.

Selection bias cannot be ruled out as a potential limitation of our study, as those choosing to join this study could be qualitatively different from those declining to participate. However, as only 17 persons of 1416 screened declined to participate it can be argued that the study population is a

representative sample of the help-seeking population struggling with work participation due to CMDs in Norway.

In this study we used a version of B-IPQ failing to explicitly ask for participants' perceptions of their CMDs, using the more generic term "your illness". This could represent a limitation to our study if participants answered the B-IPQ with other illnesses than CMDs in mind. An important characteristic shared by all participants, however, is that they all enter the study due to CMDs being the primary reason for their struggles with work participation. Hence, we consider this potential limitation to be of little importance.

Recent studies have shown that differences in RTW self-efficacy are more predictive of RTW than RTW-expectations[38]. Failing to include extensive measures on RTW self-efficacy in our study might represent a limitation. However, no extensive RTW self-efficacy measure is as of yet available in Norwegian language, and we suggest that future studies include such measures when available.

Conclusion

The current study provides important insight into predictors of non-RTW in CMDs and the different roles these predictors play for people at risk of going on sick leave, currently sick-listed or on long-term benefits. A better understanding of the RTW process should ultimately lead to improvement of RTW-interventions, and thus the clinical implications of our findings need to be considered. One of the key findings in this study was that both uncertain and negative RTW-expectations predicted non-RTW at 6 months follow-up over actual symptoms of CMDs. As RTW-expectations are potentially modifiable, we suggest that RTW-interventions integrate a focus on RTW-expectations along with the focus on reducing MHPs. Another key finding was

that RTW-expectations vary depending on sick leave status. Further, negative RTW-expectations predicted non-RTW at 6 months follow-up in those working but at risk of sick leave. A practical implication of this finding might be to focus on early identification and assessment of RTW-expectations not only in cases where sick leave has already been certified, but also in those cases where workers self-report to struggle with work participation due to CMDs. In order to get people talking about experiencing CMDs as a barrier to satisfactory work participation, more openness and knowledge concerning CMDs at the workplace could be needed.

For those sick-listed, uncertain as well as negative RTW-expectations predicted non-RTW. On the basis of these findings we suggest that interventions aiming to improve RTW in CMDs focus on improving RTW-expectations and that special attention be paid to uncertain as well as negative RTW-expectations in those sick listed. As we have previously shown, the illness perceptions component *consequences* is strongly associated with RTW-expectations. We suggest that this component be targeted in RTW-interventions, and specifically considering perceptions of the impact from CMDs on work, as work participation may be a positive contribution to mental health and well-being.

Yet another key finding is that RTW-expectations did not predict non-RTW for those on long-term benefits. Although negative RTW-expectations was borderline significant, we suggest that for those on long-term benefits other factors may be more important for future work participation than RTW-expectations.

As previous studies have highlighted, "short term sick leave may have consequences for future sick leave beyond the effect of ill health" [39], and we believe our findings further stress the importance of identifying negative or uncertain RTW-expectations early on, even before a sick leave episode occurs.

Figure legends

Table 1: Baseline demographic and clinical characteristics of participants

Table 2: Logistic regression results of return-to-work expectations and illness perceptions as predictors of non-RTW at 6 months follow-up regardless of sick leave status at baseline

Table 3: Significant predictors of non-RTW in adjusted logistic regression models for subgroups working, but at risk of sick leave (n=334), on sick leave (n=529) or on long-term disability benefits (n=330).

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Author contributor statement

CL contributed to data collection, conception and design of the study, performed data analysis, interpreted findings, wrote up the first draft of the study and consequent revisions regarding important intellectual content. WS contributed to critical revision of important intellectual content and revision of analysis. SØ contributed to conception and design of the study, critical revision of the manuscript and its analysis. SER contributed to conception and design of the study, to the first draft of the study and its consequent revisions, and oversaw the revision of the study.

SER is the guarantor of this study.

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Data sharing

No additional data available.

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Expectations and illness perceptions as predictors of benefit recipiency among workers with common mental disorders: secondary analysis from a randomized controlled trial

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EXPECTATIONS AND ILLNESS PERCEPTIONS AS PREDICTORS OF BENEFIT RECIPIENCY AMONG WORKERS WITH COMMON MENTAL DISORDERS: SECONDARY ANALYSIS FROM A RANDOMISED CONTROLLED TRIAL

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Abstract

Objective

Common mental disorders (CMDs) are among the leading causes of sick leave, and more knowledge on factors related to work participation and return-to-work (RTW) in CMDs is needed. The aim of this study was to investigate RTW-expectations and illness perceptions as predictors of benefit recipiency in CMDs.

Design

Study participants were enrolled in a randomized controlled trial and reported CMDs as a main obstacle for work participation. Three pre-specified sub-groups were included: people at risk of going on sick leave, people on sick leave (>3 weeks), or people on long-term benefits. Baseline questionnaire data and registry data at baseline and 6 months were used to investigate predictors of benefit recipiency at 6 months follow-up. Benefit recipiency included sickness benefits, disability pension, work assessment allowance and unemployment benefits.

Results

In this study, uncertain and negative RTW-expectations were strong predictors of benefit recipiency at 6 months follow-up. Illness perceptions predicted benefit recipiency in the unadjusted model, but not in the fully adjusted model. In the sub-group on sick leave, both uncertain and negative RTW-expectations predicted benefit recipiency, while in the sub-group

of people at risk of going on sick leave, negative RTW-expectations predicted benefit recipiency. In the sub-group on long-term benefits only female gender predicted benefit recipiency.

Conclusion

For people with common mental disorders, uncertain and negative RTW-expectations predict later benefit recipiency, and expectations seem particularly important for those at risk of or on sick leave. For those at risk of sick leave, benefit recipiency at follow-up denoted a transition onto sick leave or long-term benefit, while those on sick leave had remained so or were receiving long-term benefits. Addressing RTW-expectations in occupational health care services or vocational rehabilitation might be beneficial in early stages or even prior to a sick leave episode.

Strengths and limitations of this study:

- Our study population consisted of persons at risk of sick leave, currently on sick leave or on long-term benefits due to common mental disorders (CMDs). This allowed investigation of RTW-expectations and illness perceptions as predictors of future benefit recipiency across sub-groups on different stages in the transition between work and sick leave or long-term benefits.
- Benefit recipiency at 6 months follow-up was measured using complete and objective data from national registries on sick leave and benefits.
- A version of the Brief Illness Perceptions Questionnaire (B-IPQ) using the generic term “your illness” rather than “common mental disorders” (CMDs) was used. Hence, participants may have given responses based on illnesses other than CMDs.

- In this study, RTW-expectations were measured by one single item. Applying more refined and extensive measures could have provided different results regarding the predictive value of RTW-expectations.

INTRODUCTION

Background

Work contributes to financial stability and offers a structure to everyday life, possibilities for personal development and social interaction; all factors found to promote good mental health and well-being[1]. Common mental disorders (CMDs) - most often symptoms of anxiety and depression – pose a specific threat to work participation by restricting individuals' employability, reducing functionality, and thereby also negatively affecting income, self-esteem and quality of life[2, 3].In the UK, CMDs have been found to account for a large proportion of all long-term sick leave[4]. In Norway CMDs account for approximately 20% of sick leave episodes and about one third of all disability pensions[5]. Increased risk for prolonged sick leave[6] and work disability[7] has been found for CMDs, and of those sick listed with CMDs for more than 6 months, only 50% manage to return-to-work (RTW)[8]. A recent study from the U.S. found a lifetime prevalence of 33.7% for any anxiety disorder and 21.4% for any mood disorder [9]. Hence, CMDs potentially affect a large proportion of the working age population. As disability pensions for CMDs on average are awarded at a younger age, the affiliated loss of working years is immense[10]. Thus, CMDs are not only costly for the individual but for the greater society as well. Due to their high prevalence and disabling and potentially catastrophic occupational outcomes, CMDs represent a major challenge to occupational health. To improve RTW in CMDs, as well as help workers struggling with CMDs to maintain their work participation more knowledge about factors acting as barriers for work participation or RTW in CMDs is needed [11].

The volume of studies on what hinders or facilitates work participation in CMDs is growing and findings show that predictors of RTW in CMDs are both wide ranging and many[8, 12, 13]. Factors such as gender, self-rated health status, illness duration, and symptom severity[14] all predict RTW in CMDs. Factors related to work, health risk behaviors, social

status as well as medical factors have also been found to act as barriers for RTW after episodes of poor mental health[8]. In recent years, several studies have pointed out that RTW following sick leave is a multifaceted and complex process[15, 16].

The transition from work to sick leave and from sick leave to disability or back to work, has been described as a process that require decisions [11]. It is possible that the decision to RTW is influenced by the individuals' beliefs in his or her ability to attain work related goals. Recent studies have therefore looked at behavior-specific self-efficacy beliefs such as RTW self-efficacy (RTW-SE)[17] and found this to strongly predict RTW in CMDs[18]. Self-efficacy, defined as "the belief in ones' abilities to organize and execute the courses of action required to produce given attainments"[19] is central to initiation and perseverance of behavior[20]. Return-to-Work expectations are closely related to RTW–SE, and in a study on sick-listed temporary agency workers it was found that expecting a full RTW, as well as perceiving ones' own health as moderate to good, strongly predicted actual RTW[21]. Both RTW-expectations and RTW self-efficacy are presumably amendable factors, and it might prove useful to target these in occupational health care or as part of vocational rehabilitation interventions. However, in order to successfully do so more information on RTW-expectations as predictors of work status and what comprises these expectations is needed.

In other health conditions such as myocardial infarction and musculoskeletal disorders, complex psychological constructs such as people's beliefs about their illness or diagnosis ("illness perceptions") have been found to predict RTW[22]. Illness perceptions consist of cognitive and emotional representations that guide health behaviors and have been suggested to impact on the transition from disease to health and work-related outcomes[23].

Although the relation between illness perceptions and work participation has been investigated in other health conditions, little is known about the impact these self-regulatory

processes have on actual work status in CMDs[22, 24]. To the best of our knowledge, the impact of illness perceptions on work status in CMDs has not been studied longitudinally. A recent cross-sectional study of the association between illness perceptions and RTW-expectations in CMDs found a strong and salient relationship between the two[25]. Maladaptive illness perceptions were associated with uncertain- and negative RTW-expectations, with stronger associations for the negative RTW-expectations. The findings further indicate that to understand how illness perceptions and RTW-expectations relate to each other, and to work related outcomes in CMDs longitudinal designs are necessary [25].

People struggling with work participation due to CMDs may be facing barriers dependent on situational factors, such as the availability of employment. It is likely that workers *at risk* of sick leave find themselves in a situation where work participation is more available to them than to a person who is on sick leave or on long-term benefits, The process of transitioning between work participation and benefit recipiency, such as sick leave or long-term benefits, is likely to involve decisions influenced by a persons' current situation. Thus, a person *at risk of sick leave* will have to decide to maintain work status, while a person *on sick leave* will have to decide to initiate the RTW-process. A person on long-term benefits may face other important barriers, such as seeking new employment in addition to being motivated for the RTW-process. Because of these different situational barriers it is possible that RTW-expectations and illness perception act differently as predictors of benefit recipiency.

Although some interventions aiming to increase RTW in CMDs exist[26], there still is a need for more knowledge concerning specific factors to target and modify in order to continue the development and improvement of successful RTW-interventions in CMDs.

In keeping with the notion of the transition between work, sick leave and disability as a process demanding different decisions at different stages, knowing more about how RTW-

expectations and illness perceptions act as predictors benefit recipiency across different stages in this process is important.

Objectives

The aim of this study was to examine if RTW-expectations and illness perceptions predicted benefit recipiency in a population struggling with work participation due to CMDs, and whether the predictors differed in three pre-specified sub-groups (at risk of sick leave, on sick leave or on long-term benefits). Based on our previous cross-sectional study[25], we hypothesized negative RTW-expectations and perceiving severe consequences from illness could predict receiving benefits 6 months later.

This was examined through the specific aims;to i) examine if RTW-expectations and illness perceptions predicted benefit recipiency 6 months later overall, and further ii) to investigate the relative predictive contribution of RTW-expectations and illness perceptions after adjustment for confounders. As a second step, these analyses were repeated for each separate sub-group defined by baseline work status as the interpretation of results could differ accordingly.

METHODS

Design

The At Work and Coping trial (AWaC) (Trial registration - http://www.clinicaltrials.gov, NCT01146730) is a randomized controlled multicentre trial evaluating the effect of Work-focused Cognitive Behavioral Therapy (CBT) and an adaptation of Individual Placement and Support (IPS) on RTW in CMDs. The trial commenced in June 2010 and includes 1193 participants. Participants were referred to the trial from their General Practitioners (GPs) or

local national insurance offices, but also by self-referral after receiving information through websites or advertisement posters in GPs offices. A detailed overview of participant flow and enrollment has previously been published[25]. In the AWaC trial, an important criterion for inclusion was the participants' own experience of CMDs as an obstacle for work participation regardless of actual sick leave status. This was clearly stated in brochures, posters and on websites. Hence, the AWaC trial included participants self-reporting to be at risk of going on sick leave, currently on sick leave or on long-term benefits due to CMDs. Additional inclusion criteria were; age 18 to 60 years, no known severe psychiatric illness, no risk of suicide or ongoing substance abuse and no current engagement in individual psychotherapy elsewhere. An explicit willingness to either maintain work participation or return-to-work was also required.

Prior to inclusion, all participants underwent a 30-minute interview where they were screened for eligibility and given more detailed information about the study. Eligible and willing participants provided informed consent and filled in the baseline questionnaire. This questionnaire included various measures on demographic variables and measures on mental and somatic health complaints. The trial had two arms where the control condition consisted of usual care, mainly follow-up from GPs, other RTW-interventions or occupational health care. No effect of the intervention was found on RTW at 6 months follow up. For the purpose of this study, the groups were not analyzed separately, but group allocation (intervention versus control) was included as a covariate in the logistic regression models.

In the current study, we applied a longitudinal design with 6 months follow-up. Study procedures were reviewed and approved by The Regional Ethics Committee and all Helsinki declaration principles were followed.

Confounders

Instruments measuring health status included the Hospital Anxiety and Depression scale (HAD)[27] for CMDs and the SHC inventory[28] for subjective health complaints. Self-reported health status was measured by one question in the wording "How would you describe your own health?" with answers ranging from "Very good" to "Very poor" on a five point scale. Illness duration was measured by a single item asking participants how long they had had mental health problems (in years). Beliefs concerning the impact of work participation on CMDs were assessed by asking participants "If you continue working, how do you think it will affect your complaints?". Answers were given on a five point scale ranging from "It will worsen my condition" to "It will be very beneficial". Participants were also asked if they had signed private disability insurance agreements (yes/no). A Norwegian standard for classification of occupations was used to group self-reported occupational titles into either blue- or white-collar work. This standard complies with the ISCO-88 (COM) standards.

Predictors

Return-to-Work Expectations

RTW-expectations were assessed by asking participants to respond to the following statement: "I expect to be back at work within the next few weeks". Thus, for the sub-group at risk of sick leave, the response to this item would imply "maintaining work status". For the other two sub-groups (on sick leave and on long-term benefits), the response to this item would imply an expectation to RTW. For the purposes of this paper, however, the responses from all participants were labeled "RTW-expectations". Participants responded on a five point Likert scale ("strongly agree" to "strongly disagree"). Responses were grouped in three comprising those who strongly agreed or agreed into positive RTW-expectations, those

answering "neither agree nor disagree" into uncertain RTW-expectations, and those either disagreeing or strongly disagreeing into negative RTW-expectations.

Illness perceptions

Illness perceptions were measured using the Brief Illness Perception Questionnaire (B-IPQ)[29]. This nine-item questionnaire provides a rapid and reliable measurement of illness perceptions. Items 1 through 8 are rated on a 0-10 response scale. The ninth B-IPQ item is open-ended and registers attribution of causal mechanisms. All nine items were analyzed separately in the current study.

Outcome

The outcome measure (benefit recipiency) was based on registry information from complete and objective national registries on sick leave and benefits. The outcome variable was dichotomized so that those who at follow-up received any health-related benefit (disability pension, work assessment allowance, unemployment benefit or sickness benefits) from the national welfare service were coded "1", whereas those who did not receive any such benefits at follow-up were coded "0".

Statistical analysis

First, RTW-expectations and illness perceptions were examined as individual predictors of benefit recipiency at 6 months follow-up in the study population as a whole. Thus, these first analyses included participants at risk of sick leave, currently on sick leave or on long-term benefits. The illness perception- and RTW-expectation variables were examined as predictors

one at a time, using binary logistic regression analysis. The outcome predicted in all analyses was participants being registered as on sick leave or on long-term benefits.

The item on RTW-expectations was entered as a categorical variable, with positive RTW-expectations as reference category. The confounders were also subjected to the same procedure, and examined as predictors of benefit recipiency one by one using binary logistic regression. Second, all variables found to significantly predict benefit recipiency in the unadjusted regression analyses were entered simultaneously in an adjusted regression model. The basic demographic variables gender, age and educational level were included in the adjusted model whether or not these were statistically significant predictors in the unadjusted analysis. The exact same procedure was then repeated in an unadjusted model, followed by an adjusted model stratified on the three pre-specified sub-groups. These analyses were performed to examine illness perceptions and RTW-expectations as predictors of benefit recipiency in those at risk of sick leave, currently on sick leave or on long-term benefits. All analyses were performed using Statistical package for the social sciences (SPSS) version 19.0.

RESULTS

Clinical and demographic characteristics of study population

The study population consisted of more women than men (67.1%), and was characterized by a mean age of 40.4 years and education at university or postgraduate levels (60.5%). More people scored above the clinical cut-off for anxiety (78%) compared to depression (53%) on the HADS questionnaire, and self-reported average illness duration was 8.6 years. In Table 1 we present a full overview of demographic and clinical characteristics, including RTW-expectations and illness perceptions of those at risk of sick leave, on sick leave or on long-term benefits.

Table 1: Baseline demographic and clinical characteristics of participants

	Total	Baseline work-status			
		At risk of sick leave (n=334)	On sick leave (n=529)	On long-term benefits (n=330)	
					F / χ
Female	800 (67.1)	197 (16.5)	375 (31.4)	228 (19.1)	13.9*
Age	40.4 (9.7)	40.4 (9.9)	40.3 (9.4)	40.5 (9.8)	0.3
University/Postgraduate college	722 (60.5)	213 (17.9)	327 (27.5)	182 (15.3)	5.5
Blue collar workers (n (%))	391 (33.9)	90 (7.8)	166 (14.4)	135 (11.7)	16.6*
Private disability insurance (n (%))	294 (26.2)	83 (7.4)	147 (13.1)	64 (5.7)	7.5*
Beliefs about work and health (1-5)[2]	2.9 (1.5)	3.2 (1.4)	2.5 (1.4)	3.1 (1.5)	22.7*
Illness duration (years)	8.6 (9.7)	8.9 (9.7)	6.5 (8.5)	11.6(10.08)	23.8*
Return-to-Work Expectations (n (%))					
Positive	326 (32.3)	110 (10.9)	155 (15.4)	61 (6.1)	55.3*
Uncertain	312 (31.0)	63 (6.3)	160 (15.9)	89 (8.8)	0.1
Negative	370 (36.7)	37 (3.7)	197 (19.5)	136 (13.5)	48.1*
The Brief-Illness Perception Questionnaire B-IPQ (0 – 10)					
Consequences[1]	7.1 (1.9)	6.6 (2.1)	7.2 (1.8)	7.3 (1.8)	15.6*
Timeline[1]	5.9 (2.4)	6.0 (2.5)	5.5 (2.3)	6.5 (2.5)	16.7*
Personal control	4.1 (2.2)	4.1 (2.2)	4.1 (2.1)	4.3 (2.2)	0.6
Treatment control	6.9 (2.1)	6.9 (2.1)	7.0 (2.0)	6.6 (2.2)	3.7*
Identity[1]	6.6 (2.1)	6.3 (2.2)	6.6 (2.0)	6.9 (2.0)	8.2*
Illness concern[1]	6.5 (2.3)	6.3 (2.4)	6.5 (2.3)	6.5 (2.2)	0.7
Understanding	6.2 (2.4)	6.0 (2.5)	6.0 (2.4)	6.4 (2.5)	2.3
Emotional response[1]	7.7 (2.0)	7.6 (2.1)	7.6 (2.0)	7.8 (1.9)	1.3
Hospital Anxiety and Depression Scale (HADS)					
Total score	18.8 (6.9)	18.3 (6.8)	19.1 (6.9)	18.5 (6.8)	1.6
Anxiety (cut off=>8) (n (%))	926 (78.2)	255 (21.5)	421 (35.6)	250 (21.1)	2.2
Depression (cut off=>8) (n (%))	633 (53.5)	162 (13.7)	294 (24.8)	177 (14.9)	4.3
Subjective Health Complaints (SHC)					
Total score	20.5 (10.6)	19.2 (10.4)	20.9 (10.4)	21.3(11.1)	4.0*
Self-reported health status (1-5)[3]	2.7 (0.8)	2.6 (0.8)	2.7 (0.8)	2.9 (0.8)	10.9*

All data are reported as mean (SD) unless stated otherwise (n (%)).
Significant between-group differences is reported as F-values or χ in the final column to the right.
[1]=Higher score indicates more maladaptive illness perceptions
*=significant at the .05 level
[2]=Higher score indicates perceiving work participation as more beneficial for health (mental health)
[3]=Lower score indicates better self-reported health status

Predictors of benefit recipiency at 6 months follow-up regardless of work status at baseline

In the study population as a whole, both uncertain and negative RTW-expectations predicted benefit recipiency at 6 months follow-up (Table 2). The fully adjusted model showed that other statistically significant predictors of benefit recipiency were gender (female), illness duration (longer) and self-reported health status (moderate to poor). In the unadjusted model, illness perceptions pertaining to *consequences* (more and severe) and *timeline* (long lasting), ascribing many experienced symptoms to the illness (*identity*), being concerned about the illness (*illness concern)*, and experiencing emotional distress (*emotional response*), also predicted benefit recipiency.

Table 2. Logistic regression results of return-to-work expectations and illness perceptions as predictors of benefit recipiency at 6 months follow-up in the study population as a whole.

	Predictor variables	Unadjusted model OR (95% CI)	*p-value*	Adjusted model OR (95% CI)	*p-value*
Basic demographics	Gender	1.18 (0.93 to 1.51)	0.171	1.55 (1.10 to 2.18)	0.011
	Age	1.00 (0.98 to 1.01)	0.963	1.00 (0.98 to 1.02)	0.529
	Educational level	0.79 (0.62 to 1.00)	0.051	0.99 (0.68 to 1.43)	0.968
Return-to-work expectations[1]	Uncertain	**1.84 (1.33 to 2.53)**	**0.001**	**2.07 (1.39 to 3.06)**	**<0.001**
	Negative	**3.99 (2.91 to 5.47)**	**0.001**	**3.89 (2.61 to 5.79)**	**<0.001**
Illness Perceptions					
	Consequences	**1.17 (1.10 to 1.25)**	**<0.001**	1.11 (0.98 to 1.25)	0.078
	Timeline	**1.10 (1.05 to 1.16)**	**<0.001**	1.03 (0.95 to 1.11)	0.414
	Personal control*	0.98 (0.93 to 1.03)	0.527		
	Treatment control*	0.97 (0.91 to 1.02)	0.260		
	Identity	**1.16 (1.09 to 1.22)**	**<0.001**	1.09 (0.98 to 1.21)	0.083
	Illness Concern	**1.06 (1.01 to 1.11)**	**0.017**	0.97 (0.89 to 1.06)	0.977
	Understanding*	1.00 (0.963 to 1.05)	0.713		
	Emotional response	**1.05 (1.00 to 1.12)**	**0.049**	0.90 (0.81 to 1.00)	0.066
Causal attributions	Work	0.82 (0.62 to 1.08)	0.173		
	Stress	0.91 (0.62 to 1.32)	0.625		
	Personal relationships	0.83 (0.59 to 1.16)	0.294		
Mental health status	HADS total score	**1.02 (1.00 to 1.04)**	**0.009**	0.99 (0.96 to 1.02)	0.993
Subjective health complaints	SHC total score	**1.02 (1.01 to 1.03)**	**<0.001**	1.00 (0.98 to 1.01)	0.975
	Illness duration (in years)	**1.02 (1.01 to 1.04)**	**<0.001**	**1.03 (1.01 to 1.05)**	**<0.001**
	Group allocation (intervention vs control)	1.03 (0.82 to 1.29)	0.774		
	Blue-collar workers	**1.51 (1.18 to 1.93)**	**0.001**	1.44 (0.98 to 2.10)	0.057
	Private disability insurance	1.15 (0.88 to 1.50)	0.292		
	Work and health[2] (1-5)	**0.89 (0.82 to 0.97)**	**0.008**	0.94 (0.85 to 1.05)	0.317
	Self reported health status[3] (1-5)	**1.43 (1.24 to 1.65)**	**<0.001**	**1.26 (1.02 to 1.57)**	**0.033**

[1] Reference category: Positive RTW-expectations. [2] Higher score indicates perceiving work as having more positive effects on health. [3]Higher score indicates worse self-reported health status. *Higher score indicates more adaptive illness perceptions. Significant results are highlighted in bold.

Predictors of benefit recipiency in sub-groups

Of those at risk of going on sick leave 264 (79.0%) had managed to maintain their work participation six months later. Return-to-work was experienced by 288 (54.4%) of those on sick leave and by 73 (22.1%) of those on long-term benefits.

Group I: At risk of sick leave

For those at risk of going on sick leave, negative RTW-expectations and illness duration (in years) were the only significant predictors of benefit recipiency at 6 months follow-up in the unadjusted model. In the fully adjusted model, negative RTW-expectations remained the single significant predictor for benefit recipiency (Table 3).

Group II: On sick leave at baseline

In the unadjusted model for those who were on sick leave at baseline, both uncertain and negative RTW-expectations predicted benefit recipiency at 6 months follow-up. The illness perception components *consequences*, *timeline* and *identity*, were all individual predictors of benefit recipiency in the unadjusted model. Additionally, self-reported poor health, perceiving work as detrimental for health, higher scores on mental health status (HADS), subjective health complaints (SHC), occupational grade (blue collar work), and lower education were also predictors of benefit recipiency. In the fully adjusted model only uncertain and negative RTW-expectations remained significant predictors of benefit recipiency (Table 3).

Group III: On long-term benefits at baseline

In those on long-term benefits, only negative RTW-expectations predicted benefit recipiency in the unadjusted model. In the fully adjusted model negative RTW-expectations was borderline significant (p=0.050) while female gender significantly predicted benefit recipiency (Table 3).

Table 3. Significant predictors of benefit recipiency in adjusted logistic regression models for sub-groups at risk of sick leave (n=334), on sick leave (n=529) or on long-term disability benefits (n=330).

		At risk of sick leave*	On sick leave**	On long-term benefits***
Benefit recipieny at 6 months follow-up		n=70	n=241	n=257
Predictor variables		OR (95%CI)	OR (95%CI)	OR (95%CI)
Basic demographics	Gender	1.83 (0.89 to 3.78)	1.59 (0.99 to 2.56)	**0.37 (0.17 to 0.79)**
	Age	0.99 (0.95 to 1.03)	0.99 (0.97 to 1.02)	0.99 (0.96 to 1.02)
	Educational level	1.06 (0.51 to 2.19)	0.71 (0.45 to 1.10)	1.46 (0.79 to 2.69)
Return-to-work expectations[2]	Uncertain	1.92 (0.85 to 4.33)	**2.62 (1.47 to 4.67)**	0.61 (0.28 to 1.30)
	Negative	**3.03 (1.22 to 7.53)**	**3.78 (2.11 to 6.76)**	2.19 (1.00 to 4.79)
Illness Perceptions				
	Consequences		1.10 (0.94 to 1.29)	
	Timeline		1.01 (0.91 to 1.13)	
	Personal control*			
	Treatment control*			
	Identity		1.03 (0.90 to 1.18)	
	Illness Concern			
	Understanding*			
	Emotional response			
Causal attributions	Work			
	Stress			
	Personal relationships			
Mental health status	HADS total score		0.99 (0.95 to 1.03)	
Subjective health complaints	SHC total score		1.00 (0.98 to 1.03)	
	Illness duration (in years)	1.03 (0.99 to 1.06)	1.02 (0.99 to 1.05)	
	Group allocation (intervention vs control)			
	Blue-collar workers		1.09 (0.65 to 1.84)	
	Private disability insurance			

Work and health[3] (1-5)	0.87 (0.75 to 1.02)
Self reported health status[4] (1-5)	1.24 (0.93 to 1.66)

[1]Investigated in unadjusted logistic regression models for all three sub-groups, significant predictors carried forward to adjusted models: *Adjusted for demographic variables gender, age educational level, illness duration and RTW-expectations, **Adjusted for demographic variables gender, age educational level, RTW-expectations, illness perception components *consequences*, *timeline*, *identity*, mental health and subjective health complaints, illness duration, occupational grade, beliefs concerning the effect of work on health and self-reported health status ***Adjusted for demographic variables gender, age educational level and RTW-expectations.

[2] Reference category: Positive RTW-expectations. [3] Higher score indicates perceiving work as having more positive effects on health. [4]Higher score indicates worse self-reported health status. [*]Higher score indicates more adaptive illness perceptions.

Significant predictors highlighted in bold.

DISCUSSION

Main findings

In this study we investigated return-to-work expectations and illness perceptions as predictors of benefit recipiency in people with CMDs struggling with work participation. We further investigated RTW-expectations and illness perceptions as predictors of benefit recipiency in three pre-specified sub-groups based on participants' baseline status; at risk of sick leave, currently on sick leave, or on long-term benefits. Both uncertain and negative RTW-expectations were strong predictors of benefit recipiency in our study population as a whole, as well as in the sub-group of those currently sick-listed. There were differences in the predictive contribution of RTW-expectations and illness perceptions individually and relative to each other depending on participants' baseline status.

Predictors of non-Return to Work

Illness perceptions

Previous studies have shown that illness perceptions predict RTW after myocardial infarction and in musculoskeletal disorders[22, 30]. Furthermore, one study found beliefs about duration and consequences of illness acting as perpetuating factors in long-term sick leave for patients with a variety of disorders[31].Our findings seem to show some similarities with previous studies. However, in the current study the associations were not maintained in the fully adjusted models.

None of the illness perceptions significantly predicted benefit recipiency in the adjusted model for those on sick leave, whilst uncertain and negative RTW-expectations did. From our previous

study, we saw that some of the illness perceptions were particularly strongly associated with the uncertain and negative RTW-expectations[25]. We therefore find it plausible to assume that although not statistically significant predictors of benefit recipiency in this study, illness perceptions may still be part of the underlying factors comprising RTW-expectations. It appears intuitively and clinically sound that perceiving ones' illness as having more severe consequences and affecting more life domains might impact on the RTW-process. One such impact could be asserted on beliefs or decisions related to work participation, for instance when deciding on readiness to RTW. Furthermore, believing that illness will last for a longer time is likely to impact on how a person perceives the future possibilities for work participation, something that could be involved in the construction and reporting of RTW-expectations. Future studies on RTW in workers on sick leave with CMDs would benefit from including assessments on illness perceptions in order to gain more knowledge on the role these psychological processes might play.

Return-to-Work Expectations

Our findings show that psychological factors such as ones' own uncertain or negative RTW – expectations are strong predictors of benefit recipiency in CMDs. This corresponds with previous research showing RTW-expectations to repeatedly predict actual RTW[32-34]. Previous research findings suggest that health improvement alone is not enough to RTW, and that psychological factors as well are of importance in RTW [35]. Self-efficacy is essential in the processes that make us initiate and later sustain our behaviors[20]. Considering RTW-expectations, these expectations would depend on a persons' belief in the ability to RTW. In our study, RTW-expectations predicted benefit recipiency more strongly than symptom severity of

CMDs as measured by HADS. This finding is in contrast to one previous study where symptom severity was found to be an important predictor of RTW in a study population resembling the one studied here[13]. This may be due to the simple fact that this previous study did not include RTW-expectations. However, other studies have found symptom severity to predict RTW also when including RTW-expectations [33]. The findings from our study might be due to study population characteristics such as an expressed desire to work or the heterogeneous work status. We therefore suggest that future studies on work participation or RTW in CMDs include systematic evaluation of participants' RTW-expectations.

In our study, negative RTW-expectations predicted benefit recipiency in those at risk of on sick leave. This subgroup consisted of people not yet on sick leave that self-reported CMDs as an obstacle for work participation. It is likely that those in this sub-group were on the verge of sick leave. This finding stresses the importance of identifying negative RTW-expectations early in cases where CMDs represent a barrier for optimal work participation. In an occupational health care setting including a focus on peoples' RTW-expectations alongside the focus on mental health improvement could be an important factor in preventing future sick-leave episodes and disability resulting from CMDs.

Another important finding of this study was that in those on sick leave, uncertain RTW-expectations predicted benefit recipiency, although not as strongly as negative RTW-expectations. This corresponds with a previous study where uncertain RTW-expectations were associated with a longer time to RTW in workers with soft tissue injuries, with an even stronger association for negative RTW-expectations [36].

A persons' own predictions of time to RTW, as well as RTW-expectations, have been shown to be better predictors of actual RTW than the opinion of health care professionals[33], and we therefore suggest that addressing RTW-expectations in occupational health care would beuseful.

An important characteristic of our study population was that participants' work statuses varied from "at risk of sick leave" to "on sick leave" and "on long-term benefits". This heterogeneity allowed for investigation of RTW-expectations and illness perceptions across work status. As a result we were able to reveal that the predictive value of RTW-expectations may vary dependent on work status, thus adding to the literature.

Further, the B-IPQ, a reliable and rapid measure, was used to assess the participants' illness perceptions. The use of this measure allowed for comparison with other study populations using the B-IPQ, and ensured that we measured the participants' actual illness perceptions. The procedure of a one-item measurement of RTW-expectations has previously been demonstrated to be sufficient[37] and the single item used to measure RTW-expectations in the present study has been found to measure important aspects of RTW-expectations in low back pain patients[38]. Additionally, we have previously used this item to investigate the association between illness perceptions and RTW-expectations within the same study population as in the current study[25]. The use of registry based data to measure RTW secured complete follow-up on all participants and eliminates common methods problems and is thereby a considerable strength of the study.

Selection bias cannot be ruled out as a potential limitation of our study, as those choosing to join this study could be qualitatively different from those declining to participate. However, as only 17 persons of 1416 screened declined to participate it can be argued that the study population is a

representative sample of the help-seeking population struggling with work participation due to CMDs in Norway.

The classification of cases in this study was based on a hierarchical system that separated those not receiving health related benefits at all from those receiving such benefits whether these were full or partial. It is possible that a more nuanced classification of cases taking into account partial benefits such as graded sick leave would yield other results.

In this study we used a version of B-IPQ failing to explicitly ask for participants' perceptions of their CMDs, using the more generic term "your illness". This could represent a limitation to our study if participants answered the B-IPQ with other illnesses than CMDs in mind. An important characteristic shared by all participants, however, is that they all enter the study due to CMDs being the primary reason for their struggles with work participation. Hence, we consider this potential limitation to be of little importance.

Recent studies have shown that differences in RTW self-efficacy are more predictive of RTW than RTW-expectations[39]. Failing to include extensive measures on RTW self-efficacy in our study might represent a limitation. However, no extensive RTW self-efficacy measure is as of yet available in Norwegian language, and we suggest that future studies include such measures when available.

Conclusion

The current study demonstrates that expectations about ones' own future work participation (RTW-expectations) are strong predictors for future benefit recipiency. Those presenting uncertain or negative RTW-expectations are more likely be recipients of health related benefits six months later. We suggest that vocational rehabilitation services and occupational health care

services pay attention to RTW-expectations alongside mental health improvement in workers struggling with work participation due to CMDs.

As previous studies have highlighted, "short term sick leave may have consequences for future sick leave beyond the effect of ill health" [40]. We believe our findings further stress the importance of identifying negative or uncertain RTW-expectations early on, even before a sick leave episode occurs.

Figure legends

Table 1: Baseline demographic and clinical characteristics of participants

Table 2: Logistic regression results of return-to-work expectations and illness perceptions as predictors of non-RTW at 6 months follow-up regardless of sick leave status at baseline

Table 3: Significant predictors of non-RTW in adjusted logistic regression models for subgroups working, but at risk of sick leave (n=334), on sick leave (n=529) or on long-term disability benefits (n=330).

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Author contributor statement

CL contributed to data collection, conception and design of the study, performed data analysis, interpreted findings, wrote up the first draft of the study and consequent revisions regarding important intellectual content. WS contributed to critical revision of important intellectual content and revision of analysis. SØ contributed to conception and design of the study, critical revision of the manuscript and its analysis. SER contributed to conception and design of the study, to the first draft of the study and its consequent revisions, and oversaw the revision of the study.

SER is the guarantor of this study.

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Data sharing

No additional data available.

Competing Interests

None

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EXPECTATIONS AND ILLNESS PERCEPTIONS AS PREDICTORS OF BENEFIT RECIPIENCY AMONG WORKERS WITH COMMON MENTAL DISORDERS: SECONDARY ANALYSIS FROM A RANDOMISED CONTROLLED TRIAL

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Abstract

Objective

Common mental disorders (CMDs) are among the leading causes of sick leave, and more knowledge on factors related to work participation and return-to-work (RTW) in CMDs is needed. The aim of this study was to investigate RTW-expectations and illness perceptions as predictors of benefit recipiency in CMDs.

Design

Study participants were enrolled in a randomized controlled trial and reported CMDs as a main obstacle for work participation. Three pre-specified sub-groups were included: people at risk of going on sick leave, people on sick leave (>3 weeks), or people on long-term benefits. Baseline questionnaire data and registry data at baseline and 6 months were used to investigate predictors of benefit recipiency at 6 months follow-up. Benefit recipiency included sickness benefits, disability pension, work assessment allowance and unemployment benefits.

Results

In this study, uncertain and negative RTW-expectations were strong predictors of benefit recipiency at 6 months follow-up. Illness perceptions predicted benefit recipiency in the unadjusted model, but not in the fully adjusted model. In the sub-group on sick leave, both uncertain and negative RTW-expectations predicted benefit recipiency, while in the sub-group

of people at risk of going on sick leave, negative RTW-expectations predicted benefit recipiency. In the sub-group on long-term benefits only female gender predicted benefit recipiency.

Conclusion

For people with common mental disorders, uncertain and negative RTW-expectations predict later benefit recipiency, and expectations seem particularly important for those at risk of or on sick leave. For those at risk of sick leave, benefit recipiency at follow-up denoted a transition onto sick leave or long-term benefit, while those on sick leave had remained so or were receiving long-term benefits. Addressing RTW-expectations in occupational health care services or vocational rehabilitation might be beneficial in early stages or even prior to a sick leave episode.

Strengths and limitations of this study:

- Our study population consisted of persons at risk of sick leave, currently on sick leave or on long-term benefits due to common mental disorders (CMDs). This allowed investigation of RTW-expectations and illness perceptions as predictors of future benefit recipiency across sub-groups on different stages in the transition between work and sick leave or long-term benefits.
- Benefit recipiency at 6 months follow-up was measured using complete and objective data from national registries on sick leave and benefits.
- A version of the Brief Illness Perceptions Questionnaire (B-IPQ) using the generic term “your illness” rather than “common mental disorders” (CMDs) was used. Hence, participants may have given responses based on illnesses other than CMDs.

- In this study, RTW-expectations were measured by one single item. Applying more refined and extensive measures could have provided different results regarding the predictive value of RTW-expectations.

INTRODUCTION

Background

Work contributes to financial stability and offers a structure to everyday life, possibilities for personal development and social interaction; all factors found to promote good mental health and well-being[1]. Common mental disorders (CMDs) - most often symptoms of anxiety and depression – pose a specific threat to work participation by restricting individuals' employability, reducing functionality, and thereby also negatively affecting income, self-esteem and quality of life[2, 3].In the UK, CMDs have been found to account for a large proportion of all long-term sick leave[4]. In Norway CMDs account for approximately 20% of sick leave episodes and about one third of all disability pensions[5]. Increased risk for prolonged sick leave[6] and work disability[7] has been found for CMDs, and of those sick listed with CMDs for more than 6 months, only 50% manage to return-to-work (RTW)[8]. A recent study from the U.S. found a lifetime prevalence of 33.7% for any anxiety disorder and 21.4% for any mood disorder [9]. Hence, CMDs potentially affect a large proportion of the working age population. As disability pensions for CMDs on average are awarded at a younger age, the affiliated loss of working years is immense[10]. Thus, CMDs are not only costly for the individual but for the greater society as well. Due to their high prevalence and disabling and potentially catastrophic occupational outcomes, CMDs represent a major challenge to occupational health. To improve RTW in CMDs, as well as help workers struggling with CMDs to maintain their work participation more knowledge about factors acting as barriers for work participation or RTW in CMDs is needed [11].

The volume of studies on what hinders or facilitates work participation in CMDs is growing and findings show that predictors of RTW in CMDs are both wide ranging and many[8, 12, 13]. Factors such as gender, self-rated health status, illness duration, and symptom severity[14] all predict RTW in CMDs. Factors related to work, health risk behaviors, social

status as well as medical factors have also been found to act as barriers for RTW after episodes of poor mental health[8]. In recent years, several studies have pointed out that RTW following sick leave is a multifaceted and complex process[15, 16].

The transition from work to sick leave and from sick leave to disability or back to work, has been described as a process that require decisions [11]. It is possible that the decision to RTW is influenced by the individuals' beliefs in his or her ability to attain work related goals. Recent studies have therefore looked at behavior-specific self-efficacy beliefs such as RTW self-efficacy (RTW-SE)[17] and found this to strongly predict RTW in CMDs[18]. Self-efficacy, defined as "the belief in ones' abilities to organize and execute the courses of action required to produce given attainments"[19] is central to initiation and perseverance of behavior[20]. Return-to-Work expectations are closely related to RTW–SE, and in a study on sick-listed temporary agency workers it was found that expecting a full RTW, as well as perceiving ones' own health as moderate to good, strongly predicted actual RTW[21]. Both RTW-expectations and RTW self-efficacy are presumably amendable factors, and it might prove useful to target these in occupational health care or as part of vocational rehabilitation interventions. However, in order to successfully do so more information on RTW-expectations as predictors of work status and what comprises these expectations is needed.

In other health conditions such as myocardial infarction and musculoskeletal disorders, complex psychological constructs such as people's beliefs about their illness or diagnosis ("illness perceptions") have been found to predict RTW[22]. Illness perceptions consist of cognitive and emotional representations that guide health behaviors and have been suggested to impact on the transition from disease to health and work-related outcomes[23]. Although the relation between illness perceptions and work participation has been investigated in other health conditions, little is known about the impact these self-regulatory

processes have on actual work status in CMDs[22, 24]. To the best of our knowledge, the impact of illness perceptions on work status in CMDs has not been studied longitudinally. A recent cross-sectional study of the association between illness perceptions and RTW-expectations in CMDs found a strong and salient relationship between the two[25]. Maladaptive illness perceptions were associated with uncertain- and negative RTW-expectations, with stronger associations for the negative RTW-expectations. The findings further indicate that to understand how illness perceptions and RTW-expectations relate to each other, and to work related outcomes in CMDs longitudinal designs are necessary [25]. People struggling with work participation due to CMDs may be facing barriers dependent on situational factors, such as the availability of employment. It is likely that workers *at risk* of sick leave find themselves in a situation where work participation is more available to them than to a person who is on sick leave or on long-term benefits, The process of transitioning between work participation and benefit recipiency, such as sick leave or long-term benefits, is likely to involve decisions influenced by a persons' current situation. Thus, a person *at risk of sick leave* will have to decide to maintain work status, while a person *on sick leave* will have to decide to initiate the RTW-process. A person on long-term benefits may face other important barriers, such as seeking new employment in addition to being motivated for the RTW-process. Because of these different situational barriers it is possible that RTW-expectations and illness perception act differently as predictors of benefit recipiency. Although some interventions aiming to increase RTW in CMDs exist[26], there still is a need for more knowledge concerning specific factors to target and modify in order to continue the development and improvement of successful RTW-interventions in CMDs.

In keeping with the notion of the transition between work, sick leave and disability as a process demanding different decisions at different stages, knowing more about how RTW-

expectations and illness perceptions act as predictors benefit recipiency across different stages in this process is important.

Objectives

The aim of this study was to examine if RTW-expectations and illness perceptions predicted benefit recipiency in a population struggling with work participation due to CMDs, and whether the predictors differed in three pre-specified sub-groups (at risk of sick leave, on sick leave or on long-term benefits). Based on our previous cross-sectional study[25], we hypothesized negative RTW-expectations and perceiving severe consequences from illness could predict receiving benefits 6 months later.

This was examined through the specific aims;to i) examine if RTW-expectations and illness perceptions predicted benefit recipiency 6 months later overall, and further ii) to investigate the relative predictive contribution of RTW-expectations and illness perceptions after adjustment for confounders. As a second step, these analyses were repeated for each separate sub-group defined by baseline work status as the interpretation of results could differ accordingly.

METHODS

Design

The At Work and Coping trial (AWaC) (Trial registration - http://www.clinicaltrials.gov, NCT01146730) is a randomized controlled multicentre trial evaluating the effect of Work-focused Cognitive Behavioral Therapy (CBT) and an adaptation of Individual Placement and Support (IPS) on RTW in CMDs. The trial commenced in June 2010 and includes 1193 participants. Participants were referred to the trial from their General Practitioners (GPs) or

local national insurance offices, but also by self-referral after receiving information through websites or advertisement posters in GPs offices. A detailed overview of participant flow and enrollment has previously been published[25]. In the AWaC trial, an important criterion for inclusion was the participants' own experience of CMDs as an obstacle for work participation regardless of actual sick leave status. This was clearly stated in brochures, posters and on websites. Hence, the AWaC trial included participants self-reporting to be at risk of going on sick leave, currently on sick leave or on long-term benefits due to CMDs. Additional inclusion criteria were; age 18 to 60 years, no known severe psychiatric illness, no risk of suicide or ongoing substance abuse and no current engagement in individual psychotherapy elsewhere. An explicit willingness to either maintain work participation or return-to-work was also required.

Prior to inclusion, all participants underwent a 30-minute interview where they were screened for eligibility and given more detailed information about the study. Eligible and willing participants provided informed consent and filled in the baseline questionnaire. This questionnaire included various measures on demographic variables and measures on mental and somatic health complaints. The trial had two arms where the control condition consisted of usual care, mainly follow-up from GPs, other RTW-interventions or occupational health care. No effect of the intervention was found on RTW at 6 months follow up. For the purpose of this study, the groups were not analyzed separately, but group allocation (intervention versus control) was included as a covariate in the logistic regression models.

In the current study, we applied a longitudinal design with 6 months follow-up. Study procedures were reviewed and approved by The Regional Ethics Committee and all Helsinki declaration principles were followed.

Confounders

Instruments measuring health status included the Hospital Anxiety and Depression scale (HAD)[27] for CMDs and the SHC inventory[28] for subjective health complaints. Self-reported health status was measured by one question in the wording "How would you describe your own health?" with answers ranging from "Very good" to "Very poor" on a five point scale. Illness duration was measured by a single item asking participants how long they had had mental health problems (in years). Beliefs concerning the impact of work participation on CMDs were assessed by asking participants "If you continue working, how do you think it will affect your complaints?". Answers were given on a five point scale ranging from "It will worsen my condition" to "It will be very beneficial". Participants were also asked if they had signed private disability insurance agreements (yes/no). A Norwegian standard for classification of occupations was used to group self-reported occupational titles into either blue- or white-collar work. This standard complies with the ISCO-88 (COM) standards.

Predictors

Return-to-Work Expectations

RTW-expectations were assessed by asking participants to respond to the following statement: "I expect to be back at work within the next few weeks". Thus, for the sub-group at risk of sick leave, the response to this item would imply "maintaining work status". For the other two sub-groups (on sick leave and on long-term benefits), the response to this item would imply an expectation to RTW. For the purposes of this paper, however, the responses from all participants were labeled "RTW-expectations". Participants responded on a five point Likert scale ("strongly agree" to "strongly disagree"). Responses were grouped in three comprising those who strongly agreed or agreed into positive RTW-expectations, those

answering "neither agree nor disagree" into uncertain RTW-expectations, and those either disagreeing or strongly disagreeing into negative RTW-expectations.

Illness perceptions

Illness perceptions were measured using the Brief Illness Perception Questionnaire (B-IPQ)[29]. This nine-item questionnaire provides a rapid and reliable measurement of illness perceptions. Items 1 through 8 are rated on a 0-10 response scale. The ninth B-IPQ item is open-ended and registers attribution of causal mechanisms. All nine items were analyzed separately in the current study.

Outcome

The outcome measure (benefit recipiency) was based on registry information from complete and objective national registries on sick leave and benefits. The outcome variable was dichotomized so that those who at follow-up received any health-related benefit (disability pension, work assessment allowance, unemployment benefit or sickness benefits) from the national welfare service were coded "1", whereas those who did not receive any such benefits at follow-up were coded "0".

Statistical analysis

First, RTW-expectations and illness perceptions were examined as individual predictors of benefit recipiency at 6 months follow-up in the study population as a whole. Thus, these first analyses included participants at risk of sick leave, currently on sick leave or on long-term benefits. The illness perception- and RTW-expectation variables were examined as predictors

one at a time, using binary logistic regression analysis. The outcome predicted in all analyses was participants being registered as on sick leave or on long-term benefits.

The item on RTW-expectations was entered as a categorical variable, with positive RTW-expectations as reference category. The confounders were also subjected to the same procedure, and examined as predictors of benefit recipiency one by one using binary logistic regression. Second, all variables found to significantly predict benefit recipiency in the unadjusted regression analyses were entered simultaneously in an adjusted regression model. The basic demographic variables gender, age and educational level were included in the adjusted model whether or not these were statistically significant predictors in the unadjusted analysis. The exact same procedure was then repeated in an unadjusted model, followed by an adjusted model stratified on the three pre-specified sub-groups. These analyses were performed to examine illness perceptions and RTW-expectations as predictors of benefit recipiency in those at risk of sick leave, currently on sick leave or on long-term benefits. All analyses were performed using Statistical package for the social sciences (SPSS) version 19.0.

RESULTS

Clinical and demographic characteristics of study population

The study population consisted of more women than men (67.1%), and was characterized by a mean age of 40.4 years and education at university or postgraduate levels (60.5%). More people scored above the clinical cut-off for anxiety (78%) compared to depression (53%) on the HADS questionnaire, and self-reported average illness duration was 8.6 years. In Table 1 we present a full overview of demographic and clinical characteristics, including RTW-expectations and illness perceptions of those at risk of sick leave, on sick leave or on long-term benefits.

Table 1: Baseline demographic and clinical characteristics of participants

	Total	Baseline work-status			
		At risk of sick leave (n=334)	On sick leave (n=529)	On long-term benefits (n=330)	F / χ
Female	800 (67.1)	197 (16.5)	375 (31.4)	228 (19.1)	13.9*
Age	40.4 (9.7)	40.4 (9.9)	40.3 (9.4)	40.5 (9.8)	0.3
University/Postgraduate college	722 (60.5)	213 (17.9)	327 (27.5)	182 (15.3)	5.5
Blue collar workers (n (%))	391 (33.9)	90 (7.8)	166 (14.4)	135 (11.7)	16.6*
Private disability insurance (n (%))	294 (26.2)	83 (7.4)	147 (13.1)	64 (5.7)	7.5*
Beliefs about work and health (1-5)[2]	2.9 (1.5)	3.2 (1.4)	2.5 (1.4)	3.1 (1.5)	22.7*
Illness duration (years)	8.6 (9.7)	8.9 (9.7)	6.5 (8.5)	11.6(10.08)	23.8*
Return-to-Work Expectations (n (%))					
Positive	326 (32.3)	110 (10.9)	155 (15.4)	61 (6.1)	55.3*
Uncertain	312 (31.0)	63 (6.3)	160 (15.9)	89 (8.8)	0.1
Negative	370 (36.7)	37 (3.7)	197 (19.5)	136 (13.5)	48.1*
The Brief-Illness Perception Questionnaire B-IPQ (0 – 10)					
Consequences[1]	7.1 (1.9)	6.6 (2.1)	7.2 (1.8)	7.3 (1.8)	15.6*
Timeline[1]	5.9 (2.4)	6.0 (2.5)	5.5 (2.3)	6.5 (2.5)	16.7*
Personal control	4.1 (2.2)	4.1 (2.2)	4.1 (2.1)	4.3 (2.2)	0.6
Treatment control	6.9 (2.1)	6.9 (2.1)	7.0 (2.0)	6.6 (2.2)	3.7*
Identity[1]	6.6 (2.1)	6.3 (2.2)	6.6 (2.0)	6.9 (2.0)	8.2*
Illness concern[1]	6.5 (2.3)	6.3 (2.4)	6.5 (2.3)	6.5 (2.2)	0.7
Understanding	6.2 (2.4)	6.0 (2.5)	6.0 (2.4)	6.4 (2.5)	2.3
Emotional response[1]	7.7 (2.0)	7.6 (2.1)	7.6 (2.0)	7.8 (1.9)	1.3
Hospital Anxiety and Depression Scale (HADS)					
Total score	18.8 (6.9)	18.3 (6.8)	19.1 (6.9)	18.5 (6.8)	1.6
Anxiety (cut off=>8) (n (%))	926 (78.2)	255 (21.5)	421 (35.6)	250 (21.1)	2.2
Depression (cut off=>8) (n (%))	633 (53.5)	162 (13.7)	294 (24.8)	177 (14.9)	4.3
Subjective Health Complaints (SHC)					
Total score	20.5 (10.6)	19.2 (10.4)	20.9 (10.4)	21.3(11.1)	4.0*
Self-reported health status (1-5)[3]	2.7 (0.8)	2.6 (0.8)	2.7 (0.8)	2.9 (0.8)	10.9*

All data are reported as mean (SD) unless stated otherwise (n (%)).
Significant between-group differences is reported as F-values or χ in the final column to the right.
[1]=Higher score indicates more maladaptive illness perceptions
*=significant at the .05 level
[2]=Higher score indicates perceiving work participation as more beneficial for health (mental health)
[3]=Lower score indicates better self-reported health status

Predictors of benefit recipiency at 6 months follow-up regardless of work status at baseline

In the study population as a whole, both uncertain and negative RTW-expectations predicted benefit recipiency at 6 months follow-up (Table 2). The fully adjusted model showed that other statistically significant predictors of benefit recipiency were gender (female), illness duration (longer) and self-reported health status (moderate to poor). In the unadjusted model, illness perceptions pertaining to *consequences* (more and severe) and *timeline* (long lasting), ascribing many experienced symptoms to the illness (*identity*), being concerned about the illness (*illness concern)*, and experiencing emotional distress (*emotional response*), also predicted benefit recipiency.

Table 2. Logistic regression results of return-to-work expectations and illness perceptions as predictors of benefit recipiency at 6 months follow-up in the study population as a whole.

	Predictor variables	Unadjusted model OR (95% CI)	*p-value*	Adjusted model OR (95% CI)	*p-value*
Basic demographics	Gender	1.18 (0.93 to 1.51)	0.171	1.55 (1.10 to 2.18)	0.011
	Age	1.00 (0.98 to 1.01)	0.963	1.00 (0.98 to 1.02)	0.529
	Educational level	0.79 (0.62 to 1.00)	0.051	0.99 (0.68 to 1.43)	0.968
Return-to-work expectations[1]	Uncertain	**1.84 (1.33 to 2.53)**	**0.001**	**2.07 (1.39 to 3.06)**	**<0.001**
	Negative	**3.99 (2.91 to 5.47)**	**0.001**	**3.89 (2.61 to 5.79)**	**<0.001**
Illness Perceptions					
	Consequences	**1.17 (1.10 to 1.25)**	**<0.001**	1.11 (0.98 to 1.25)	0.078
	Timeline	**1.10 (1.05 to 1.16)**	**<0.001**	1.03 (0.95 to 1.11)	0.414
	Personal control*	0.98 (0.93 to 1.03)	0.527		
	Treatment control*	0.97 (0.91 to 1.02)	0.260		
	Identity	**1.16 (1.09 to 1.22)**	**<0.001**	1.09 (0.98 to 1.21)	0.083
	Illness Concern	**1.06 (1.01 to 1.11)**	**0.017**	0.97 (0.89 to 1.06)	0.977
	Understanding*	1.00 (0.963 to 1.05)	0.713		
	Emotional response	**1.05 (1.00 to 1.12)**	**0.049**	0.90 (0.81 to 1.00)	0.066
Causal attributions	Work	0.82 (0.62 to 1.08)	0.173		
	Stress	0.91 (0.62 to 1.32)	0.625		
	Personal relationships	0.83 (0.59 to 1.16)	0.294		
Mental health status	HADS total score	**1.02 (1.00 to 1.04)**	**0.009**	0.99 (0.96 to 1.02)	0.993
Subjective health complaints	SHC total score	**1.02 (1.01 to 1.03)**	**<0.001**	1.00 (0.98 to 1.01)	0.975
	Illness duration (in years)	**1.02 (1.01 to 1.04)**	**<0.001**	**1.03 (1.01 to 1.05)**	**<0.001**
	Group allocation (intervention vs control)	1.03 (0.82 to 1.29)	0.774		
	Blue-collar workers	**1.51 (1.18 to 1.93)**	**0.001**	1.44 (0.98 to 2.10)	0.057
	Private disability insurance	1.15 (0.88 to 1.50)	0.292		
	Work and health[2] (1-5)	**0.89 (0.82 to 0.97)**	**0.008**	0.94 (0.85 to 1.05)	0.317
	Self reported health status[3] (1-5)	**1.43 (1.24 to 1.65)**	**<0.001**	**1.26 (1.02 to 1.57)**	**0.033**

[1] Reference category: Positive RTW-expectations. [2] Higher score indicates perceiving work as having more positive effects on health. [3]Higher score indicates worse self-reported health status. *Higher score indicates more adaptive illness perceptions. Significant results are highlighted in bold.

Predictors of benefit recipiency in sub-groups

Of those at risk of going on sick leave 264 (79.0%) had managed to maintain their work participation six months later. Return-to-work was experienced by 288 (54.4%) of those on sick leave and by 73 (22.1%) of those on long-term benefits.

Group I: At risk of sick leave

For those at risk of going on sick leave, negative RTW-expectations and illness duration (in years) were the only significant predictors of benefit recipiency at 6 months follow-up in the unadjusted model. In the fully adjusted model, negative RTW-expectations remained the single significant predictor for benefit recipiency (Table 3).

Group II: On sick leave at baseline

In the unadjusted model for those who were on sick leave at baseline, both uncertain and negative RTW-expectations predicted benefit recipiency at 6 months follow-up. The illness perception components *consequences*, *timeline* and *identity*, were all individual predictors of benefit recipiency in the unadjusted model. Additionally, self-reported poor health, perceiving work as detrimental for health, higher scores on mental health status (HADS), subjective health complaints (SHC), occupational grade (blue collar work), and lower education were also predictors of benefit recipiency. In the fully adjusted model only uncertain and negative RTW-expectations remained significant predictors of benefit recipiency (Table 3).

Group III: On long-term benefits at baseline

In those on long-term benefits, only negative RTW-expectations predicted benefit recipiency in the unadjusted model. In the fully adjusted model negative RTW-expectations was borderline significant (p=0.050) while female gender significantly predicted benefit recipiency (Table 3).

Table 3. Significant predictors of benefit recipiency in adjusted logistic regression models for sub-groups at risk of sick leave (n=334), on sick leave (n=529) or on long-term disability benefits (n=330).

		At risk of sick leave*	On sick leave**	On long-term benefits***
Benefit recipieny at 6 months follow-up		n=70	n=241	n=257
Predictor variables		OR (95%CI)	OR (95%CI)	OR (95%CI)
Basic demographics	Gender	1.83 (0.89 to 3.78)	1.59 (0.99 to 2.56)	**0.37 (0.17 to 0.79)**
	Age	0.99 (0.95 to 1.03)	0.99 (0.97 to 1.02)	0.99 (0.96 to 1.02)
	Educational level	1.06 (0.51 to 2.19)	0.71 (0.45 to 1.10)	1.46 (0.79 to 2.69)
Return-to-work expectations[2]	Uncertain	1.92 (0.85 to 4.33)	**2.62 (1.47 to 4.67)**	0.61 (0.28 to 1.30)
	Negative	**3.03 (1.22 to 7.53)**	**3.78 (2.11 to 6.76)**	2.19 (1.00 to 4.79)
Illness Perceptions				
	Consequences		1.10 (0.94 to 1.29)	
	Timeline		1.01 (0.91 to 1.13)	
	Personal control*			
	Treatment control*			
	Identity		1.03 (0.90 to 1.18)	
	Illness Concern			
	Understanding*			
	Emotional response			
Causal attributions	Work			
	Stress			
	Personal relationships			
Mental health status	HADS total score		0.99 (0.95 to 1.03)	
Subjective health complaints	SHC total score		1.00 (0.98 to 1.03)	
	Illness duration (in years)	1.03 (0.99 to 1.06)	1.02 (0.99 to 1.05)	
	Group allocation (intervention vs control)			
	Blue-collar workers		1.09 (0.65 to 1.84)	
	Private disability insurance			

Work and health[3] (1-5)	0.87 (0.75 to 1.02)
Self reported health status[4] (1-5)	1.24 (0.93 to 1.66)

[1]Investigated in unadjusted logistic regression models for all three sub-groups, significant predictors carried forward to adjusted models: *Adjusted for demographic variables gender, age educational level, illness duration and RTW-expectations, **Adjusted for demographic variables gender, age educational level, RTW-expectations, illness perception components *consequences*, *timeline*, *identity*, mental health and subjective health complaints, illness duration, occupational grade, beliefs concerning the effect of work on health and self-reported health status ***Adjusted for demographic variables gender, age educational level and RTW-expectations.
[2] Reference category: Positive RTW-expectations. [3] Higher score indicates perceiving work as having more positive effects on health. [4]Higher score indicates worse self-reported health status. [*]Higher score indicates more adaptive illness perceptions.
Significant predictors highlighted in bold.

DISCUSSION

Main findings

In this study we investigated return-to-work expectations and illness perceptions as predictors of benefit recipiency in people with CMDs struggling with work participation. We further investigated RTW-expectations and illness perceptions as predictors of benefit recipiency in three pre-specified sub-groups based on participants' baseline status; at risk of sick leave, currently on sick leave, or on long-term benefits. Both uncertain and negative RTW-expectations were strong predictors of benefit recipiency in our study population as a whole, as well as in the sub-group of those currently sick-listed. There were differences in the predictive contribution of RTW-expectations and illness perceptions individually and relative to each other depending on participants' baseline status.

Predictors of non-Return to Work

Illness perceptions

Previous studies have shown that illness perceptions predict RTW after myocardial infarction and in musculoskeletal disorders[22, 30]. Furthermore, one study found beliefs about duration and consequences of illness acting as perpetuating factors in long-term sick leave for patients with a variety of disorders[31].Our findings seem to show some similarities with previous studies. However, in the current study the associations were not maintained in the fully adjusted models.

None of the illness perceptions significantly predicted benefit recipiency in the adjusted model for those on sick leave, whilst uncertain and negative RTW-expectations did. From our previous

study, we saw that some of the illness perceptions were particularly strongly associated with the uncertain and negative RTW-expectations[25]. We therefore find it plausible to assume that although not statistically significant predictors of benefit recipiency in this study, illness perceptions may still be part of the underlying factors comprising RTW-expectations. It appears intuitively and clinically sound that perceiving ones' illness as having more severe consequences and affecting more life domains might impact on the RTW-process. One such impact could be asserted on beliefs or decisions related to work participation, for instance when deciding on readiness to RTW. Furthermore, believing that illness will last for a longer time is likely to impact on how a person perceives the future possibilities for work participation, something that could be involved in the construction and reporting of RTW-expectations. Future studies on RTW in workers on sick leave with CMDs would benefit from including assessments on illness perceptions in order to gain more knowledge on the role these psychological processes might play.

Return-to-Work Expectations

Our findings show that psychological factors such as ones' own uncertain or negative RTW – expectations are strong predictors of benefit recipiency in CMDs. This corresponds with previous research showing RTW-expectations to repeatedly predict actual RTW[32-34]. Previous research findings suggest that health improvement alone is not enough to RTW, and that psychological factors as well are of importance in RTW [35]. Self-efficacy is essential in the processes that make us initiate and later sustain our behaviors[20]. Considering RTW-expectations, these expectations would depend on a persons' belief in the ability to RTW. In our study, RTW-expectations predicted benefit recipiency more strongly than symptom severity of

CMDs as measured by HADS. This finding is in contrast to one previous study where symptom severity was found to be an important predictor of RTW in a study population resembling the one studied here[13]. This may be due to the simple fact that this previous study did not include RTW-expectations. However, other studies have found symptom severity to predict RTW also when including RTW-expectations [33]. The findings from our study might be due to study population characteristics such as an expressed desire to work or the heterogeneous work status. We therefore suggest that future studies on work participation or RTW in CMDs include systematic evaluation of participants' RTW-expectations.

In our study, negative RTW-expectations predicted benefit recipiency in those at risk of on sick leave. This subgroup consisted of people not yet on sick leave that self-reported CMDs as an obstacle for work participation. It is likely that those in this sub-group were on the verge of sick leave. This finding stresses the importance of identifying negative RTW-expectations early in cases where CMDs represent a barrier for optimal work participation. In an occupational health care setting including a focus on peoples' RTW-expectations alongside the focus on mental health improvement could be an important factor in preventing future sick-leave episodes and disability resulting from CMDs.

Another important finding of this study was that in those on sick leave, uncertain RTW-expectations predicted benefit recipiency, although not as strongly as negative RTW-expectations. This corresponds with a previous study where uncertain RTW-expectations were associated with a longer time to RTW in workers with soft tissue injuries, with an even stronger association for negative RTW-expectations [36].

A persons' own predictions of time to RTW, as well as RTW-expectations, have been shown to be better predictors of actual RTW than the opinion of health care professionals[33], and we therefore suggest that addressing RTW-expectations in occupational health care would beuseful.

An important characteristic of our study population was that participants' work statuses varied from "at risk of sick leave" to "on sick leave" and "on long-term benefits". This heterogeneity allowed for investigation of RTW-expectations and illness perceptions across work status. As a result we were able to reveal that the predictive value of RTW-expectations may vary dependent on work status, thus adding to the literature.

Further, the B-IPQ, a reliable and rapid measure, was used to assess the participants' illness perceptions. The use of this measure allowed for comparison with other study populations using the B-IPQ, and ensured that we measured the participants' actual illness perceptions. The procedure of a one-item measurement of RTW-expectations has previously been demonstrated to be sufficient[37] and the single item used to measure RTW-expectations in the present study has been found to measure important aspects of RTW-expectations in low back pain patients[38]. Additionally, we have previously used this item to investigate the association between illness perceptions and RTW-expectations within the same study population as in the current study[25]. The use of registry based data to measure RTW secured complete follow-up on all participants and eliminates common methods problems and is thereby a considerable strength of the study.

Selection bias cannot be ruled out as a potential limitation of our study, as those choosing to join this study could be qualitatively different from those declining to participate. However, as only 17 persons of 1416 screened declined to participate it can be argued that the study population is a

representative sample of the help-seeking population struggling with work participation due to CMDs in Norway.

The classification of cases in this study was based on a hierarchical system that separated those not receiving health related benefits at all from those receiving such benefits whether these were full or partial. It is possible that a more nuanced classification of cases taking into account partial benefits such as graded sick leave would yield other results.

In this study we used a version of B-IPQ failing to explicitly ask for participants' perceptions of their CMDs, using the more generic term "your illness". This could represent a limitation to our study if participants answered the B-IPQ with other illnesses than CMDs in mind. An important characteristic shared by all participants, however, is that they all enter the study due to CMDs being the primary reason for their struggles with work participation. Hence, we consider this potential limitation to be of little importance.

Recent studies have shown that differences in RTW self-efficacy are more predictive of RTW than RTW-expectations[39]. Failing to include extensive measures on RTW self-efficacy in our study might represent a limitation. However, no extensive RTW self-efficacy measure is as of yet available in Norwegian language, and we suggest that future studies include such measures when available.

Conclusion

The current study demonstrates that expectations about ones' own future work participation (RTW-expectations) are strong predictors for future benefit recipiency. Those presenting uncertain or negative RTW-expectations are more likely be recipients of health related benefits six months later. We suggest that vocational rehabilitation services and occupational health care

services pay attention to RTW-expectations alongside mental health improvement in workers struggling with work participation due to CMDs.

As previous studies have highlighted, "short term sick leave may have consequences for future sick leave beyond the effect of ill health" [40]. We believe our findings further stress the importance of identifying negative or uncertain RTW-expectations early on, even before a sick leave episode occurs.

Figure legends

Table 1: Baseline demographic and clinical characteristics of participants

Table 2: Logistic regression results of return-to-work expectations and illness perceptions as predictors of non-RTW at 6 months follow-up regardless of sick leave status at baseline

Table 3: Significant predictors of non-RTW in adjusted logistic regression models for subgroups working, but at risk of sick leave (n=334), on sick leave (n=529) or on long-term disability benefits (n=330).

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Author contributor statement

CL contributed to data collection, conception and design of the study, performed data analysis, interpreted findings, wrote up the first draft of the study and consequent revisions regarding important intellectual content. WS contributed to critical revision of important intellectual content and revision of analysis. SØ contributed to conception and design of the study, critical revision of the manuscript and its analysis. SER contributed to conception and design of the study, to the first draft of the study and its consequent revisions, and oversaw the revision of the study.

SER is the guarantor of this study.

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Data sharing

No additional data available.

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cohort studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2, 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5, 6, 7
Objectives	3	State specific objectives, including any prespecified hypotheses	8
Methods			
Study design	4	Present key elements of study design early in the paper	2, 8, 9
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	8,
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	9,
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	-
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	10, 11
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	10, 11
Bias	9	Describe any efforts to address potential sources of bias	8, 9
Study size	10	Explain how the study size was arrived at	8, 9
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	10, 11, 12
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	11, 12
		(*b*) Describe any methods used to examine subgroups and interactions	11, 12
		(*c*) Explain how missing data were addressed	11, 12, 13
		(*d*) If applicable, explain how loss to follow-up was addressed	- (11)
		(*e*) Describe any sensitivity analyses	-
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	13
		(b) Give reasons for non-participation at each stage	-
		(c) Consider use of a flow diagram	9
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	12, 13, 16
		(b) Indicate number of participants with missing data for each variable of interest	-
		(c) Summarise follow-up time (eg, average and total amount)	9
Outcome data	15*	Report numbers of outcome events or summary measures over time	17
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10, 15, 17,
		(*b*) Report category boundaries when continuous variables were categorized	10, 11, 13
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	-
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	16, 17, 18
Discussion			
Key results	18	Summarise key results with reference to study objectives	20
Limitations			
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	20, 21, 22, 23, 24
Generalisability	21	Discuss the generalisability (external validity) of the study results	22, 23, 24
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	25

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.