

Predicting Return to Work in Employees Sick-Listed Due to Minor Mental Disorders

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Abstract *Objective* To investigate which factors predict return to work (RTW) after 3 and 6 months in employees sick-listed due to minor mental disorders. *Methods* Seventy GPs recruited 194 subjects at the start of sick leave due to minor mental disorders. At baseline (T0), 3 and 6 months later (T1 and T2, respectively), subjects received a questionnaire and were interviewed by telephone. Using multivariate logistic regression analyses, we developed three prediction models to predict RTW at T1 and T2. *Results* The RTW rates were 38% after 3 months (T1) and 61% after 6 months (T2). The main negative predictors of RTW at T1 were: (a) a duration of the problems of more than 3 months before sick leave; and (b) somatisation. The main negative predictors of RTW at T2 were: (a) a duration of the problems of more than 3 months before sick leave; (b) more than 3 weeks of sick leave before inclusion in the study; and (c) anxiety. The main negative predictors of RTW at T2 for those who had not resumed work at T1 were: (a) more than 3 weeks of sick leave before inclusion in the study; and (b)

depression at T1. The predictive power of the models was moderate with AUC-values between 0.695 and 0.763. *Conclusions* The main predictors of RTW were associated with the severity of the problems. A long duration of the problems before the occurrence of sick leave and a long duration of sick leave before seeking help predict a relatively small probability to RTW within 3–6 months. High baseline somatisation and anxiety, and high depression after 3 months make the prospect even worse. Since these predictors are readily assessable with just a few questions and a symptom questionnaire, this opens the opportunity to select high-risk employees for a targeted intervention to prevent long-term absenteeism.

Keywords Sick leave · Mental disorders · Prediction · RTW · Primary care · Emotional distress

Introduction

Over the last decade, the number of employees on sick leave due to mental health problems has increased considerably in Western countries, including Sweden, Germany, the UK and The Netherlands [1]. Apart from the individual suffering that is caused by mental health problems, associated sick leave has a variety of negative consequences. Longer absences are associated with a reduced probability of eventual return to work, resulting in a weakened financial position, social isolation and exclusion from the labour market [2, 3]. Only 50% of those who are off work for 6 months or more return to work [4]. Apart from these individual disadvantages, sickness absence forms an economic burden on society [5, 6]. In the Netherlands, about one-third of the people receiving disability benefits do so because of mental health problems, the majority of which

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are common *minor* mental health problems, including emotional distress [7]. Also in the UK, especially common mental disorders rather than complex psychoses account for the majority of incapacity benefit claims [3]. In people with minor mental disorders, sick leave costs are much higher than medical costs [8]. This is mainly due to the long duration of the sick leave period: on average, people on sick leave because of minor mental disorders or emotional distress have been found to be absent from work for over 100 days before they fully or even partially resumed their work [8]. Considering the scope of the problem, it is surprising that only very few international studies have been conducted on absenteeism due to mental health problems, as opposed to physical problems. In a recent systematic review of factors predicting Return to Work (RTW) for people with poor mental health it was concluded that the factors found were wide ranging [4]. For instance, factors were related to work (e.g. job stress, threat of unemployment), health risk behaviours (e.g. weight, smoking, drug dependence), social status (e.g. marital status, gender, education), and medical condition (e.g. severity of symptoms). However, the authors also concluded that the definitions of poor mental health varied widely, that studies sometimes had produced opposing results, and that further research was needed [4].

In the Netherlands, most people on sick leave seek contact with their general practitioner (GP) and/or occupational physician (OP) within the first weeks of their absenteeism [9]. Therefore, these professionals have opportunities for treatment and prevention. The identification of prognostic factors for patients at risk for long-term sick leave may facilitate the selection of patients who will most likely benefit from early interventions. The aim of the present prospective longitudinal study was to investigate which factors predict RTW in primary care patients who are sick-listed due to emotional distress or minor mental disorders.

Methods

Procedure

For the study, data collected for a randomised clinical trial were used [8, 10]. This trial compared the effectiveness of an intervention by social workers to care as usual by General Practitioners (GPs), in employees sick-listed due to minor mental disorders. The social work intervention did not show an effect on return to work (RTW) [10]. Data from studies with an RCT design, such as the present study, can be used for prediction studies [11]. If the intervention is effective, the treatment groups can be combined, but the treatment must be included as a separate predictor. When

the treatment is not effective, as is the case in the present study, the treatment groups can simply be combined [11]. This, of course, assumes that the treatment does not impact the natural course and outcome of the problem under investigation. However, in some instances, even when the treatment does not influence the overall outcome, the treatment may impact the relationship between predictors and outcome [12]. Analyzing the treatment groups separately is a possible solution, but for predictors that act the same in both groups, this results in loss of statistical power. An elegant way to address this issue is to look for treatment \times predictor interactions and to include statistically significant interactions in the prediction model. In regression analysis, the relationship between a predictor and an outcome is represented by an odds ratio (OR, i.e. the odds of a certain outcome in the group with the predictor, divided by the odds of that outcome in the group without the predictor) [13]. The treatment \times predictor interaction tests whether the OR for the treatment group and the OR for the control group are not statistically significantly different. If these ORs do not differ, the treatment groups can be combined to estimate a single OR for the predictor, thereby preserving statistical power. This single OR is equally valid for both the treatment group and the control group. If the ORs are different, separate ORs have to be calculated for the treatment groups.

Between August 2001 and July 2003, patients were recruited by 70 GPs in the city of Almere, the Netherlands. Patients were recruited for a randomised clinical trial to assess the effectiveness of a new treatment for minor mental disorders in primary care [10]. Inclusion criteria were: (a) suffering from emotional distress or minor mental disorders according to GP and patient; (b) paid employment; (c) on sick leave or planning to be directly after visit to GP because of emotional or mental problems, but no longer than 3 months; (d) aged 18–60; and (e) Dutch speaking. GPs were asked to include patients as early as possible after they had reported sick. As the study focussed on people on sick leave because of emotional distress *or minor* mental disorders, patients were screened for the presence of more severe mood and anxiety disorders by means of the CIDI [14], a fully structured diagnostic interview, resulting in psychiatric diagnoses according to the DSM-IV [15] and the ICD-10 [16] criteria. Patients with mild disorders (generalised anxiety disorder, mild major depressive disorder), or no mood or anxiety disorder according to the CIDI could participate in the trial. In contrast, patients with a moderately severe or severe mood disorder (major depressive disorder, bipolar disorder), agoraphobia, panic disorder, social phobia, as well as patients already receiving psychotherapy, were excluded. After the study had been fully explained to each patient, written informed consent was obtained. A total of 98 patients were randomised to a social worker, and 96 to usual care

(their GP). For more information about the selection procedure of the sample see Brouwers et al. [8, 10, 17] At baseline (T0), and 3 (T1) and 6 (T2) months later subjects received a questionnaire. During the follow-up they were also interviewed by telephone. In the questionnaires the following types of information were gathered: (a) socio-demographic characteristics (e.g. gender, age, education level); (b) problem-related characteristics (e.g. patients' perspective on what caused the problems, and the expectations of their own sick leave duration); and (c) health care use in the past 4 weeks. In addition, the Four-Dimensional Symptom Questionnaire (4DSQ) [18, 19] was used to measure four dimensions of common psychopathology: distress, depression, anxiety and somatisation. The 4DSQ is a self-rating questionnaire existing of 50 items: 16 items measure distress, 6 depressive symptoms, 12 anxiety and 16 somatisation. Items are scored on a 5-point scale and refer to symptoms during the past week. The 4DSQ was chosen for this study because it measures distress and somatisation separately from depression and anxiety and has good psychometric properties [18–20].

The outcome of interest in the present study was full return to work 3 or 6 months after baseline, as assessed during the telephone follow-up interviews. Although the primary outcome in the original trial was the duration of sickness absence, from the first day of sick leave until the first day of (partial or full) RTW, analyzed using Cox' regression analysis, we chose a dichotomous outcome of full RTW after a certain period of time, to be analyzed with logistic regression for this prediction study, for two reasons. First, the proportional hazard assumption underlying a Cox' regression analysis, implicating that the relationship between a predictor and the outcome is the same across the whole time span of the follow-up, is unlikely to hold for many predictors. Some predictors may have a short-term effect and have worn off in the longer term. Conversely, other predictors may exhibit their effect in the long run only. Second, the results of a logistic regression analysis, using information available at one point in time to predict the situation at a certain point in the future, are more easy to interpret than the results of a Cox' regression analysis. Moreover, the chosen analysis allows for utilizing information that has become available during the process, i.e. data gathered at 3 months, for the prediction of RTW after 6 months.

Prior to the start of the study, approval was obtained from the ethical committee of the Netherlands Institute of Mental Health and Addiction.

Statistical Analysis

For the prediction of RTW three prediction models were developed, according to three questions: (a) What variables

at baseline (T0) predict RTW 3 months later (T1)?; (b) What variables at T0 predict RTW 6 months later (T2)?; and (c) in the subsample of patients who have not yet resumed work at T1, what variables predict RTW at T2? To answer this latter question, data gathered at both T0 and T1 were used, similar to a realistic situation in which professionals guiding an individual on sick leave usually are in contact with this individual periodically and obtain prognostic information during these consultations. Moreover, information on what sustains sick leave can aid health care professionals to identify obstacles for RTW, select adequate interventions to eliminate these obstacles and prevent long-term sick leave [2]. The variables investigated were based on the literature on the prediction of RTW [2, 4, 21, 22], except for the health care use variables. These were included because help seeking behaviour was interpreted as a sign of severity of emotional distress. Moreover, if (certain) health care use variables would be related to RTW, this would provide opportunities for intervention. The variables included can be found in Table 1.

Each of the prediction models was developed in three consecutive steps

The first step involved selecting potential predictors through univariate analyses of the association between the outcome of RTW and potential predictors. These analyses were conducted separately for the treatment groups (respectively, social work intervention and care as usual by the GP). Chi-square tests were used for categorical predictor variables and *t*-tests for continuous variables. Potential predictors that showed an association with RTW with *P*-values < 0.20 in one or both treatment groups were considered for inclusion in the multivariate model (in step 3).

The second step concerned testing and selecting potential interactions between possible predictors and type of treatment (social worker or GP). Interaction effects between potential predictors and treatment condition were initially explored by looking for conspicuous differences in the associations of potential predictors with RTW in the treatment groups. In order to estimate the significance of the possible interactions, separate logistic regression analyses were computed, using RTW as the dependent variable, and treatment condition, predictor, and the predictor × treatment condition interaction as independent variables. Interaction terms with *P*-values < 0.20 were included in the multivariate model (in step 3). In the third step the actual multivariate prediction model was built. Potential predictors with *P*-values < 0.20 (from step 1) and potential predictors with predictor × treatment condition interaction terms with *P*-values < 0.20 were entered in an initial multivariate logistic regression model. In addition, squared 4DSQ scores were included in the model to account for non-linear associations between the 4DSQ scores and RTW. Next, stepwise manual backward selection was used to

Table 1 Variables investigated in the present study. Numbers and percentages, unless indicated otherwise

	GP group N = 96 (%)	Social work group N = 98 (%)
<i>Socio-demographic characteristics</i>		
Gender (female)	58 (60.4)	57 (58.2)
Age mean (SD)	40.1 (9.3)	39.4 (9.1)
Level of education		
Lower level	17 (17.9)	14 (14.4)
Intermediate level	58 (61.1)	67 (69.1)
Higher level	20 (21.1)	16 (16.5)
Has partner	74 (75.6)	77 (77.9)
Has children aged 0–11	32 (33.3)	39 (39.8)
Has children aged 12–18*	33 (34.4)	14 (14.3)
Works part time (≤ 32 h)	27 (29.3)	34 (35.8)
Chronic somatic disease	12 (12.6)	18 (18.9)
<i>Problem related characteristics</i>		
Previous mental problems	22 (23.2)	17 (17.7)
Onset symptoms > 3 ms before T0	54 (59.3)	55 (62.5)
Onset sick leave ≥ 3 weeks before T0	38 (41.3)	31 (31.6)
Own prediction RTW < 6 weeks	20 (20.8)	18 (18.4)
Attributes cause of absenteeism to		
Work	70 (72.9)	71 (73.2)
Health problems	16 (16.7)	22 (22.7)
Relationship with partner	19 (19.8)	8 (8.2)
Family (partner/children)	21 (21.9)	14 (14.4)
Relatives	13 (13.5)	17 (17.5)
Financial problems	15 (15.6)	16 (16.5)
Stressful life event	29 (30.2)	23 (23.7)
Other problems	20 (20.8)	17 (17.3)
Health care use T0		
Contact with GP past 4 weeks	94 (97.9)	94 (96.9)
Contact with OP past 4 weeks	52 (54.2)	36 (37.1)
Contact medical specialist past 4 weeks	8 (8.3)	9 (9.3)
Contact mental health professional past 4 weeks	7 (7.3)	9 (9.2)
Contact physical therapist past 4 weeks	12 (13.6)	7 (7.2)
Contact complementary healer	6 (6.3)	8 (8.2)
Benzodiazepam use	26 (27.1)	26 (26.5)
Antidepressant use	8 (8.3)	10 (10.2)
4DSQ scores (T0), mean (SD)		
Distress (range 0–32)	21.4 (7.4)	20.0 (7.2)
Depression (range 0–12)	3.0 (3.0)	2.8 (2.9)
Anxiety (range 0–24)	4.7 (4.7)	3.7 (4.0)
Somatization (range 0–32)	12.5 (6.4)	11.9 (6.0)
Health care use T1		
Contact with GP past 4 weeks	38 (43.2)	33 (34.0)
Contact with OP past 4 weeks	49 (55.7)	54 (55.7)
Contact medical specialist past 4 weeks	10 (11.4)	16 (16.5)
Contact mental health professional past 4 weeks	40 (45.5)	73 (75.3)
Contact physical therapist past 4 weeks	12 (13.6)	7 (7.2)
Contact complementary healer	8 (9.1)	8 (8.2)
Benzodiazepam use	20 (20.8)	20 (20.4)
Antidepressant use	5 (5.2)	6 (6.1)

Table 1 continued

	GP group <i>N</i> = 96 (%)	Social work group <i>N</i> = 98 (%)
4DSQ scores (T1), mean (SD)	<i>N</i> = 88	<i>N</i> = 97
Distress (range 0–32)	10.9 (8.5)	8.4 (7.2)
Depression (range 0–12)	1.3 (2.2)	0.9 (1.9)
Anxiety (range 0–24)	2.3 (4.4)	1.6 (3.4)
Somatization (range 0–32)	7.1 (6.1)	5.6 (5.7)

* X^2 10.6; *DF* 1; $P < 0.001$

eliminate non-significant predictors and interactions from the model and to retain only those variables that were significantly related to the outcome at issue ($P < 0.05$). When significant interactions were retained in the final model, we calculated ORs for the separate treatment groups. As we anticipated a low chance for the social work intervention to be implemented, due to lack of efficacy, our principal interest concerned the OR in the usual care condition. For the multivariate analyses, missing values were imputed by means of the Missing Values Analysis regression method in SPSS.

To give an indication of the predictive power (discrimination) of the models, the predicted probabilities for RTW as derived from the final models were used to perform a Receiver Operating Characteristic (ROC) analysis. The Area Under the Curve (AUC) may be interpreted as an estimate of the probability that a randomly chosen patient who had resumed work will have a higher predicted probability than a randomly chosen patient who had not resumed work [23]. All analyses were carried out with SPSS 14.0 software.

Results

The mean age of the participants was 39.8 (SD 9.2, range 20–60). Seventy-nine (41%) subjects were male. Their mean number of work hours per week was 34.0 (SD 8.0). Baseline characteristics, as well as health care data and 4DSQ scores at T1, are presented in Table 1. These variables were evaluated as potential predictors in the first two steps of the analysis.

At T1, 38% (70/185) of the subjects had fully resumed work, and 61% (106/175) had fully resumed at T2. Of those subjects who had not resumed their work at T1, 41% (44/108) had resumed work 3 months later, at T2. In Fig. 1, a flow chart of RTW over time is shown for the two treatment groups. Of the total group, 57% had none of the investigated disorders according to DSM-IV, 29% had a mild major depressive disorder, 17% a generalised anxiety disorder, 1% a dysthymic disorder, and 0.5% a mild bipolar disorder.

Model 1: Predicting RTW Three Months After Baseline (T1), Using Baseline Data

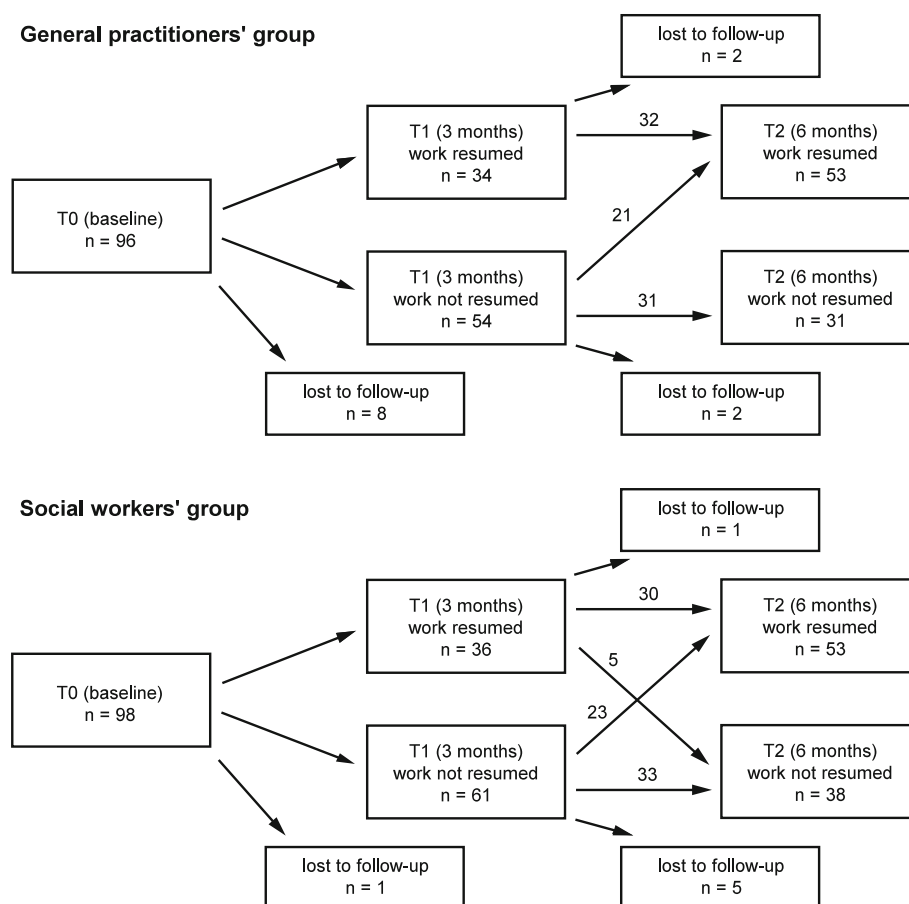
The univariate analyses (step 1) yielded 11 potential predictors with P -values < 0.20 . Nine suspected interactions were tested (step 2), yielding five potential interactions with P -values < 0.20 . The potential predictors from step 1, together with the predictors showing possible interactions from step 2, the interaction terms and the treatment condition were entered in the initial multivariate model (step 3, data not shown). Stepwise manual backward selection resulted in the final model presented in Table 2. As can be seen from this table, RTW at T1 was predicted by four factors assessed at baseline. None of the interactions were retained in the final model. In addition, as expected, the treatment condition did not significantly contribute to the model, and was removed. Patients who expected to resume work within 6 weeks' time had indeed a higher probability of RTW. In contrast, a duration of problems of more than 3 months, having been in contact with the OP in the past 4 weeks, and a high somatisation score on the 4DSQ were associated with a lower probability of RTW at T1. As can be seen from the Wald statistics in Table 2, the strongest negative predictors for RTW at T1 were a longer duration of the problems and a higher somatisation score at baseline.

The accuracy of the final model was quantified by the construction of a ROC-curve. The AUC was 0.723 (95%CI 0.648–0.799), indicating a moderate predictive power.

Model 2: Predicting RTW Six Months After Baseline (T2), Using Baseline Data

The univariate analyses (step 1) yielded 14 potential predictors with P -values < 0.20 . Twelve suspected interactions were tested (step 2), yielding six potential interactions with P -values < 0.20 . The potential predictors from step 1, together with the predictors showing possible interactions from step 2, the interaction terms and the treatment condition were entered in the initial multivariate model (step 3, data not shown). Stepwise manual backward selection resulted in the final model presented in Table 2. The strongest predictors of sick leave at T2 were a longer

Fig. 1 Flow chart of follow-up



duration of the problems and a longer sick leave duration at baseline. In addition, the 4DSQ anxiety score turned out to be predictive of continued sick leave at T2. Furthermore, two interactions were retained in model 2. First, in the usual care group (treated by the GP), patients who attributed their absenteeism to family problems had a lower probability of RTW at T2 than those who did not attribute it to family problems (OR = 0.204, 95%CI: 0.052–0.808). In the social work group, this ‘effect’ of attribution to family problems could not be found (OR = 2.132, 95%CI: 0.575–7.906). The second interaction concerned the treatment condition and having had contact with a physical therapist in the 4 weeks before baseline. In the usual care (GP) group, patients who had contacted a physical therapist had a higher probability of RTW at T2 (OR = 5.542, 95%CI: 0.502–61.206). In contrast, in the group treated by a social worker, those patients had a lower probability of RTW (OR = 0.277, 95%CI: 0.049–1.576). Although both ORs were statistically non-significant within the separate treatment groups, the difference between the ORs across the treatment groups was significant ($P = 0.048$). Some of the ORs showed wide confidence intervals. This is probably due to the relatively small number of patients attributing their

absenteeism to family problems or having been in contact with a physical therapist. It should further be noted that, although the treatment condition’s ‘main effect’ was statistically not significant ($P = 0.159$), treatment condition had to be retained in model 2 in order to correctly estimate the interaction effects with attribution to family problems and contact with physical therapist. As we were primarily interested in predictors in the usual care situation, model 2 could be reduced to a simpler model. In the usual care situation, the code for treatment condition was 0 and therefore treatment condition and the interaction terms disappeared from the model and only the following predictors remained: problems started >3 months before T0 (OR = 0.275, $P < 0.001$), absenteeism >3 weeks at T0 (OR = 0.384, $P < 0.010$), attributes cause of absenteeism to family problems (OR = 0.204, $P < 0.024$), contact physical therapist in past 4 weeks (OR = 5.542, $P < 0.162$), and 4DSQ anxiety score (OR = 0.902, $P < 0.022$). Moreover, contact with a physical therapist in the past 4 weeks could be removed because of its non-significant contribution.

The accuracy of the final model was again moderate, with an AUC of 0.763 (95%CI 0.690–0.837).

Model 3: Predicting RTW at T2 in the Subsample of Patients Who Had Not Resumed Work at T1, Using Data Gathered at Baseline and at T1

The univariate analyses (step 1) yielded 12 potential predictors with *P*-values < 0.20. Seven suspected interactions were tested (step 2), yielding four potential interactions with *P*-values < 0.20. The potential predictors from step 1, together with the predictors showing possible interactions from step 2, the interaction terms and the treatment condition were entered in the initial multivariate model (step 3, data not shown). Stepwise manual backward selection resulted in a simple final model presented in Table 2. In the subgroup of patients on sick leave at T1, continued sick leave at T2 could be predicted by just two variables: absenteeism of more than 3 weeks before the inclusion in the study at T0 and the 4DSQ depression score at T1. Hence, as illustrated in Fig. 2, in subjects who had not yet resumed work at T1, the probability of RTW at T2 was low for patients with high depression scores and those who had been on sick leave longer than 3 weeks before baseline. The accuracy of the final model was again moderate, with an AUC of 0.695 (95%CI 0.597–0.794).

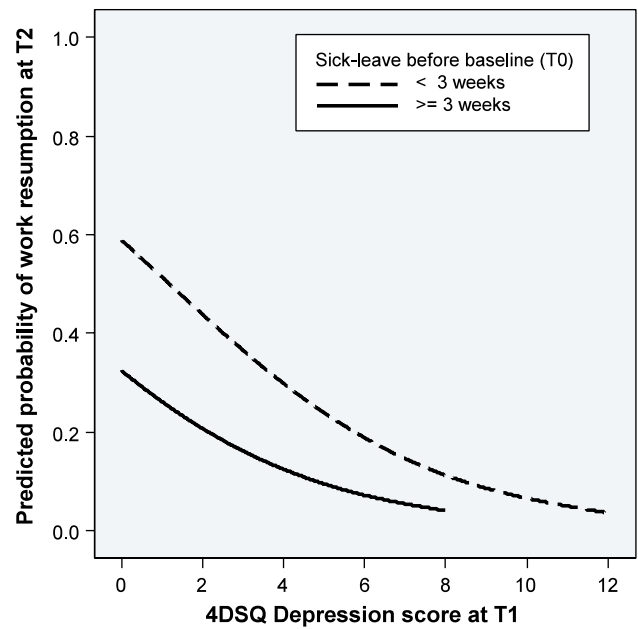


Fig. 2 Predicted probability of RTW 6 months after baseline for employees still sick-listed 3 months after baseline

Table 2 Predictors of RTW in 3 models: (1) prediction of RTW at T1 using baseline data; (2) prediction of RTW at T2 using baseline data; (3) prediction of RTW at T2 in those who had not yet resumed work at T1, using data gathered at T0 and T1

	<i>P</i>	Wald	OR	95% CI
<i>Prediction of RTW at T1 using baseline data, N = 185</i>				
Problems started > 3 months before T0	0.006	7.588	0.395	0.204–0.765
Own prediction of sick leave duration < 6 weeks	0.042	4.143	2.278	1.031–5.035
Contact OP in past 4 weeks	0.036	4.407	0.489	0.251–0.954
4DSQ somatisation score at T0	0.008	7.102	0.926	0.876–0.980
Constant	0.017	5.700	2.974	
<i>Prediction of RTW at T2 using baseline data, N = 175</i>				
Treatment condition (GP = 0; social work = 1)	0.159	1.982	0.573	0.264–1.244
Problems started > 3 months before T0	0.001	11.667	0.275	0.131–0.577
Absenteeism > 3 weeks at T0	0.010	6.555	0.384	0.185–0.799
Attributes cause of absenteeism to family problems	0.024	5.129	0.204	0.052–0.808
Interaction effect: attribution cause of absenteeism to family problems × treatment condition	0.016	5.808	10.440	1.550–70.341
Contact physical therapist in past 4 weeks	0.162	1.953	5.542	0.502–61.206
Interaction effect: contact physical therapist in past 4 weeks × treatment condition	0.048	3.919	0.050	0.003–0.971
4DSQ anxiety score at T0	0.022	5.269	0.902	0.826–0.985
Constant	0.000	21.550	10.885	
<i>Prediction of RTW at T2 in those who had not yet resumed work at T1, N = 115</i>				
Absenteeism > 3 weeks at T0	0.016	5.767	0.335	0.137–0.818
4DSQ depression score at T1	0.020	5.440	0.738	0.572–0.953
Constant	0.213	1.551	1.431	

Logistic regression analyses, manual backwards selection. Presented are the final models

Discussion

In this study it was investigated which factors, under usual care circumstances, predicted RTW 3 and 6 months after participants first reported sick because of minor mental disorders. The main predictors appeared to be related to various aspects of the severity of the patients' problems: the duration of the problems prior to the occurrence of sick leave, more than 3 weeks of sick leave before seeking help, and the level of symptoms (somatisation, anxiety and depression). In addition, the patients' expectations about being able to RTW within 6 weeks predicted indeed a higher RTW rate 3 months later. Moreover, patients who had recently been in contact with the OP had significantly lower chances of RTW 3 months after baseline.

Patients appeared well aware of the degree of severity of their individual situation. For instance, their own prediction showed to be an accurate predictor of the actual sick leave duration. This finding is supported by other studies, in which patients' own predictions of their sick leave duration were studied [21, 24]. The finding that early contact with an OP was negatively associated with RTW may illustrate patients' awareness of the severity of their problems as well.

Subjects who reported long-term problems at inclusion were at risk of long-term sick leave. These findings are similar to those of Van Nieuwenhuijsen et al., who found that a pre-baseline duration of mental disorders of more than 3 months was a significant predictor of a longer sick leave period [21]. This finding also suggests that preventive measures may be especially effective if targeted at employees with long-term problems who are still at work.

Another interesting finding of the present study was that a sick leave duration of more than 3 weeks prior to the (first) consultation with the GP negatively predicted RTW. In fact, this was one of only two predictors of RTW at T2 in patients still on sick leave at T1. Plausibly, subjects who delay consulting a professional may have an avoidant coping style or display avoidant behaviour, causing sustained sick leave. This idea is in line with the findings of Oyeflaten et al. [25], who found fear-avoidance beliefs about work to be the most important risk factor for not returning to work. Although Van der Klink et al. did not find coping style to be related to sick leave duration [7], future research should further investigate this relationship.

The level of psychological symptoms appeared in all three prediction models, but it was not just the amount of general distress that predicted lower RTW rates. Instead, it was the baseline level of somatisation that predicted RTW at T1, the baseline level of anxiety that predicted RTW at T2, and the depression level at T1 that predicted RTW at T2 in employees who were sick for a minimum of 3 months. The predictive value of high somatisation scores was

previously found by Van der Klink et al. [26] Somatisation may reflect the severity of the problems. Moreover, as somatising patients tend to worry about their physical complaints, the negative effect of somatisation on RTW may be due to 'distraction' from the psychosocial problems that need to be solved, which could result in insufficient problem-solving activities. Anxiety hampers social functioning and, therefore, may prevent successful RTW. It is difficult to explain why baseline anxiety would exert its influence on RTW only after the first 6 months of sick leave and not before. Plausibly, during the first 3 months of sick leave, the effect of anxiety is overshadowed by the effect of somatisation, which is also related to anxiety.

Central to this study was the question what factors gathered at baseline predicted RTW 3 and 6 months later. In model 3, however, data gathered at both T0 and T1 were used, similar to a realistic situation in which professionals guiding an individual on sick leave periodically reassess this individual and obtain additional prognostic information. The results showed that the only information gathered at T1 that was related to RTW at T2, was the 4DSQ depression score. Specifically, especially subjects with a *low* chance of RTW at T2 could be predicted. High depression scores at T1 were associated with a low chance of RTW at T2, whereas high depression scores at baseline were not. This may reflect that people who were depressed at baseline may have had different problems than those depressed 3 months later, and despair may have played a role in those still on sick leave and with high depression scores at T1.

Two significant interaction effects were found in the prediction of RTW at T2 (model 2). First, the attribution of absenteeism to family problems was significantly associated with a lower RTW rate in patients in the usual care condition. In contrast, in patients treated by social workers no such association with RTW was found.

This may be a result of the different areas of expertise of social workers and GPs. In the Netherlands, about 75% of social workers' workload exists of counselling, entailing aspects such as providing emotional support and helping to clarify problems in all life domains [27]. Hence, perhaps social workers are more experienced in dealing with family problems than GPs. Second, recent contact with a physical therapist at baseline was associated with a lower RTW rate in patients receiving social work treatment. In contrast, contact with a physical therapist was associated with a higher RTW rate in patients receiving usual care by the GP. As the reason for patients to get into contact with a physical therapist might be the experience of physical symptoms, this again may be related to the different areas of expertise of social workers and GPs. Perhaps GPs were better able to help patients deal with the symptoms by providing information and reassurance.

Whereas others have reported age, gender and educational level to be predictors of sick leave duration [1, 2, 4, 21, 24], no such relationships were found in the present study. This may be due to the fact that only few studies have been conducted on sick leave due to mental problems, and that those studies differ in many respects, such as definitions (e.g. of RTW) and study populations. Further research in this field is needed. Special about the present study was that it specifically focussed on people who were on sick leave because of *mild* mental problems, a condition that is highly prevalent in general practice.

In discussing the results of the study, several limitations need to be taken into account. First, a recent systematic review of factors associated with sick leave demonstrated that a history of sickness absence was associated with sick leave [2]. However, in the present study only the initial sick leave period was studied, and no information was gathered on patients' history of absenteeism prior to participation in the study. Second, no data were gathered on work related factors, such as work stress, supervisory behaviour, and job satisfaction. A third limitation is that we did not assess the sustainability of the return to work as such. Therefore, some patients may have reported sick again within a few weeks after full RTW.

In conclusion, sick leave due to mental health problems is a considerable problem, and much can be gained both individually and economically if more knowledge is gained in this field. Identifying patients at greatest risk for long-term sick leave has become an important goal to pursue. The present study contributes to this by focussing on people on sick leave due to emotional distress or *minor* mental disorders. It was shown that a lengthy existence of problems prior to the start of sick leave was the strongest predictor of long-term sick leave duration, even as long as 6 months after the first sick day. This finding suggests that prevention of long-term sick leave might be possible by signalling those employees with more serious and long-lasting problems and providing them with a more comprehensive treatment. In addition, considering that the employees' own expectations of their sick leave duration was predictive of the actual sick leave duration, one might try to influence the patients' expectations by a positive and optimistic approach to the problems and the opportunities to RTW [28]. Furthermore, since the severity of somatisation, anxiety and depression proved predictive of RTW at various stages of the process, we recommend monitoring those symptoms every 6–12 weeks. Finally, we would like to recommend professionals and employers to keep in frequent touch with sick listed employees. This attention might be beneficial to the social relationship between the employee and the employer or professional, it may make the step to return to work less difficult, and hamper avoidant behaviour.

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References

1. Vaez M, Rylander G, Nygren A, Asberg M, Alexanderson K. Sickness absence and disability pension in a cohort of employees initially on long-term sick leave due to psychiatric disorders in Sweden. *Soc Psychiatry Psychiatr Epidemiol.* 2007;42:381–8.
2. Dekkers-Sánchez PM, Hoving JL, Sluiter JK, Frings-Dresen MH. Factors associated with long-term sick leave in sick-listed employees: a systematic review. *Occup Environ Med.* 2008;65:153–7.
3. Henderson M, Glozier N, Holland Elliot K. Long term sickness absence is caused by common conditions and needs managing. *BMJ.* 2005;330:802–3.
4. Blank L, Peters J, Pickvance S, Wilford J, MacDonald E. A systematic review of the factors that predict return to work for people suffering episodes of poor mental health. *J Occup Rehabil.* 2008;18:27–34.
5. Koopmans GT, Lamers LM. Comparing patients with depressive complaints and patients with chronic medical conditions on their functioning and medical consumption. *J Ment Health Policy Econ.* 2001;4(2):91–100.
6. Cuijpers P, de Graaf R, van Dorsselaer S. Minor depression: risk profiles, functional disability, health care use and risk of developing major depression. *J Affect Disord.* 2004;79(1):71–9.
7. van der Klink J, Blonk R, Schene A, van Dijk F. Reducing long term sickness absence by an activating intervention in adjustment disorders: a cluster randomised design. *Occup Environ Med.* 2003;60:429–37.
8. Brouwers EP, de Bruijne MC, Terluin B, Tiemens BG, Verhaak P. Cost-effectiveness of an activating intervention by social workers for patients with minor mental disorders on sick leave: a randomized controlled trial. *Eur J Public Health.* 2007;17(2):214–20.
9. Anema JR, Jettinghoff K, Houtman IL, Schoemaker CG, Buijs PC, Berg van den R. Medical care to employees long-term sick listed due to mental health problems: a cohort study to describe and compare the care of the occupational physician and the general practitioner. *J Occup Rehabil.* 2006;16(1):41–52.
10. Brouwers EP, Tiemens BG, Terluin B, Verhaak P. Effectiveness of an intervention to reduce sickness absence in patients with emotional distress or minor mental disorders: a randomised controlled effectiveness trial. *Gen Hosp Psychiatry.* 2006;28:223–9.
11. Moons KG, Royston P, Vergouwe Y, Grobbee DE, Altman DG. Prognosis and prognostic research: what, why, and how? *BMJ.* 2009;338:1317–20.
12. Van Jellema P, der Horst HE, Vlaeyen JW, Stalman WA, Bouter LM, van der Windt DA. Predictors of outcome in patients with (sub)acute low back pain differ across treatment groups. *Spine.* 2006;31(15):1699–705.

13. Vittinghof E, McCulloch CE, Glidden D, Shiboski S. Regression methods in biostatistics: linear, logistic, survival, and repeated measures models. New York: Springer Verlag; 2005.
14. World Health Organisation. Composite international diagnostic interview. Geneva: World Health Organisation; 1990.
15. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (fourth edition): DSM-IV. Washington D.C.: American Psychiatric Association; 1994.
16. World Health Organisation. International classification of disease. 10th ed. Geneva: World Health Organisation; 1990.
17. Brouwers EP, Terluin B, Tiemens BG, Verhaak P. Patients with minor mental disorders leading to sickness absence: a feasibility study for social workers' participation in a treatment programme. *Br J Soc Work*. 2006;36:127–38.
18. Terluin B, Van Marwijk H, Adèr H, De Vet H, Penninx B, Hermens M. The four-dimensional symptom questionnaire (4DSQ): a validation study of a multidimensional self-report questionnaire to assess distress, depression, anxiety and somatisation. *BMC Psychiatry*. 2006;6:34.
19. Terluin B, Duijsens IJ. 4DSQ manual. Leiderdorp: Datec; 2002.
20. Terluin B, van Rhenen W, Schaufeli W, de Haan M. The four-dimensional symptom questionnaire (4DSQ): measuring distress and other mental health problems in a working population. *Work Stress*. 2004;18(3):187–207.
21. Nieuwenhuijsen K, Verbeek J, Boer Ad, Blonk R, van Dijk F. Predicting the duration of sickness absence for patients with common mental disorders in occupational health care. *Scan J Work and Environ Health*. 2006;32(1):67–74.
22. Peters J, Wilford J, MacDonald E, Jackson A, Pickvance S, Blank L, et al. Literature review of risk factors for job loss following sickness absence. London: Department for Work and Pensions Social Research division; 2003. ISBN 1 84388 214 0.
23. Murphy JM, Berwick DM, Weinstein MC, Borus JF, Budman SH, Klerman GL. Performance of screening and diagnostic tests. Application of receiver operating characteristic analysis. *Arch Gen Psychiatry*. 1987;44(6):550–5.
24. Fleten N, Johnsen R, Forde O. Length of sick leave-why not ask the sick-listed? Sick-listed individuals predict their length of sick leave more accurately than professionals. *BMC Pub Health*. 2004;4:46.
25. Oyeftaten I, Hysing M, Eriksen HR. Prognostic factors associated with return to work following multidisciplinary vocational rehabilitation. *J Rehabil Med*. 2008;40:548–54.
26. van der Klink JJ. Back in balance: the development and evaluation of an occupational health intervention for work-related adjustment disorders [thesis]. Amsterdam: Coronel Institute; 2002.
27. VOG/AMW. Social work portrayed [in Dutch]. Utrecht, the Netherlands: VOG; 2001.
28. de Croon E, Hugenholtz N, Nieuwenhuijsen K, van Dijk F. Prognose van verzuimduur bij psychische aandoeningen. *Tijdschrift voor Bedrijfs- en Verzekeringsgeneeskunde*. 2005;13(5):137–42.