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One-year trajectories of mental health and work outcomes post return to work in patients with common mental disorders

I. Arends^{1*}, J. Almansa¹, S.A. Stansfeld², B.C. Amick^{3,4}, J.J.L. van der Klink⁵, U. Bültmann¹

¹Department of Health Sciences, Community & Occupational Medicine, University Medical Center Groningen, University of Groningen, Groningen, the Netherlands

²Barts & the London School of Medicine, Queen Mary University of London, London, UK

³Robert Stempel College of Public Health & Social Work, Department of Health Policy and Management, Florida International University, Miami, FL, USA

⁴Institute for Work & Health, Toronto, Canada

⁵School of Social and Behavioural Sciences, Tranzo, Tilburg University, Tilburg, the Netherlands

*Address for correspondence: I. Arends, PhD., Department of Health Sciences, Community & Occupational Medicine, University Medical Center Groningen, University of Groningen, Groningen, the Netherlands. (Email: i.arends@umcg.nl)

Abstract

Background: We investigated one-year trajectories of symptom recovery, work functioning and the return to work percentage (RTW%) among patients with common mental disorders (CMDs).

Methods: Data were used from a cluster-randomised controlled trial evaluating a problem-solving intervention for CMD patients (N=158) who had returned to work. Information on anxiety and depressive symptoms, work functioning and RTW% was collected at baseline and 3, 6 and 12 months follow-up. Latent class growth analyses were used to identify trajectories for the four outcomes and investigate how these trajectories clustered in higher order latent classes. Additionally, we investigated the relation between patient characteristics and class membership.

Results: We identified four trajectories for all four outcomes and derived three higher order latent classes: slow recovery (42% [66/158]) (high anxiety and depressive symptoms, moderate to low work functioning and fast RTW); fast recovery (25% [40/158]) (low anxiety and depressive symptoms, high work functioning and fast RTW); and gradual recovery (33% [52/158]) (decreasing anxiety and depressive symptoms, increasing or low work functioning and fast RTW). Participants with a higher work engagement and readiness to stay at work were more likely to belong to the fast recovery class.

Limitations: Due to the relatively small sample size, some trajectories consisted of few participants. Symptom severity was self-reported.

Conclusions: Many CMD patients experience high levels of mental health symptoms and work functioning problems during the year post RTW. Creating realistic recovery expectations (for both patients and their environments) could be important for successful and sustainable recovery and work participation.

Keywords: common mental disorders; symptom recovery; work functioning; return to work; longitudinal study; trajectories

Introduction

Most patients with common mental disorders (CMDs), such as adjustment, anxiety and depressive disorders, benefit from working. Research has shown working improves the recovery process (OECD, 2015; Schuring et al., 2017) and has a protective effect on depression (van der Noordt et al., 2014). Patients value work as it contributes to a feeling of meaningfulness, self-respect and identity (Fossey and Harvey, 2010; Gheaus and Herzog, 2016; Noordik et al., 2011).

The majority of patients with CMDs are employed but often struggle to stay at work (OECD, 2012). Approximately 30% of CMD patients experience sickness absence (OECD, 2012), and after a first sickness absence episode due to CMDs, 20-30% of the patients experience recurrent sickness absence (Koopmans et al., 2011; Virtanen et al., 2011). Moreover, 70% of people with CMDs experience problems with at-work performance compared to only 20% of people without mental health problems (OECD, 2012). Given, the importance of work for CMD patients, more knowledge is needed on how they are functioning at work and whether work outcomes are inter-related to symptom recovery over time. Such information can support (mental) health care professionals in assessing whether problems in the recovery process go hand in hand with work-related problems and should be jointly addressed. Furthermore, it would provide a starting point for discussing the subject of work with patients, which is often not touched upon (OECD, 2015).

Many studies have examined CMD patients' return to work (RTW) focusing primarily on time to partial and full RTW (Andersen et al., 2012; Dewa et al., 2015; Durand et al., 2014; Nieuwenhuijsen et al., 2014; Nigatu et al., 2016). A few also considered recurrent sickness absence (Arends et al., 2014a; Koopmans et al., 2011; Martin et al., 2015; Norder et al., 2015; Virtanen et al., 2011), predictors of impaired work functioning after return to work (de Vries et al., 2015), and the longitudinal relationship between mental illness and work outcomes in sick-listed patients (Hees et al., 2013). Little is known about how CMD patients function at work (Ubalde-Lopez et al., 2017). Knowledge about work functioning is essential to develop and investigate hypotheses on factors facilitating *sustainable* symptom recovery and work participation post RTW (Nielsen et al., 2018).

When investigating CMD symptom recovery and work functioning, sub-group variation needs to be addressed. In many studies, all patients are averaged so that the heterogeneity in the recovery process

and work functioning is masked. Being able to identify more homogeneous subgroups aligns with precision medicine goals and supports refining health care and work support service decisions for meaningful subgroups. While two studies on CMD patients' work functioning (Ubalde-Lopez et al., 2017) and RTW trajectories (Hellstrom et al., 2017) have identified sub-groups, neither of these studies described how work outcomes and symptom recovery trajectories are inter-related (e.g. do people in a trajectory with an improvement in anxiety and depressive symptoms also belong to a trajectory with an improvement in work outcomes).

The study aimed to: 1) identify CMD patients' trajectories for anxiety and depressive symptoms and work outcomes during 12 months post RTW; 2) examine whether anxiety and depressive symptoms trajectories and work outcome trajectories cluster into meaningful sub-groups; and, 3) investigate the relation between patient characteristics and trajectory clusters.

Methods

Study setting and design

The study took place in the Netherlands in collaboration with a large Dutch occupational health service. Data were collected as part of a cluster-randomised controlled trial (cluster-RCT) evaluating a problem-solving intervention provided by occupational physicians (OPs) to patients with CMDs who had started their return to work (Arends et al., 2014a). In the Netherlands, people return to work in a gradual manner, i.e. they do not return full-time at once but step by step. This gradual return to work process is decided upon by the OP (every organisation is mandated by law to hire an OP, for example through an occupational health service) in consultation with the patient. Intervention effectiveness in preventing recurrent sickness absence was evaluated compared to care as usual by OPs (Arends et al., 2014a). OPs from the occupational health service recruited eligible patients. The OPs (N=154) were based all over the country and worked for companies (N=116) of different sizes and in various sectors. For the present study, data from participants in the intervention and control group were combined.

Participants and procedure

Patients (N=158) were included if they met five inclusion criteria: (i) age 18-63 years; (ii) employed in a paid job; (iii) OP-diagnosed CMD (at the start of sickness absence) based on ICD-10 codes that relate to the most commonly diagnosed disorders, i.e. F32, F41, F43, R45 and Z73.0 (codes F32.2, F32.3 and F43.1 were excluded due to potential disorder severity which would introduce too much heterogeneity in the sample); (iv) sickness absence for at least 2 consecutive weeks; and, (v) ready to RTW (as the intervention focussed on patients being back at work). Six exclusion criteria were: (i) sickness absence longer than 12 months; (ii) prior sickness absence due to CMDs in the three months before the current episode; (iii) severe mental disorders, such as schizophrenia or bipolar disorder; (iv) OP-assessed somatic problems that affect return to work; (v) pregnancy, retirement, resignation or lay-off; and, (vi) inability to read or write Dutch.

From January 2010 to June 2011, N=212 patients were recruited of which N=54 (25%) declined participation. Patients who declined participation did not differ significantly from those who agreed to participate with respect to gender and age (information on other patient characteristics was not available for non-participants) (Arends et al., 2014b). Data collection took place at baseline (T0) and 3, 6 and 12 months follow-up (T1, T2 and T3, respectively). The Medical Ethical Board of the University Medical Center Groningen approved the study. Further details on the study design, procedure and intervention content can be found elsewhere (Arends et al., 2014a; Arends et al., 2014c).

Measures

Patient characteristics

Information was collected by questionnaire on gender, age, educational level (low = below secondary education, medium = secondary and vocational education and high = college or university), cohabitation status, general health status and chronic disease count. Work-related information was collected on job tenure, contract type, company size and having a supervisory role. Work engagement was assessed with the 9-item Utrecht Work Engagement Scale (Schaufeli et al., 2006). Scores range between 0-6, with higher scores indicating more work engagement. Readiness to stay at work (RSAW) was

assessed with the 6-item Stay At Work subscale of the Readiness to Return to Work Scale (Franche et al., 2007). Total scores range between 6-30 with higher scores indicating higher readiness to stay at work. Both work engagement and RSAW scores were dichotomised based on the mean score in the total group. Decision latitude (score range 24-96), psychological job demands (score range 12-48) and supervisor and co-worker support (score range 4-16) were assessed with the Job Content Questionnaire (Karasek, 1979). Higher scores indicate higher decision latitude, higher psychological job demands and higher supervisor and co-worker support. These three variables were categorised based on tertile scores among the total group. Finally, conflicts with co-workers and the supervisor (never versus sometimes, often or always) and job uncertainty (yes versus no) were assessed by the Dutch Questionnaire on Perception and Judgment of Work (van Veldhoven and Meijman, 1994).

Mental health symptoms

The Hospital Anxiety and Depression Scale (HADS) was used as an indicator of anxiety and depressive symptoms. This questionnaire has shown good reliability and validity (Andrea et al., 2004; Spinhoven et al., 1997). Each item is scored on a 4-point Likert scale indicating the extent to which an item was experienced in the past week. Scores range between 0-21 per scale and higher scores indicate more symptoms. A cut-off score of 8 is used as potential presence of the respective mood disorder (referred to as 'borderline' from here on) and a cut-off score of 11 indicates the probable presence of the respective mood disorder (referred to as 'caseness' from here on).

Work functioning

Work functioning was assessed with the 27-item Work Role Functioning Questionnaire (WRFQ 2.0). Good questionnaire reliability and validity has been established for the Dutch working population (Abma et al., 2013). The questionnaire assesses reported difficulties in meeting work demands given physical or mental problems in the past two weeks (e.g. "I found it difficult to concentrate on work"). Response categories range from 100% (all of the time) to 0% (never). There is the option to score 'not applicable' for each item, which was coded as a missing score. If 20% or more of the items scored missing, the total score was set to missing. Scores were converted to a total score between 0-100%, with higher scores indicating better work functioning.

Return to work percentage

Based on administrative data from the occupational health service, the return to work percentage (RTW%) was extracted. A RTW% of 25% would, for example, imply that someone was back at work for 25% of their contracted work hours.

Statistical analyses

First, to identify trajectories of anxiety and depressive symptoms, work functioning and RTW% during 12 months post RTW, latent class growth analyses (LCGA) were conducted (Nagin, 2005). The method allows to group individuals with similar patterns into a small number of clusters (i.e. latent classes). Time was used as a categorical variable (piecewise trend over time) to allow for non-linearity of the growth patterns. Decisions on the number of trajectories per outcome variable were based on the best model fit represented by Bayesian Information Criteria (BIC) and Akaike Information Criteria (AIC) indices. The optimum model is the one with the lowest indices. Model selection was also based on our assessment of the models' clinical relevance, meaningfulness and differentiation in trends. Furthermore, we evaluated per outcome whether there was a significant difference in how the intervention and control group were distributed across the identified trajectories (i.e. as an indicator of whether treatment group could have affected the identified trajectories). The limitations of the small sample size forced us to estimate trajectories with fixed effects only and assume residual variances constant over time. Additionally, we had to fix residual variances over classes for RTW%, but not for the other three outcomes. No power analysis was conducted for the LCGA as there is no clear rule about sample sizes in LCGA. This is due to the multitude of factors that would need to be taken into account to set up a rule (e.g. the 'real' number of classes in the general population, separation of trajectories between classes, residual variances within and between classes, shape of the trajectories).

Second, once trajectories for the four outcome variables were identified, it was examined whether trajectories of the different outcomes clustered (e.g. does a trajectory of decreasing anxiety symptoms cluster with trajectories of decreasing depression symptoms and increasing work functioning and RTW%). A higher-order latent-class model was defined in which the individual membership probability to belong to each of the outcome trajectories depended on a higher-order latent class. Decisions on the number of

higher-order latent classes were based on the best model fit represented by BIC and AIC indices and whether the resulting classes represented clinically relevant, meaningful and differentiated groups.

Third, we analysed the potential effect of covariates, i.e. patient characteristics, as a-posteriori descriptive for the higher-order latent classes (we did not include these covariates in the LCGA models due to the small sample size). Patient characteristics were selected based on the literature about factors predicting work functioning and RTW in CMD patients (Blank et al., 2008; Lagerveld et al., 2010; Netterstrøm et al., 2015). Also, treatment group was added as a variable to assess whether the intervention and control group were differently divided over the higher-order classes, which could imply an effect of the intervention on the identified higher-order classes. Chi-square analyses (weighted by class membership probability) were used to assess the relationship between each characteristic and the higher-order classes. Given the small sample size, only univariate analyses were performed.

All LCGA models were run with at least 50 different random starting values to avoid local optimal estimates. Missing data were assumed to be missing at random, thus all participants were included in the analyses. Latent class growth analyses were performed with LatentGold 4.5 (Vermunt and Madison, 2013) and the weighted Chi-square analyses in R version 3.0.2 (R Development Core Team, 2013).

Results

Sample characteristics

Of the 158 participants, 41% were male. The mean age was 42.3 years (standard deviation (SD) = 9.6). The majority of participants had a medium (48%) or high (39%) education level. At baseline, mean anxiety and depressive symptom scores were respectively 7.5 (SD=3.7) and 7.1 (SD=4.4), just below the 8.0 borderline cut-off score, and the mean work functioning score was 63.6 (SD=18.4). The median RTW% at baseline was 25% (interquartile range, IQR=0-50%). Table 1 presents all the baseline characteristics.

Trajectories of anxiety and depressive symptoms, work functioning and RTW percentage

Figure 1a to 1d show the different trajectories for the four outcome measures. Following the model fit indices (Table 2) and clinical meaningfulness; a 4-trajectory model was selected as best fitting

for each outcome measure. For all four outcomes, there was no significant difference in how the intervention and control group were distributed across the different trajectories (i.e. $P = 0.26$ for anxiety symptoms; $P = 0.34$ for depressive symptoms; $P = 0.07$ for work functioning; and $P = 0.06$ for RTW percentage).

Trajectories of anxiety symptoms

The following four trajectories were identified (Figure 1a): (1) a “stable low symptoms” trajectory (15.3% of the study population) showing low anxiety scores on all four measurement points; (2) a “low symptoms and decreasing” trajectory (13.3% of the study population) starting with an anxiety score below the borderline cut-off and showing about a 4-point decrease over time; (3) a “moderate symptoms and decreasing” trajectory (53.8% of the study population) starting with a borderline anxiety score but dropping below borderline over time; and (4) a “stable high symptoms” trajectory (17.6% of the study population) starting with a score above caseness, then dropping just below caseness but remaining borderline.

Trajectories of depressive symptoms

The four trajectories for depressive symptoms were (Figure 1b): (1) a “stable low symptoms” trajectory (8.3% of the study population) with almost no depression symptoms at any time point; (2) a “low symptoms and decreasing” trajectory (21.9% of the study population); (3) a “high symptoms and decreasing” trajectory (28.6% of the study population) with a borderline score at baseline but a steep drop over the follow-up measurements to below borderline; and (4) a “stable high symptoms” trajectory (41.2% of the study population) with borderline scores at each measurement.

Trajectories of work functioning

For work functioning, the following four trajectories were found (Figure 1c): (1) a “stable low work functioning” trajectory (23.6% of the study population) starting with a low baseline score of 43% (i.e. no difficulties in performing the job in 43% of the working time) on average, which increases to 57% at 12 months follow-up; (2) a trajectory with a “stable moderate work functioning” pattern (41.4% of the study population) showing a change between baseline and 12 months follow-up from 66% to 77%; (3) a “stable high work functioning” trajectory with a baseline score of 83% increasing to 88% at 12 months follow-up

(25.8% of the study population); and (4) an “increasing work functioning” trajectory (9.2% of the study population) showing a steep increase in work functioning score from 54% to 95% between baseline and 12 months follow-up.

Trajectories of RTW percentage

Figure 1d shows the four identified trajectories for RTW%, which were: (1) a “low and unstable RTW” trajectory (7.3% of the study population), starting with 28% RTW at baseline, followed by an increase at 3 months follow-up but then dropping to 4% RTW at the end of follow-up; (2) a “stable high RTW” trajectory (20.5% of the study population) starting with 81% RTW at baseline and 97% RTW at 12 months follow-up; (3) a “slow gradual RTW” trajectory (18.7% of the study population) moving from 18% RTW at baseline to 39%, 59% and 97% RTW at three, six and 12 months follow-up, respectively; and (4) a “fast gradual RTW” trajectory (53.4% of the study population), showing 20% RTW at baseline and progressing to 85% RTW at three months follow-up and 99% RTW at both six and 12 months follow-up.

Clustering of mental health, work functioning and return to work trajectories in higher order classes

The 16 trajectories of the four outcome measures showed the best fit with three higher order classes according to the AIC index while the BIC index suggested that a 2-class model had a better fit (Table 3). The 3-class solution was chosen because it provided a more meaningful classification. Table 4 shows the distribution of the trajectories in each higher order class.

The first higher order class (“slow recovery”, 42% of the population) mainly consisted of patients with a stable high or moderate and decreasing anxiety symptoms trajectory, a stable high depressive symptoms trajectory, a stable low or stable moderate work functioning trajectory and a fast gradual RTW trajectory. The second higher order class (“fast recovery”, 25% of the study population) was primarily represented by patients with a stable low anxiety symptoms trajectory, a stable low or low and decreasing depression symptoms trajectory, a stable high or stable moderate work functioning trajectory and a stable high RTW or fast gradual RTW trajectory. The third higher order class (“gradual recovery”, 33% of the study population) largely comprised patients with a moderate and decreasing anxiety symptoms trajectory, a high

and decreasing depressive symptoms trajectory, an increasing or stable low work functioning trajectory and a fast gradual RTW trajectory.

Relationship between patient characteristics and the higher order classes

Table 5 shows how the different patient characteristics are distributed within the three higher order classes along with the Chi-square test results. The distribution of patients who belonged to the intervention or control group in the cluster-RCT did not significantly differ for the three higher order classes. “Work engagement” and “Readiness to stay at work” were significantly related to the higher order classes. While these variables were relatively evenly distributed in the slow and gradual recovery classes, the fast recovery class primarily comprised patients with a higher work engagement and readiness to stay at work score.

Discussion

Main findings

We found that a four-trajectory model best represented each of the four outcomes. For both anxiety and depressive symptoms there was a group with stable low and a group with stable high symptoms across all four time points. The other two groups showed a clear decline in symptoms over time. For work functioning there were three groups with stable scores over time: stable low, stable moderate and stable high work functioning. One group showed an increase from low to high work functioning over time. Finally, RTW% consisted of one group with a low and one group with a high RTW% over time and two groups showing a slow versus fast gradual increase in RTW%. A recent Danish study also investigated RTW trajectories in patients with mood and anxiety disorders (Hellstrom et al., 2017). The researchers identified four RTW trajectories: a group with almost no RTW, a group with rapid RTW and two groups showing a more gradual increase in RTW of which one group never reached full RTW. Comparison with the present study is, however, difficult because the Danish study focussed on patients sick-listed at baseline while the present study specifically looked at the period after sick leave.

An important study finding is that many CMD patients who have returned to work still experience high levels of anxiety and depressive symptoms and work functioning problems until one year post RTW. Specifically, 18% of the study population in the stable high anxiety symptoms trajectory started with

caseness anxiety scores at baseline, which remained at borderline caseness level during 12 months follow-up. Furthermore, 41% of the study population belonged to the stable high depressive symptoms trajectory with borderline level depressive symptom scores across all four time points. Also, work functioning scores during 12 months follow-up of the stable low and stable moderate work functioning trajectories (24% and 41% of the study population, respectively) were well below the average score of 85% found among a general Dutch working population with self-assessed good health (Abma et al., 2013). The group in the stable low work functioning trajectory even remained below the average score of 76% found among Dutch workers with self-assessed poor to fair health (Abma et al., 2013). Similarly, de Vries et al. found that workers with a major depressive disorder in remission continue to show signs of impaired work functioning (de Vries et al., 2015). Only one group was identified with an improvement in work functioning over time, which represented merely 9% of the study population. The relatively poor work functioning trajectories raise the question whether the patients in this study were experiencing presenteeism, i.e. lost productivity due to being at work while experiencing health problems. Although this may seem a poor outcome, it should be taken into account that prolonged full-time absence from work increases the likelihood of complete work disability (Ahola et al., 2011; Koopmans et al., 2008). It could be argued that gradual RTW and the accompanying temporary reduction in work functioning could be seen as an inherent part of the recovery process.

The higher-order latent class model showed that the trajectories of the four outcomes measures clustered in three classes: (1) slow recovery, (2) fast recovery, and (3) gradual recovery. Anxiety symptoms, depressive symptoms and work functioning trajectories that showed a similar course over time (e.g. quick improvement or almost no improvement) also grouped together in the same higher-order classes rather consistently. For example, patients with a moderate or high anxiety trajectory were most likely to have a high depressive symptoms trajectory and a moderate or low work functioning trajectory. In contrast, the RTW% trajectories did not align well with the other outcome trajectories within the three higher-order classes, e.g. the two most favourable RTW% trajectories (stable high RTW and fast gradual RTW) comprised 64% of the slow recovery class, which primarily contained the most unfavourable trajectories of the other outcomes. This implies that some patients with high levels of symptoms and low work functioning had a high RTW%. Findings by Hees et al. are comparable (Hees et al., 2013), showing that depression

severity had a stronger impact on work functioning than on sick leave. The authors argued that sick leave might show less synchrony of change with depressive symptoms as it is more influenced by external factors in the social security system (e.g. financial incentives for RTW). Also, it could be possible that patients who strongly value their work are eager to resume work in spite of remaining symptoms.

The distribution of patients who belonged to the intervention or control group was not statistically significant across the three higher order classes, providing an indication that treatment group did not have an effect on the identified higher order classes. Only a patient's work engagement and readiness to stay at work after RTW differed significantly over the three higher order classes. Patients who reported a higher work engagement and readiness to stay at work were most likely to belong to the fast recovery class. This result should be interpreted with caution given the small sample size.

Strengths and limitations

A study strength is the prospective design. It is the first study to provide insight into the clustering of mental health and work outcome trajectories 12 months post RTW and related patient characteristics. A valid, reliable and internationally known instrument (the HADS) was used to assess anxiety and depressive symptoms. Furthermore, the RTW% was based on register data from the occupational health service. Another strength is that as well as the work outcome "RTW", work functioning was also examined. It is important to take both work outcomes into account, as RTW does not imply that patients experience good work functioning. Finally, the inclusion of participants from a variety of workplace settings does not limit the results to a certain occupational group or sector.

This study also has some limitations. The results provide no insight into the temporal relationship between the four outcome measures, e.g. it remains unknown whether improvements in anxiety symptoms are followed by improvements in depressive symptoms, work functioning and RTW% or vice versa. Furthermore, the study population was relatively small, which led to some trajectories consisting of few participants and too small cells in the description of the higher-order classes based on participant characteristics. Additionally, there is the risk of misclassification in assigning participants to the different trajectories based on probability. However, the high magnitude of the entropy statistic shows that the majority of the participants were clearly assigned to one of the classes. As self-reported questionnaires

were used to assess anxiety and depressive symptoms and work functioning, this may have caused (response) bias due to halo effects of symptom severity on work functioning perceptions. Nevertheless, given the importance of work for a patient's overall wellbeing, a patient's experience of poor work functioning (irrespective of objective work functioning) is an important factor to address in the recovery process. Finally, generalisability of our results to other contexts can be debated. Nevertheless, the already longstanding system in the Netherlands where patients can return to work gradually before full symptom recovery is established is also becoming more common in other countries in acknowledgment of the importance of work for CMD patients (OECD, 2015).

Implications

A practical implication of our findings is that mental health care providers and other stakeholders (e.g. general practitioners, employment support providers, supervisors) need to realise that many CMD patients who have returned to work are still struggling with mental health and work functioning problems. While a patient's family, co-workers or supervisor often have high expectations with regards to being fully functioning when back at work (Andersen et al., 2012; Eriksson et al., 2008), our study shows that for a large group this does not hold. Ensuring realistic recovery expectations about CMD patients who have returned to work and continued psychological and work support could be important for successful and sustainable recovery and work participation. Moreover, the finding that both mental health and work functioning problems continue during 12 months post RTW supports the literature stressing the importance of integrating mental health and employment support (Nielsen et al., 2018; OECD, 2015). The trajectory analyses also revealed subgroups with few anxiety and depressive symptoms and good work functioning and subgroups with improving symptoms and work functioning. Decisions on the type and intensity of support for CMD patients need to take these subgroup differences into account. Finally, our results show that the patient's work engagement and readiness to stay at work after RTW may play an important role in how mental health and work outcomes develop over time. These aspects are important to consider during the treatment of CMD patients and may serve as an indicator of whether patients will be able to stay at work with good symptom recovery and work functioning.

Our results give direction to future research. First, it would be interesting to investigate the temporal relationship between trajectories of mental health outcomes and work outcomes. By collecting data from the moment workers still have zero percent RTW and using a cross-lagged panel design, it would be possible to shed light on whether symptom reduction is followed by an increase in RTW% and work functioning or vice versa. Second, when evaluating the effect of interventions on patients' work outcomes, it is important to follow them beyond RTW and to consider not only full and sustainable RTW as work outcome but also how they function at work. Third, when developing interventions to improve mental health and work outcomes, the role of work engagement and expectations regarding the ability to stay at work after RTW could be incorporated. Finally, our results corroborate the call for research on factors in the work and non-work (e.g. individual, family, community, healthcare) context to facilitate both symptom recovery and sustainable work participation among CMD patients post RTW (Nielsen et al., 2018).

Conflict of interest

The authors declare no conflicts of interest.

Contributors

IA, JK and UB conceived the study. JA analysed the data. IA drafted the manuscript. All authors contributed to interpretation of the study results and provided critical revision of the manuscript.

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Table 1. Baseline characteristics of study population (N = 158)

Characteristics	Mean (SD) or Frequency (%) or Median (IQR)
Socio-demographic factors	
Gender, male	65 (41%)
Age	42.3 (9.6)
Educational level	
Low	19 (12%)
Medium	76 (48%)
High	61 (39%)
Cohabiting, yes	126 (80%)
Disease-related factors	
General health, poor or very poor	45 (29%)
One or more chronic diseases, yes	82 (52%)
HADS anxiety score (0-21) T0	
T1	6.1 (3.1)
T2	5.9 (3.6)
T3	5.2 (3.6)
HADS depression score (0-21) T0	
T1	5.0 (3.7)
T2	5.1 (4.0)
T3	4.5 (4.1)
Sickness absence duration (days)	101.8 (59.3-145.1)
Work-related factors	
Tenure, 0-5 years	69 (44%)
Contract type, permanent	150 (95%)
Company size, <100	62 (39%)
Supervisory role	44 (28%)
RTW percentage (0-100) T0	
T1	92.5 (50.0-100)
T2	100 (92.0-100)
T3	100 (100-100)
WRFQ total score (0-100) T0	
T1	63.7 (18.2)
T2	70.9 (14.0)
T3	75.5 (16.2)
T3	77.0 (15.3)
Work engagement, (0-6)	3.3 (1.3)
RSAW total score (6-30)	20.4 (3.7)
JCQ subscale scores	
Decision latitude (24-96)	67.58 (10.4)
Psychological job demands (12-48)	33.9 (6.6)
Supervisor social support (4-16)	10.6 (2.5)
Co-worker social support (4-16)	12.0 (1.6)
Conflicts with co-workers, never	76 (48%)
Conflicts with supervisor, never	75 (48%)
Job uncertainty, yes	20 (13%)

SD, standard deviation; IQR, interquartile range (25– 75%); HADS, hospital anxiety and depression scale; JCQ, job content questionnaire; RSAW, readiness to stay at work; RTW, return to work; WRFQ, work role functioning questionnaire.

Table 2. Model fit indices of the latent class growth models for each of the four outcome measures

	LogL	BIC	AIC	Npar	Entropy
Anxiety					
1 class	-1359.8	2744.9	2729.6	5	
2 classes	-1270.1	2596.0	2562.3	11	0.84
3 classes	-1227.7	2541.4	2489.3	17	0.79
4 classes	-1214.6	2545.7	2475.3	23	0.78
5 classes ^a	Non-convergent solution				
Depression					
1 class	-1429.9	2885.2	2869.9	5	
2 classes	-1312.5	2680.7	2647.0	11	0.89
3 classes	-1281.5	2649.0	2596.9	17	0.76
4 classes	-1255.1	2626.6	2556.2	23	0.77
5 classes ^a	Non-convergent solution				
Work functioning					
1 class	-1807.7	3640.7	3625.4	5	
2 classes	-1754.1	3563.9	3530.2	11	0.67
3 classes	-1735.5	3557.1	3505.1	17	0.71
4 classes	-1717.0	3550.5	3480.0	23	0.69
5 classes ^a	Non-convergent solution				
Return to work					
1 class	-2903.0	5831.3	5815.9	5	
2 classes	-2848.4	5747.5	5716.9	10	0.84
3 classes	-2809.8	5695.5	5649.6	15	0.78
4 classes	-2772.8	5646.8	5585.5	20	0.80
5 classes	-2728.2	5582.9	5506.4	25	0.84

LogL, log likelihood (higher values imply better fit); BIC, Bayesian Information Criterion (the model with the lowest BIC is preferred); AIC, Akaike Information Criterion (the model with the lowest AIC is preferred); Npar, number of parameters; Entropy refers to the quality of class assignment (a higher entropy is preferred).

^aIt was not possible to get proper estimates of this model, so it was discarded.

Table 3. Model fit indices for the higher order latent class model

Number of higher order classes	LogL	BIC	AIC	Npar	Entropy
1	-6959.5	14369.6	14097.0	89	
2	-6901.7	14319.8	14007.4	102	0.90
3	-6880.9	14344.0	13991.8	115	0.83
4	-6869.1	14386.3	13994.3	128	0.85
5	-6863.0	14439.8	14008.0	141	0.86

LogL, log likelihood (higher values imply better fit); BIC, Bayesian Information Criterion (the model with the lowest BIC is preferred); AIC, Akaike Information Criterion (the model with the lowest AIC is preferred); Npar, number of parameters; Entropy refers to the quality of higher-order class assignment (a higher entropy is preferred).

Table 4. Profiles of the higher order classes according to the trajectories of anxiety and depressive symptoms, work functioning and RTW%

Trajectory classes	Higher order classes		
	Slow recovery N=66 (42%)	Fast recovery N=40 (25%)	Gradual recovery N=52 (33%)
Anxiety			
stable low symptoms	0.00	0.64	0.00
low symptoms and decreasing	0.00	0.14	0.26
moderate symptoms and decreasing	0.52	0.21	0.74
stable high symptoms	0.48	0.00	0.00
Depression			
stable low symptoms	0.00	0.34	0.00
low symptoms and decreasing	0.00	0.65	0.14
high symptoms and decreasing	0.11	0.02	0.86
stable high symptoms	0.89	0.00	0.00
Work functioning			
stable high work functioning	0.07	0.63	0.22
increasing work functioning	0.00	0.03	0.31
stable moderate work functioning	0.54	0.34	0.19
stable low work functioning	0.38	0.00	0.28
RTW%			
stable high RTW	0.14	0.37	0.16
fast gradual RTW	0.50	0.39	0.72
slow gradual RTW	0.28	0.14	0.08
low and unstable RTW	0.08	0.10	0.05

RTW, return to work.

Table 5. Distribution of patient characteristics within the higher order classes

Characteristics	Higher order classes			P-value of Chi-square test
	Slow recovery N=66 (42%)	Fast recovery N=40 (25%)	Gradual recovery N=52 (33%)	
Gender				0.672
male	45.3%	38.8%	37.7%	
female	54.7%	61.2%	62.3%	
Educational level				0.183
low	13.8%	4.4%	16.0%	
medium	54.8%	43.7%	45.0%	
high	31.3%	51.9%	39.0%	
Living together				0.099
yes	81.7%	89.4%	71.6%	
no	18.3%	10.6%	28.4%	
Chronic disease				0.090
no	37.4%	54.1%	55.9%	
yes	62.6%	45.9%	44.1%	
Work engagement				0.001
≤3	56%	18.8%	46.1%	
>3	44%	81.2%	53.9%	
RSAW-score				0.006
≤20	62%	30.2%	56.4%	
>20	38%	69.8%	43.6%	
Job uncertainty				0.115
no	80.9%	94.2%	89.6%	
yes	19.1%	5.8%	10.4%	
Conflicts with supervisor				0.848
never	46.7%	52%	46.8%	
sometimes/often/always	53.3%	48%	53.2%	
Conflicts with co-workers				0.703
never	49.6%	43.2%	51.8%	
sometimes/often/always	50.4%	56.8%	48.2%	
Psychological demands				0.772
≤31	39.2%	30.4%	31.6%	
32-37	28.1%	39.4%	34.4%	
>37	32.6%	30.2%	33.0%	
Decision latitude				0.057
≤64	41.8%	19.0%	49.0%	
65-72	33.3%	46.6%	27.3%	
>73	24.8%	34.6%	23.7%	
Supervisor social support				0.590
≤9	27.8%	29.7%	38.5%	
10-12	61.6%	58.7%	46.4%	
>12	10.6%	11.6%	15.1%	
Co-worker social support				0.170
≤11	34.3%	13.2%	34.0%	
12	42.9%	54.8%	44.2%	
>12	22.8%	32.0%	21.8%	
Treatment group				0.189
Control group	45.6%	42.2%	59.5%	
Intervention group	54.4%	57.8%	40.5%	

RSAW, readiness to stay at work.

Figures

Fig. 1. Patients categorised according to their trajectory of anxiety symptoms scores (A), depressive symptoms scores (B), work functioning scores (C) and return to work percentage (D) at baseline and 3, 6 and 12 months follow-up.

