

Predicting work disability and the success of work rehabilitation

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Author Note

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Abstract

Purpose: The study's primary aim was to investigate, in an inclusive real life setting, whether the outcome of vocational rehabilitation and functional impairment at its beginning could be predicted by the presence of Persistent Physical symptoms (PPS), specific PPS types or symptoms of psychological distress. **Methods.** A sample of 324 individuals seeking work rehabilitation filled out questionnaires measuring PPS and mental health problems.

Information related to their rehabilitation was retrieved from the service provider. A hierarchical linear regression was used to predict work disability and the length of service and a logistic regression was used to predict return to work following vocational rehabilitation.

Results. Only depressive symptoms, PPS and social anxiety symptoms independently predicted functional impairment at the beginning of service. We were able to predict 11% of cases where service seekers did not return to work. Only persistent pain and depressive symptoms contributed to that prediction. The length of rehabilitation was not related to the severity or number of psychological symptoms nor the presence or number of PPS.

Conclusions: Vocational rehabilitation interventions need further evaluation and should be investigated in terms of how well they match with reported symptoms and whether they target the particular symptoms contributing to work disability.

Keywords: Persistent Physical Symptoms, Work Disability, Vocational Rehabilitation, Return to Work, Mental Health.

Introduction

Work disability is common across the globe and leads to substantial personal and societal costs. In 2010, the average cost of disability and sickness benefits within the OECD countries amounted to two percent of gross domestic product and was about ten percent of total public social spending. In some countries, including Iceland, these costs were considerably higher constituting between 20-25% of total public social spending (OECD, 2010a). Prolonged sickness absence precedes permanent disability in many countries, but those awarded permanent disability pension rarely return to the labour market (OECD, 2010a). Rehabilitating people with work disability due to persistent health problems effectively, and thereby preventing permanent disability, is essential for both the affected individual and the society they live in.

Mental health and musculoskeletal disorders are the most common causes of work disability, both internationally and in Iceland (OECD, 2010a; The Icelandic Social Insurance Administration, 2015; VIRK Vocational Rehabilitation Fund, 2014, 2015, 2016, 2019; Vos et al., 2012). People with work disability commonly have multiple health complaints and comorbid physical and mental health problems but are otherwise a heterogeneous group in terms of diagnoses (OECD, 2010a; VIRK Vocational Rehabilitation Fund, 2016). In Iceland, individuals with reduced ability to work due to injury or ill-health are referred to VIRK – Vocational Rehabilitation Fund for assessment and rehabilitation. VIRK is a social enterprise of which all the major employers (including the Icelandic government and the city of Reykjavík) and labour unions in Iceland are members, and its main aim is to prevent permanent disability by helping people to return to work. The rehabilitation process includes individualised rehabilitation plans involving multifaceted interventions which are overseen by

a vocational rehabilitation counsellor. Vocational rehabilitation aims to help people enter or return to the labour market, so evaluation of its effectiveness should include a measure how often service user return to work rather than relying solely on symptom and distress measures. In evaluating rehabilitation outcomes, attention should be given to the length of the rehabilitation as, with more effective interventions, it might be possible to shorten the duration of the rehabilitation and reduce the resources needed to accomplish return to work.

Internationally, several factors have been found to be positively associated with return to work after vocational rehabilitation such as having a case coordinator, having an individualised rehabilitation plan based on multidisciplinary assessment and use of multidisciplinary interventions (Berglund et al., 2018; Briand et al., 2008; Cancelliere et al., 2016; Cullen et al., 2018; Hamer et al., 2013; Lytsy et al., 2017; Schandelmaier et al., 2012). Generic individual factors such as disability and pain levels and in some studies, depression have been found to negatively predict return to work (Cancelliere et al., 2016; Cornelius et al., 2011; Crisp, 2005; Detaille et al., 2009; Hamer et al., 2013; Hara, Bjørngaard, et al., 2018; Lagerveld et al., 2010; O’Neil et al., 2010). However, neither diagnosis-specific factors nor distinguishing between mental and physical disorders predict return to work very well (Cancelliere et al., 2016; Hara, Bjørngaard, et al., 2018; Loisel et al., 2001). Surprisingly, the focus of work rehabilitation studies is commonly on specific diagnostic categories, and physical health and mental health are often dichotomised. The previous findings actually suggest that a focus on the experience of specific and enduring symptoms may be more helpful, particularly taking into account the impact of and disability arising from those symptoms.

Such a focus is characteristic of Persistent Physical Symptoms (PPS) which are defined as distressing and persistent symptoms that have no known biological cause. They vary in severity, duration and number, and a range of specific PPS have been described and defined as syndromes, e.g. Chronic Fatigue, Irritable Bowel Syndrome, Chronic Pain, Fibromyalgia and Non-Cardiac Chest Pain. PPS are particularly promising to look at in the context of work rehabilitation as they are common in both most medical and rehabilitation settings and are strongly associated with psychological distress (Budtz-Lilly, Vestergaard, et al., 2015a; Harris et al., 2009a; Hoedeman et al., 2010; Rask et al., 2017), comorbid mental health problems (Harris et al., 2009a; Löwe et al., 2008; Roca et al., 2009), work disability (den Boeft et al., 2016; Harris et al., 2009a; Hoedeman et al., 2010; Loenggaard et al., 2015; Rask et al., 2017) and an increased risk of becoming permanently disabled (Rask et al., 2015). These observations might mean there is an increased chance of helping those with PPS and mental health problems, restore their functional ability and return to work as their disability is not caused by any known irreversible condition.

The sample described here draws upon the sample described in a previous paper (Flóvenz, Salkovskis, Gregory, et al., n.d.), which focussed on the prevalence of PPS, their associations with psychological distress, and on identifying individuals most likely to benefit from a psychological treatment in a vocational rehabilitation setting. The primary goal of the present paper is to investigate how well PPS and psychological distress, separately or combined, predict work disability and response to work rehabilitation in terms of likelihood of returning to work and the duration of rehabilitation received. Secondly, we wanted to know whether these factors influence the chance of dropping out of rehabilitation.

Method

Design

In this study, we used measures of PPS and psychological distress to predict work disability, return to work following vocational rehabilitation and duration of the successful rehabilitation. We also compared people who dropped out of rehabilitation with those that continued in terms of these same variables.

Participants

All those that sought work rehabilitation through VIRK, in Iceland's capital area, between June 2017 and May 2018 that were 18 years or older and able to speak and read Icelandic were eligible to participate in this study. Service seekers that had started receiving rehabilitation were not eligible for participation. Our participants came from all sectors of the labour market and were members of labour unions representing manual labourers, trade workers, store and office workers, state and municipal employees or university graduates. Three hundred eighty-three service seekers were invited to participate in the study, of which 324 (84.6%) agreed, and 59 (15.4%) declined. Not all eligible service seekers were invited to participate in the study ($N \approx 50$), some because counsellors forgot to approach clients, and sometimes they were not instructed to do so by their supervisors. In some cases, counsellors considered their clients to be too exhausted or emotionally upset to participate in the study. The prevalence of PPS and scores above clinical cut-offs on questionnaires measuring functional impairment, depression, health anxiety, social anxiety, post-traumatic stress and substance use within our sample as well as the samples demographics are summarised in Table 1. As we have reported before (Flóvenz, Salkovskis, Gregory, et al., n.d.), our participants commonly reported one or more

PPS and high levels of depression, health anxiety, social anxiety and post-traumatic stress symptoms as well as severe functional impairment. Self-reported substance use was less common and did not always reflect active use.

Table 1

Demographic variables and the number and percentages of VIRK's service seekers that meet criteria for PPS and surpass cut-off on psychological measures.

Demographic variables	Participants N (%)	Presence of PPS	Participants N (%)	Psychological measures	Participants N (%)
Gender		PPS present	262 (80.9%)	SHAI ≥ 18	104 (32.7%)
Male	71 (21.9%)	PPS type		PHQ-9 ≥ 10	246 (75.9%)
Female	253 (78.1%)	PPS _{Sleep}	191 (59.0%)	SIAS/SPS ≥ 74	93 (29.1%)
Education completed		PPS _{Pain}	143 (44.1%)	IES-R ≥ 33	114 (37.7%)
Primary school	82 (27.2%)	PPS _{Fatigue}	204 (63.0%)	AUDIT ≥ 8	64 (20.1%)
Secondary school	103 (34.2%)	PPS _{Gastrointestinal}	55 (17.0%)	DUDIT ≥ 6	34 (10.7%)
Vocational education	19 (6.3%)	PPS _{Heart and chest}	39 (12.0%)	WSAS ≥ 20	216 (69.9%)
University degree	97 (32.2%)	PPS _{Neurological}	68 (21.0%)		
Relationship status		PPS _{Gynaecological}	22 (8.7%) ^a		
Single	161 (52.8%)				
Married or cohabiting	97 (31.8%)				
Separated or widowed	47 (5.4%)				

Note. PPS = Persistent physical symptoms; OR = Odds ratio; SHAI = Short Health Anxiety Inventory; PHQ-9 = Patient Health Questionnaire-9; GAD-7=Generalised Anxiety Disorder-7; SPS = Social Phobia Scale; SIAS = Social Interaction Anxiety Scale; IES-R = Impact of Event Scale-Revised; AUDIT = Alcohol Use Disorders Identification Test; DUDIT = Drug Use Disorders Identification Test; WSAS = Work and Social Adjustment Scale.

^a PPS_{Gynaecological} is calculated as a percentage of the total number of female participants.

Procedure

Eligible service seekers were asked to participate in the study by their rehabilitation counsellor during one of their first sessions. Those agreeing to participate were asked for their informed consent and were given a battery of self-report questionnaires which they filled in after their counselling session and put in a sealed mailbox. Information about participants was retrieved from VIRK's database and matched with the questionnaire data using research identification numbers. This study was approved by the National Bioethics Committee of Iceland (application no. VSN-16-045).

Measures

Background information

Information was retrieved from VIRK's database on participants' age, gender, education and marital status.

Measuring the outcome of vocational rehabilitation

Our primary measure of the rehabilitation outcome was return to work, we used the duration of rehabilitation as a secondary measure and drop out as a tertiary measure. Participants were categorised as having returned to work if they were working or studying by the time they were discharged from vocational rehabilitation. Participants that were still receiving rehabilitation at the end of our study (N=12) were counted as not returned to work. Duration of rehabilitation was counted in days, i.e., from first contact to discharge. Participants were counted as having dropped out if they had decided to discontinue their rehabilitation, irrespective of their reason for doing so. Participants who were unemployed at the time of discharge (N=20) were excluded when analysing return to work and duration of rehabilitation vice as it could not be

concluded whether they would or would not return to work. Participants who discontinued their rehabilitation because they were referred elsewhere (N=25) were excluded when return to work, rehabilitation duration and drop out was analysed as these participants were not offered full rehabilitation.

Psychological measurements

The Persistent Physical Symptoms Checklist (PPSC) measures persistent problems with seven types of physical symptoms that interfere with daily life, i.e., sleep problems, pain, chronic tiredness fatigue or muscle problems, gastrointestinal problems, heart and chest symptoms, dizziness and/or related problems and gynaecological problems. Respondents are asked whether they have had problems with each of the symptoms for more than six months (one month for sleep problems), whether their symptoms have a known cause, and to which extent their symptoms interfere with their life. The criteria for a specific PPS was met if the symptoms had no known medical explanation, clearly interfered with the respondent's life and had been present for the indicated period. Previous validation of the checklists in a small sample suggests adequate convergent validity (Flóvenz, Salkovskis, Svendsdóttir, et al., n.d.). If occasional missing items on the PPSC prevented us from concluding whether the criteria for a particular PPS symptom was met, it was counted as absent.

The Short Health Anxiety Inventory (SHAI) (Alberts et al., 2013; Salkovskis, 2002) measures health-related anxiety. The scale has 14 items, each consisting of four statements that the respondent chooses between based on which one best describes his or her feelings over the last six months. The scale's total score ranges from 0 to 54, and a cut-off score of 18 has been shown to differentiate between those that meet DSM-IV criteria for hypochondriasis

and those that do not. Both the original (Alberts et al., 2013) and the Icelandic version (Viðarsson, 2016) have good psychometric properties, and in this study, Cronbach's alpha was 0.89.

The Patient Health Questionnaire-9 (PHQ-9) (Kroenke et al., 2001) measures depressive symptom severity over two weeks (Kroenke & Spitzer, 2002). It contains nine items rated on a 4-point scale, a total score ranging from 0 to 27 and cut-off points of 5, 10, 15 and 20, which are interpreted as mild, moderate, moderately severe and severe depression, respectively. Both the original and the Icelandic version of the scale have good psychometric properties (Kroenke et al., 2001; Kroenke & Spitzer, 2002; Pálsdóttir, 2007), and Cronbach's alpha in our sample was 0.81. In this study, we considered PHQ-9 scores to be in the clinical range if they met a cut-off of 10.

The Generalised Anxiety Disorder-7 (GAD-7) (Spitzer et al., 2006) measures general anxiety symptoms over two weeks. It contains seven items rated on a 4-point scale, a total score ranging from 0 to 21 and cut-off points at 5, 10 and 15, which are interpreted as mild, moderate, and severe anxiety. Both the Icelandic and the original version of the scale have good psychometric properties (Ingólfssdóttir, 2014; Spitzer et al., 2006), and Cronbach's alpha in our sample was 0.88. In this study, we considered GAD-7 scores to be in the clinical range if they met a cut-off of 10.

The Social Phobia Scale (SPS) and the Social Interaction Anxiety Scale (Mattick & Clarke, 1998) are two companion instruments that measure social anxiety. The SIAS measures fear of engaging socially with others, and the SPS measures fear of being observed by others during everyday activities. Both scales consist of 20 items, rated on a 5-point scale with a total

score that ranges from 0 to 80. Both the original and the Icelandic versions of these scales have good psychometric properties (Ólafsdóttir, 2012; Osman et al., 1998), and in our sample, SIAS had a Cronbach's alpha of 0.94 and the SPS of 0.96. In this study we considered social anxiety scores to be in the clinical range if the combined total score of SIAS and SPS met a cut-off of 74 as this scoring method has been shown to best discriminates between those with and without social anxiety disorder in an Icelandic sample (Ólafsdóttir, 2012).

Traumatic experiences. Past traumatic events were assessed with the following single, yes or no, question taken from the Icelandic version of MINI International Neuropsychiatric Interview version 5.0 (Lecrubier et al., 1997; Sheehan & Lecrubier, 1998): *Have you ever experienced or witnessed or had to deal with an extremely traumatic event that included actual or threatened death or serious injury to you or someone else?*

The Impact of Event Scale-Revised (IES-R) (Beck et al., 2008; Sundin & Horowitz, 2002) measures symptoms of post-traumatic stress. It contains 22 items rated on a 5 point scale, a total score ranging from 9 to 88 and a cut-off score of 33 has been shown to differentiate between those diagnosed with and without Post Traumatic Stress Disorder (PTSD) (Creamer et al., 2003). The IES-R has good psychometric properties (Creamer et al., 2003), and Cronbach's alpha was 0.95 in our sample.

The Alcohol Use Disorders Identification Test (AUDIT) (Saunders et al., 1993) measures harmful alcohol consumption. It contains ten items, scored from 0 to 4, a total score ranging from 0 to 40 and a cut off score at eight, which indicates hazardous or harmful alcohol use (Saunders et al., 1993). The AUDIT has good psychometric properties (Reinert & Allen, 2007), and in our sample, it had a Cronbach's alpha of 0.86.

The Drug Use Disorders Identification Test (DUDIT) (Berman et al., 2005)

measures substance-related problems and is intended to be used with the AUDIT. It contains 11 items, a total score ranging from 0 to 44. The scale has been shown to have good psychometric properties (Berman et al., 2005; Voluse et al., 2012), and in our sample, it had a Cronbach's alpha of 0.93. In this study we considered DUDIT scores to be in the clinical range they met a cut-off of 6 as that cut off score has been shown to indicate harmful substance use in a general population sample (Berman et al., 2005)

The Work and Social Adjustment Scale (WSAS) (Mundt et al., 2002) measures impaired functioning in five areas of everyday life: the ability to work, manage a home, form and maintain close relationships and engage in social or private leisure activities. It contains five items rated on an 8-point scale and a total score ranging from 0 to 40. Scores between 10 and 20 have been associated with significant functional impairment and scores over 20 a more severe pathology (Mundt et al., 2002). The scale has good psychometric properties (Mundt et al., 2002; Zahra et al., 2014), and Cronbach's alpha was 0.84 in our sample.

Data analysis

We ran two separate hierarchical linear regressions using WSAS scores and rehabilitation duration as the dependent variables and age, gender, PPS and scores on the PHQ-9, SHAI, IES-R and combined SIAS and SPS as independent variables. WSAS scores were also used as an independent variable when predicting the rehabilitation duration. We ran a logistic regression with return to work as a dependent variable and binary variables representing whether participants met criteria for any of the seven specific PPS types or had scores above or below clinical cut off on the PHQ-9, SHAI, IES-R or SIAS and SPS combined as

independent variables. Chi-square tests were used to compare those that dropped out of rehabilitation with those that continued on demographic and psychological variables.

Results

Predicting work disability at the beginning of vocational rehabilitation

More than two-thirds of our participants had WSAS scores indicating severe functional impairment (see Table 1) and average WSAS scores were also high ($M=23.96$, $SD=9.00$). We carried out a hierarchical linear regression analysis in order to predict WSAS scores. In the first step, gender and age were entered as independent variables. The presence of PPS was added in the second step and self-reported symptoms of depression, health anxiety, social anxiety and post-traumatic stress in the third step. Finally, in step four, the interactions between these psychological symptoms and the presence of PPS were added. To ensure that the assumption of multicollinearity was not violated GAD-7 scores were excluded from the model and all interaction variables were made out of mean centred variables. The overall regression model was significant, and there was a significant improvement in model fit with each step except step four. The presence of PPS and self-reported symptoms of depression and social anxiety contributed independently and significantly to the model while age, gender and other psychological measures and their interactions did not. A total of 36% of the variance in functional impairment, as measured by WSAS scores, was predicted by our model. Self-reported depression being the strongest predictor, with a large effect size ($f^2=0.427$), the presence of PPS the second strongest, with a medium effect size ($f^2=0.207$), and finally, social anxiety, with a medium effect size ($f^2=0.150$). The results are summarised in Table 2.

Table 2

Summary of a hierarchical regression analysis: Predicting WSAS scores with PPS and psychological symptoms.

Predictor	<i>B (SE)</i>	CI	β	Cohen's f^2
Constant	10.838 (2.752)	[5.419, 16.257]		
Gender	0.255 (1.078)	[-1,868, 2.378]	.012	
Age	-0.033 (0.041)	[-0.113, 0.048]	-.043	
PPS present	4.122 (1.520)	[1.219, 7.116]	.182**	0.207
Depression (PHQ-9)	0.626 (0.104)	[0.421, 0.832]	.366**	0.427
Health anxiety (SHAI)	0.070 (0.067)	[-0.062, 0.201]	.056	
Social anxiety (SIAS&SPS)	0.032 (0.016)	[0.001, 0.064]	.125*	0.150
PTSD symptoms (IES)	0.010 (0.018)	[-0.027, 0.046]	0.027	
PPS x Depression	-0.283 (0.296)	[-0.867, 0.300]	-.069	
PPS x Health Anxiety	0.083 (0.185)	[-0.281, 0.447]	.025	
PPS x Social Anxiety	-0.084 (0.047)	[-0.177, 0.009]	-.118	
PPS x PTSD symptoms	0.034 (0.051)	[-0.067, 0.136]	.036	

Note. * $\Delta R^2 = 0.057$, $F(2, 273) = 8.824$, $p < .001$, for Step1, $\Delta R^2 = 0.142$ for Step 2, $F(1, 272) = 48.124$, $p < .001$, $\Delta R^2 = 0.172$, $F(4, 268) = 18.260$, $p < .001$ for Step 3, $\Delta R^2 = 0.019$ for Step 4, $F(4, 264) = 2.075$, $p = .084$.

Adjusted $R^2_{\text{total}} = 0.364$.

* $p < 0.05$, ** $p < 0.01$

Predicting return to work

At the end of our study, 229 (74.8%) had finished their rehabilitation, 25 (8.2%) had discontinued as they were referred elsewhere, 40 (13.1%) dropped out, and 12 (3.9%) were still receiving rehabilitation from VIRK. One hundred sixty-one participants (72.9%) were considered as having returned to work, as they were working or studying at the end of their rehabilitation, while sixty (27.1%) were not. We ran a hierarchical logistic regression in an attempt to predict return to work at the end of service. Binary variables representing whether participants met criteria for the seven specific PPS types or had clinical levels of depression, health anxiety, social anxiety or post-traumatic stress symptoms were entered hierarchically as independent variables, after ensuring that the assumption of multicollinearity was not violated.

The most parsimonious model is presented in Table 3. Of the variables in the final model, clinical levels of depressive symptoms and persistent pain both significantly contribute to the prediction of returning to work while persistent fatigue does not. Other independent variables entered into the original hierarchical logistic regression did not predict return to work. Our final model contains persistent fatigue even though it independently does not significantly add to the model because removing it reduces the model fit, and the accuracy of the prediction and the independent effects of pain and depression seem to be significant.

Table 3

A logistic regression analysis: Predicting return to work.

Predictor	β	$SE \beta$	Walds χ^2	Df	p	e^β (odds ratio)	CI
Constant	0.638	0.222	8.261	1	.004	1.892	
PPS _{Pain}	0.757	0.347	4.776	1	.029	2.133	[1.081, 4.207]
PPS _{Fatigue}	-0.665	0.380	3.057	1	.080	0.514	[0.244, 1.084]
PHQ-9 _{≥10}	0.880	0.434	4.125	1	.042	2.412	[1.031, 5.642]
Test			χ^2	df	p		
Overall model evaluation							
Likelihood ratio test			10.632	3	0.014		
Goodness of fit test							
Hosmer & Lemeshow			5.819	6	0.444		

Note. Cox and Snell $R^2 = .047$. Nagelkerke $R^2 = .068$.

Two cases were identified that inflict undue influence on the model and when they are removed the Persistent Fatigue becomes a significant predictor of return to work, i.e., the absence of Persistent Fatigue is associated with not returning to work. These influential cases were not removed as they might not be true outliers.

The model correctly predicts whether or not participant return to work in 75.1% of cases and with it, we were able to predict 11.7% of all cases where participants do not return to work (seven out of nine). In order to inspect why these cases could be predicted by depression scores and the presence of persistent pain but only while having the information about

persistent fatigue, we categorised the participants in term of which combination of these three problems they experienced. We then examined the prevalence of returning to work within each group and tested whether there was an association between group membership and returning to work with a Chi-square test. The results are summarised in Table 4.

Table 4

Number and percentages of participants with different combinations of unexplained pain, fatigue and depression, that did and did not, return to work.

Symptom combination	No RTW	RTW
No pain, fatigue or depression	5 (16.1%)	26 (83.9%)
Only one of the three	11 (23.9%)	35 (76.1%)
Fatigue and depression	10 (20.4%)	39 (79.6%)
Pain and depression	7 (77.8%)	2 (22.2%)
Pain and fatigue	2 (22.2%)	7 (77.8%)
Pain, fatigue and depression	25 (32.5%)	52 (67.5%)
Total	60 (27.1%)	161 (72.9%)

$\chi^2(7) = 16.148, p = 0.006$

As can be seen in Table 4, there was a significant association between symptom combination and not returning to work. Participants with persistent pain and depression are 18.20 (OR) times more likely not to return to work than those with none, only one, all three symptoms or any other two symptoms combined. The other symptom combination groups were not significantly different from one another.

Predicting the duration of rehabilitation and drop out

The length of rehabilitation of participants that returned to work (N=159) ranged from 109 to 989 days. Almost half of them (42.8%) had finished their rehabilitation within a year and

almost everyone within two years (97.2%). The average rehabilitation duration was 432.19 days (SD = 190.12), and the mode was 314 days.

To test whether PPS or various symptoms of psychological distress predicted the duration of vocational rehabilitation, we ran a hierarchical linear regression analysis. In the first step, gender and age were entered as independent variables. The presence of PPS was added in the second step, the severity of functional impairment in the third step and self-reported symptoms of depression, health anxiety, social anxiety and post-traumatic stress in the fourth step. Finally, in step five, the interactions between these psychological symptoms and the presence of PPS were added as independent variables. To ensure that the assumption of multicollinearity was not violated, GAD-7 scores were excluded from the model, and all interaction variables were made out of mean centred variables. The overall regression model, as well as each step of the model, were found to be insignificant. The severity of functional impairment, the presence of PPS, symptoms of health anxiety, depression, social anxiety and post-traumatic stress did not predict the duration of vocational rehabilitation. Neither did any interactions between PPS and these psychological symptoms.

Comparing participants that dropped out with those that finished rehabilitation we found that participants were more likely to drop out of their rehabilitation if persistent fatigue was not present, $\chi^2(1) = 5.926, p=0.015, OR=2.28$, if they had severe symptoms of depression (PHQ-9 ≥ 15), $\chi^2(1) = 5.474, p=0.019, OR= 2.21$, or clinical levels of social anxiety (combined SIAS and SPS score ≥ 74), $\chi^2(1) = 4.843, p=0.028, OR=2.13$.

Discussion

In the present study, we examined whether the success of vocational rehabilitation and functional impairment at its beginning could be predicted by the presence of PPS, specific PPS types, symptoms of psychological distress, or combinations thereof. This was done in a sample of 324 vocational rehabilitation service seekers in a relatively inclusive real life setting.

PPS and symptoms of depression, anxiety, social anxiety, and post-traumatic stress are prevalent in our sample and have all previously been linked with functional impairment and work disability (Lecrubier et al., 2000; Ormel et al., 1994; Sanderson & Andrews, 2006; Stein et al., 2000). Only PPS, symptoms of depression and symptoms of social anxiety independently predicted functional impairment at the beginning of the rehabilitation process while age, gender, other psychological symptoms, and their interactions with PPS did not. Thirty-six percent of the variation in WSAS scores could be accounted for by our model with depressive symptoms being the strongest predictor, followed by PPS and symptoms of social anxiety. These results suggest that, despite a variety of symptoms being associated with work disability, there might be value in giving these particular symptoms additional attention in the context of work rehabilitation.

About two-thirds of our participants completed their rehabilitation within the study period. The vocational rehabilitation was successful in the majority of cases, with only 27.1 % of those that completed the program not returning to work. We were able to predict 11% of cases where participants did not return to work with logistic regression. None of our demographic variables and very few of our psychological ones contributed to that prediction. The only variables that independently contributed to this prediction were Persistent Pain and

depressive symptoms, but they only did so if Persistent Fatigue was included in the model. A more detailed look revealed that participants with a specific combination of these symptoms (i.e., had depressive symptoms in the clinical range and persistent pain but not persistent fatigue), were substantially less likely to return to work than other participants. It is important to note that these results are based on a small sample as only nine participants had this particular symptom combination. Further research is needed to reveal whether these results would hold in a larger sample and if they do what might be causing them. A more detailed look at the data did not reveal any apparent reasons for the lower success rate of these participants. They do not seem to have a more disabling pain than other participants, and despite not meeting the criteria for persistent fatigue, most of them report experiencing it, just without it interfering much with their life. One possible explanation may lie in the various interventions service users receive and how they are matched with their symptoms. It could, for example, be a mismatch if these individuals were offered fatigue focussed treatment as it is not their fatigue that is contributing most to their disability.

The duration of the rehabilitation VIRK service seekers receive is often quite long and often involves multifaceted interventions. Interestingly, the duration of the rehabilitation our participants received was not related to the severity or number of psychological symptoms nor the presence or number of PPS. This might be caused by something in the rehabilitation process. For example, some service users might be getting effective treatment that is well matched for the symptoms causing their work disability while others might be getting treatment that lacks in effectiveness, is ill-matched for their symptoms, or is targeting symptoms that are not primary contributors in their work disability.

The return to work rate of VIRK's service seekers suggests a good overall success of work rehabilitation in Iceland. This beneficial outcome highlights the importance of systematically employing organisational factors known to positively influence return to work within vocational rehabilitation, as many of them are embedded in VIRK's services. On the other hand, the duration of the vocational rehabilitation, which is often substantial, was unrelated to the presence or number of PPS, specific PPS types, or any measured psychological symptoms. This lack of association indicates a need for evaluating and comparing the various interventions used in terms of effectiveness, how well they are matched with reported symptoms and whether they are targeting the particular symptoms that are affecting workability. Special attention should be given to PPS, depressive- and social anxiety symptoms in that process as these symptoms specifically predict functional impairment in the context of work rehabilitation. These symptoms should also be systematically assessed and directly targeted in vocational rehabilitation as doing so might increase the rehabilitations cost-effectiveness by shortening its length and improving its already beneficial outcome. This could perhaps be done by employing cognitive behavioural therapy for PPS which, as we have previously argued, might be particularly well suited for people experiencing work disability due to a combination of PPS and psychological distress.

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