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ABSTRACT

Objectives To describe the 5 year work status in patients referred for suspected work-related common mental disorders. To develop a prognostic model.

Design Register-based nationwide longitudinal follow-up study.

Setting All departments of occupational medicine in Denmark.

Participants 17 822 patients aged 18–67 years, seen for the first time at a Department of Occupational Medicine in Denmark from 2000 to 2013 and diagnosed with stress, depression, post-traumatic stress disorder, anxiety or other mental disorders.

Interventions All patients were seen for diagnostic assessment and causal evaluation of the work-relatedness of their disorders. Some departments offered patients with stress disorders psychological treatment, which, however, was not organised according to patient selection or type of treatment.

Primary and secondary outcome measures Register data were collected for 5 year periods before and after the patients' first assessment at a department. Weekly percentages of patients are presented according to work status. The outcome in the prognostic model was a high Work Participation Score (ie, working >75% of potential work weeks/year) at 5 year follow-up.

Results For all subgroups of patients, a high proportion were working (>75%) 1–5 years before assessment, and all experienced a large reduction in work status at time of assessment. At 1 year follow-up, almost 60% of patients with stress were working, whereas in the other patient subgroups, less than 40% were working. In the following years, practically no increase was observed in the percentage of patients working in any of the subgroups. Based on these 5 year follow-up data, we developed a work participation model with only moderate discrimination and calibration.

Conclusions In Denmark, not all return to previous work status 5 years after a referral due to a suspected work-related common mental disorder. We developed a prognostic model with only moderate discrimination and calibration for long-term work participation after suggested work-related common mental disorders.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ We present a large and nation-wide patient sample, followed weekly for 5 years before and after the index date.

⇒ The patients served as their own controls regarding work status.

⇒ The study includes a wide range of register-based prognostic variables, involving demographic, work and health characteristics with few missing data.

⇒ A limitation of the study is the lack of relevant information from patient questionnaires and hospital records preventing us from developing a clinically feasible prognostic model.

OBJECTIVES

Many studies have linked exposure to psychosocial risk factors in the workplace with increased risk of work-related common mental disorders such as depression,[1] anxiety,[2] stress-related diseases[1 3 4] and post-traumatic stress disorder (PTSD).[5]

In Denmark, when general practitioners (GPs) suspect that working conditions may have contributed to a patient's common mental disorder, they can refer patients to departments of occupational medicine for further examination. An examination provides a diagnostic assessment and causal evaluation of whether or not the disease occurred due to exposures at work. In addition to diagnostic assessment, patients who are on sick leave at referral receive advice on optimal return to work practices. Psychological treatment for patients with stress disorders has been introduced during the last 10 years at some Danish departments of occupational medicine based on results from randomised clinical studies.[6 7]

Except from a recent cohort profile study,[8] no studies have reported on long-term follow-up of patients with mental disorders referred to Danish departments of occupational medicine. Long-term follow-up studies from other countries are also scarce.[9] The burden and costs associated with mental disorders are high for the affected individuals, their employers and society.[10] This is in agreement with a recent systematic review reporting that mental disorders are a major cause of long-term sick leave and disability expenses.[11] Employees on sick leave due to mental disorders often experience challenges on attempting to return to work,[12] and the risk of recurrent sick leave[13] or job loss is high.[6 12] A 7–year follow-up study by Koopmans *et al*[13] found that 19% of employees who had experienced sick leave due to a common mental disorder experienced relapse within 3 years. While some long-term follow-up studies on large samples are available,[12 13] most research has focused on short follow-up periods.[14 15] Few studies have assessed work-relatedness of common mental disorders,[12 13] even though this would be highly relevant for return to work, and the advice given to these patients.

In a public healthcare system, where financial resources are often scarce, prediction of which patients are at risk of losing their labour market attachment after having a work-related common mental disorder, is highly valuable. Emphasis should be on identifying which patients might be at particular risk of recurrence or job loss and could profit from treatment and extended consultative interventions.

Studies are however, sparse that focus on prognostic factors or prognostic modelling of long-term labour market attachment after a work-related common mental disorder. The primary endpoint of most studies has been time to return to work, often within 1–2 year's follow-up. Two reviews reported strong evidence that increasing age is associated with continuing disability and longer time to return to work after common mental disorders.[16 17] A scoping review found consistent evidence that lower symptom severity, no previous absenteeism and positive sick leave duration expectations were associated with earlier return to work.[17 18] Recent studies find that 'degree of motivation to return to work' and higher 'work ability at baseline' are positively associated with improved return to work.[19 20] High socioeconomic position is associated with a greater likelihood of return to work after depression but not after severe stress.[21] The prognostic value of gender and educational level remains unclear.[16 17 22–24] Further research is needed to determine the importance of all the prognostic factors studied so far.

The purposes of this paper is to examine long-term prognosis after a work-related common mental disorder among patients in a nationwide occupational medicine cohort and to develop a prognostic model predicting which patients experience a relatively stable return to work process and which patients are at risk of losing their long-term labour market attachment.

MATERIALS AND METHODS
Study design and participants
We present a register-based nation-wide longitudinal study. The study was based on registrations in the Danish National Patient Registry, which records all hospital contacts.[25] We identified all patients referred to departments of occupational medicine in Denmark 2000–2013.[8] Inclusion into the mental health cohort was defined as: first contact to a Department of Occupational Medicine for a range of mental disorders specified by ICD-10 diagnoses F00-F99, Z56, Z63.7, Z73.0-Z73.3 and R45.7.

For the descriptive part of the study, patients younger than 18 years and older than 67 years of age at assessment were excluded from the study population as were patients registered as receiving public retirement pension, early public retirement pension or emigrated (figure 1).

For the prognostic model, patients older than 62 years at assessment and patients receiving permanent health-related public benefits at time of assessment were also excluded.

Variables and data sources
All data were obtained through Statistics Denmark. We retrieved register data from 5 years before and 5 years after patient assessment. Data in these registries were complete from 1995 and updated until the end of 2018, enabling us to include patients seen during 2000–2013.

The patient's unique social security number was linked to nation-wide registries (The Population Register, The Danish National Patient Registry, The Danish Register for Evaluation of Marginalisation (DREAM), The Population Education Register, The Job Register, The Danish National Health Service Register, The Danish Psychiatric Central Research Register, The Cause of Death Register and the Danish Occupational Cohort (DOC*X)) and used to merge all data at the individual level.[26] In Denmark, all citizens are registered by their social security number and entitled to payment in case of unemployment or disease.[27] The DREAM register provided information on all transfer payments provided by the Danish authorities to citizens. The DREAM register comprises numerous codes for transfer payment, emigration and death recorded on a weekly basis.[27] Absence of a weekly code refers to patients not receiving transfer payment, most likely due to an income from working but for a small proportion it can be due to no income at all (ie, spousal support or similar). DREAM codes were grouped as (1) working, (2) education, maternity or parental leave, (3) temporary public benefits due to either sick leave or temporary unemployment, (4) permanent health-related public benefits, (5) retirement due to old age public retirement or voluntary early retirement, (6) emigration and (7) death.

The dependent variable in the prognostic analyses was the Work Participation Score (WPS) during the fifth year of follow-up of each patient. A WPS was calculated per follow-up year. The first year comprised the period from the week of the first visit and the following 51 weeks. The time periods for the following years were 52 weeks. WPS
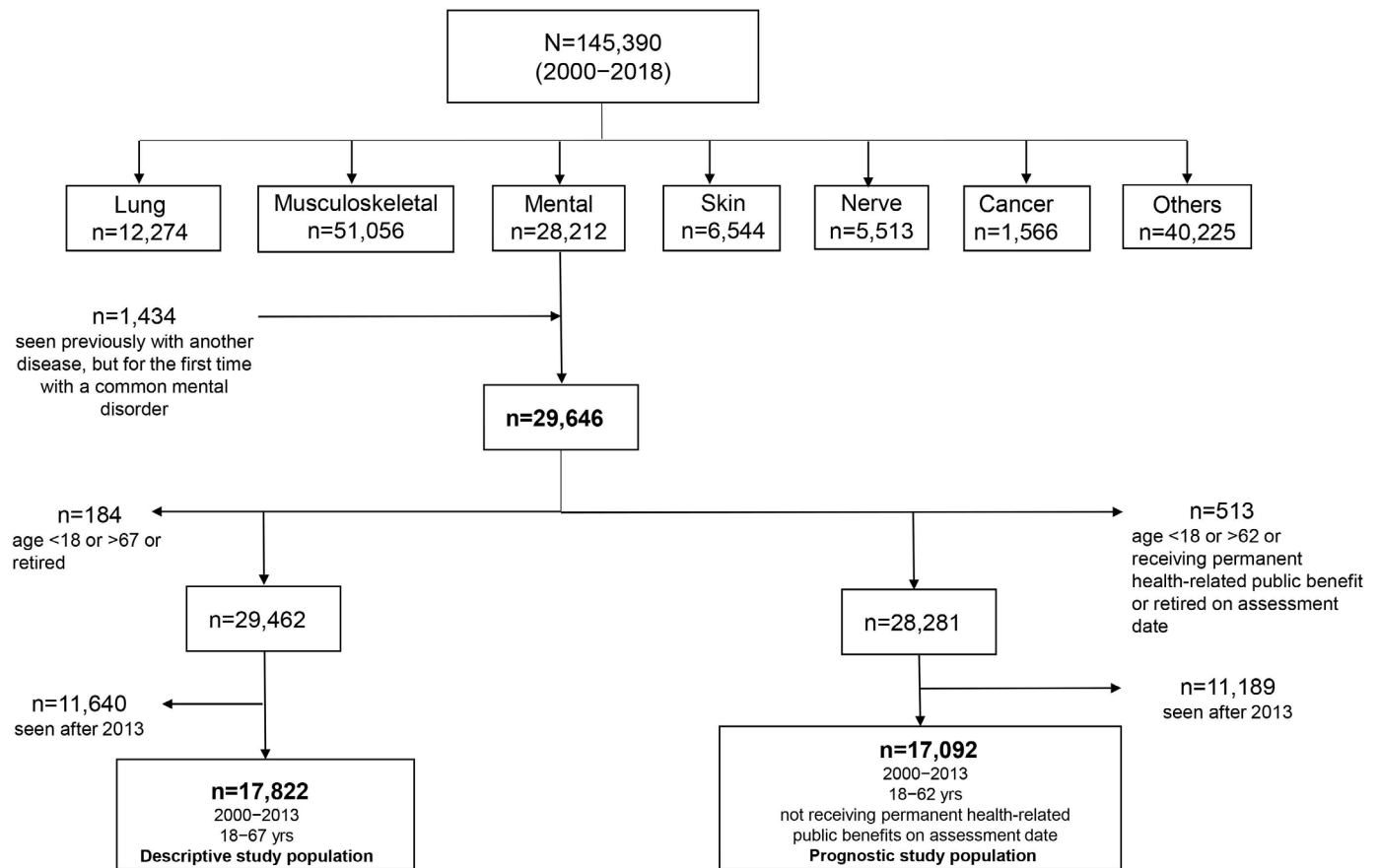
Figure 1 Patient flow diagram.

was defined as weeks of employment, education, maternity or parental leave relative to the total number of potential weeks of work (ie, weeks of employment, education, maternity, parental leave plus weeks on temporary public benefits or permanent health-related public benefits). Patients were censored from the year of public retirement pension, voluntary early retirement pension, emigration or death. Thus, weeks on public retirement pension and voluntary early retirement as well as death and emigration were not included in the calculation of the WPS. Similar to other studies, a WPS>75% was defined as high work participation.[28]

The non-dependent variables in the prognostic analyses were selected if we estimated that the variable was theoretically relevant for the association between suggested work-related common mental disorder and work participation. Besides, the variable had to be available for the clinician in a daily clinical setting and available from Statistics Denmark (as this study is strictly register based). The theoretical relevance of the variables was among others based on a literature search (presented in objectives).[16–24] Altogether the following non-dependent variables were selected: gender, age, marital status, education, occupational groups, geographical region, diagnostic group, calendar time period, sick leave, comorbidity, geographical region, prior healthcare utilisation, prior work participation and comorbidity.

The ICD-10 diagnoses were grouped into the following categories: stress disorder, depression, PTSD, anxiety and other mental disorders. Stress disorder was used as an umbrella diagnosis aggregated by the following diagnoses: psychological strain disease (F43.0, F43.8 or F43.9), adjustment disorder (F43.2), the Z56 diagnoses (problems with employment), Z63.7 traumatising life experiences, Z73.0 exhaustion, Z73.2 lacking relaxation and spare time and Z73.3 psychological stress not otherwise classified. Depression was aggregated by single episode depression (F32), periodic depression (F33), persistent affective disorders (F34) and depression when bipolar (F31.0, F31.3 and F31.4). PTSD (F43.1) was a single group. Anxiety (F40.0–F41.9) was kept as a single group in tables 1 and 2 but was grouped with 'other mental disorders' (the remaining F diagnoses) in figure 1 due to rules stated by Statistics Denmark enforcing the General Data Protection Regulation, which prohibits cells in tables with <5 persons. 'Other mental disorders' were the remaining psychiatric ICD-10 F-diagnoses.

The number of professional groups (classified in 10 ISCO categories) were reduced to: (1) managers and professionals, (2) technicians and associate professionals, (3) clerical support workers, (4) service and sales workers, (5) craftsmen, agriculture and armed forces, (6) elementary occupations and plant and machine operators and (7) unknown.

Table 1 Demographic and health characteristics at index date for all patients

Characteristic	All (n=17 822)
Gender	
Male	4802 (27%)
Female	13 020 (73%)
Age	
<30	1109 (6%)
30–49	10 082 (57%)
50–67	6631 (37%)
Marital status	
Married	10 493 (59%)
Single	4267 (24%)
Divorced	2838 (16%)
Widowed	206 (1%)
Missing	18 (0%)
Level of further education	
None	3172 (18%)
Short	6678 (38%)
Medium	6780 (38%)
Long	1062 (6%)
Missing	130 (1%)
Occupational groups (ISCO-88)	
Managers and professionals	3622 (20%)
Technicians and associate professionals	5994 (34%)
Clerical support workers	1725 (10%)
Services and sales workers	3539 (20%)
Craftsmen, agriculture and armed forces	825 (5%)
Elementary occupations, machine operators, other	1860 (10%)
Missing	257 (1%)
Geographical region	
Capital region hospitals	2094 (12%)
Region Zealand hospitals	2176 (12%)
Region South hospitals	4897 (28%)
Region Central hospitals	5850 (33%)
Region North hospitals	2805 (16%)
Diagnostic groups	
Stress disorder	12 858 (72%)
Depression	2323 (13%)
PTSD	1039 (6%)
Anxiety	405 (2%)
Other mental disorder	1197 (7%)
Calendar time periods	
2000–2004	3446 (19%)
2005–2009	6689 (38%)
2010–2013	7687 (43%)
On sick leave at index date	

Continued

Table 1 Continued

Characteristic	All (n=17 822)
No	4618 (26%)
Yes	13 204 (74%)
Prior use of healthcare utilities	
Low	13 735 (77%)
High	4087 (23%)
Prior work participation (third year prior)	
High	14 438 (81%)
Low	3335 (19%)
Missing	49 (0%)
Comorbid somatic disease	
No	16 391 (92%)
Yes	1431 (8%)

PTSD, post-traumatic stress disorder.

Sample size

Traditionally, multivariable logistic regression analyses require 10 outcome events per prognostic variable.[29] The 12 non-dependent variables in this study require 120 outcome events of the dependent variable. Because more than 15 000 patients were included, no formal sample size calculation was performed.

Missing data

The non-dependent variables had missing data in the range of 0%–1.4% which we considered low, and no attempt to correct for missing data was performed. There were no missing data for the patients included in the multivariable logistic regressions.

Statistical analyses

Descriptive figures 2 and 3 show the work status of the patient cohort on a weekly basis. Data are presented for each week from 5 years before to 5 years after first contact to a Department of Occupational medicine.

Two different prognostic models were built that analysed probability of high work participation (working >75% of total number of potential work weeks during the fifth year of follow-up). Twelve non-dependent variables were included in the analyses. Correlations between the variables were examined by performing a correlation matrix. Ten variables were analysed as categorical, whereas age and calendar time period were kept on a continuous scale. Statistical analyses were performed using Stata V.16 (STATA Corp, College Station, Texas, USA).

A model using multivariable logistic regression analyses was built that included all 12 non-dependent variables. Impact of non-dependent variables was analysed using backwards selection, excluding variables from the model if p-values exceeded 0.20. Performance of the model was tested with Hosmer-Lemeshow goodness-of-fit.

Additionally, a regression model using the LASSO technique (least absolute shrinkage and selection operator)

Table 2 Two prognostic models of high Work Participation Score (WPS) at 5 years' follow-up

Variable	Patients	OR	Logistic regression 95% CI	P value	LASSO Est
Age	15 547	0.96	(0.96 to 0.97)	<0.001	0.73
Marital status					
Married	9069	1.00			1.16
Single	3896	0.68	(0.63 to 0.75)	<0.001	0.98
Divorced	2444	0.73	(0.66 to 0.81)	<0.001	1.00
Widowed	138	1.04	(0.72 to 1.50)	0.83	1.03
Level of further education					
Long	967	1.00			1.10
Medium	6089	0.69	(0.58 to 0.82)	<0.001	1.01
Short	5857	0.68	(0.56 to 0.82)	<0.001	1.00
None	2634	0.52	(0.43 to 0.63)	<0.001	0.91
Major occupational groups (ISCO-88)					
Managers and professionals	3225	1.00			1.13
Technicians and associate professionals	5404	0.84	(0.76 to 0.93)	0.001	1.07
Clerical support workers	1500	0.73	(0.62 to 0.85)	<0.001	1.00
Services and sales workers and caretaking	3166	0.64	(0.56 to 0.73)	<0.001	0.95
Craftsmen, agriculture and armed forces	719	0.63	(0.51 to 0.77)	<0.001	0.97
Elementary occupations, machine operators, other	1533	0.53	(0.45 to 0.62)	<0.001	0.91
Geographical region					
Capital region hospitals	1808	1.00			1.00
Region Zealand hospitals	1880	0.99	(0.86 to 1.14)	0.86	1.00
Region South hospitals	4276	0.87	(0.77 to 0.98)	0.03	0.95
Region Central hospitals	5195	0.99	(0.88 to 1.11)	0.82	1.00
Region North hospital	2388	0.87	(0.76 to 0.99)	0.04	0.96
Diagnostic groups					
Stress disorder	11 387	1.00			1.25
Depression	1985	0.55	(0.49 to 0.61)	<0.001	0.97
PTSD	854	0.34	(0.29 to 0.40)	<0.001	0.88
Anxiety	360	0.67	(0.53 to 0.84)	0.001	1.01
Other mental disorder	961	0.61	(0.52 to 0.71)	<0.001	1.00
Year of first contact to a Department of Occupational Medicine	15 547	1.07	(1.06 to 1.08)	<0.001	1.30
Sick leave at first appointment					
No	4207	1.00			1.43
Yes	11 340	0.44	(0.41 to 0.48)	<0.001	1.00
Prior use of healthcare utility					
Low	12 127	1.00			1.18
High	3420	0.66	(0.61 to 0.72)	<0.001	1.00
Prior work participation (year 3)					
High	13 059	1.00			1.00
Low	2488	0.46	(0.42 to 0.51)	<0.001	0.76
Comorbidity					
None	14 406	1.00			1.00
Any	1141	0.79	(0.69 to 0.90)	0.001	0.94

Multivariable logistic regression including OR, p values and a LASSO model including estimates.
All patients n=15 547 (age 18–62 years and not receiving any permanent health related public benefits or retirement pension at index date).
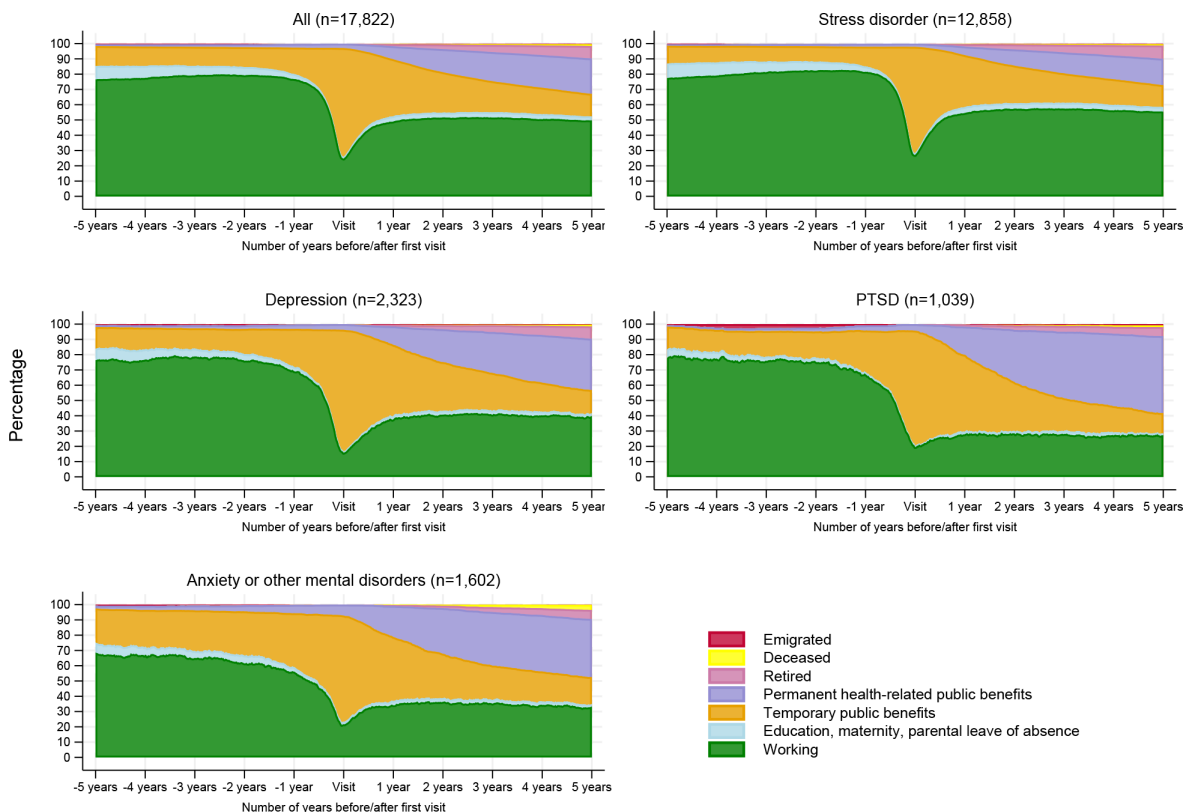LASSO, least absolute shrinkage and selection operator.

Figure 2 Work status for all patients and diagnostic subgroups 5 years before and after assessment at a Department of Occupational Medicine in Denmark in 2000–2013. PTSD, post-traumatic stress disorder.

was built to apply penalised estimation and investigate variable selection based on the full logistic model. The LASSO technique was originally introduced to improve prediction accuracy and interpretability of regression models by shrinking the number of covariates used in the model. Performance was tested with LASSO goodness-of-fit using deviance and deviance ratios.

To assess calibration of the two models, we plotted expected against observed probabilities of outcome in a calibration belt plot with 80% and 95% CIs.[30] Estimates of discrimination
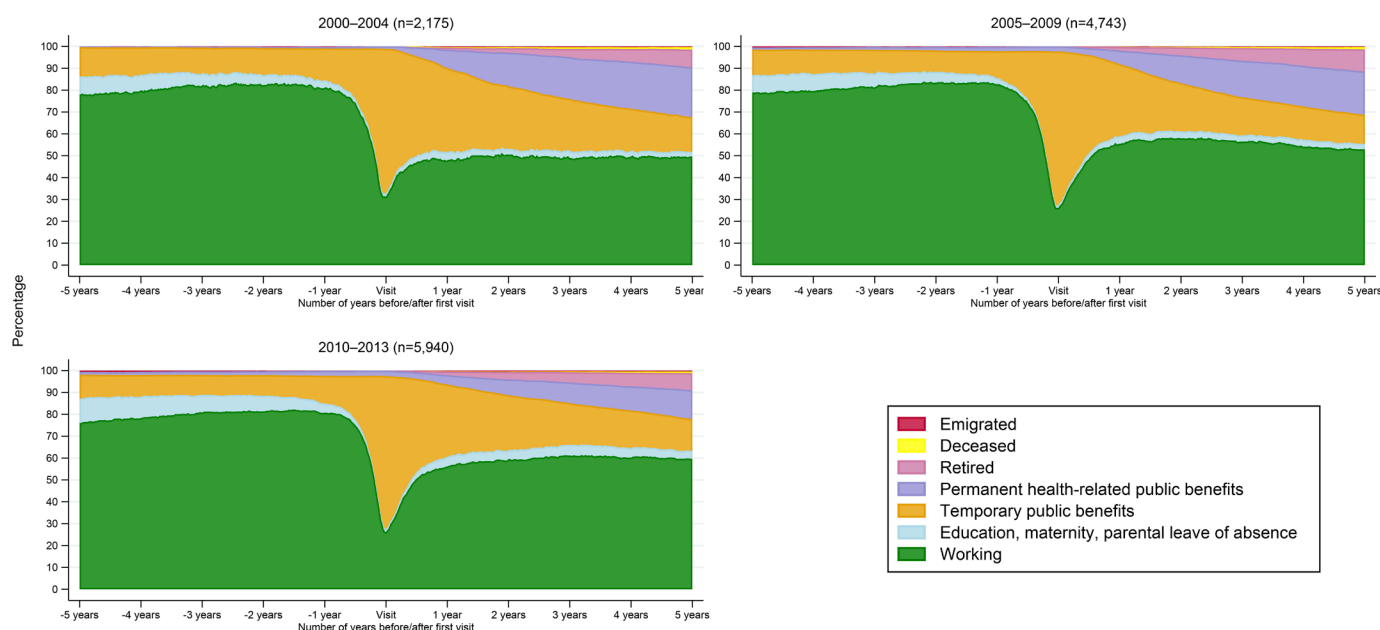

Figure 3 Work status for all patients diagnosed with stress disorder, 5 years before and after assessment at a Department of Occupational Medicine in Denmark, in three time periods, 2000–2004, 2005–2009 and 2010–2013.

were achieved by calculating the area under the receiver operator curve (ROC AUC) and applying the Brier score with Spiegelhalter's Z-statistic.

Patient and public involvement
None.

RESULTS
In total, 17 822 patients, 18–67 years of age, were seen for the first time due to mental disorders at a Department of Occupational Medicine in Denmark during 2000–2013 (table 2). Most patients were women (73%), median age of 45 at the first contact to a Department of Occupational Medicine. Almost three-fourths of patients had either a short or medium level of further education and 59% were married. More than three-fourths had high work participation prior to study inclusion. Patients were diagnosed with conditions within the following categories: stress disorder 72%, depression 13%, PTSD 6% anxiety 2%, and 'other mental disorder' 7%.

Figure 2 presents high labour market attachment for all diagnostic subgroups and the combined group of patients with mental disorders in the 5 years preceding a first contact to a department of occupational medicine. Within the subgroup of patients with stress disorder, around 85% of patients diagnosed with stress disorder were working or on leave of absence (categorised as working) 2–5 years before assessment at a department of occupational medicine. At assessment time only around 30% were working, increasing to around 60% after 1 year, after which practically no further increase was seen. The same tendencies with practically no increase in work status after the first year of follow-up were also seen within the other subgroups of mental disorders. Among patients with PTSD, a particularly small increase in work status (28%) was seen after the first contact. Correspondingly, an increase in the proportion of patients receiving permanent health-related public benefits during the 5 year follow-up period was seen in all diagnostic subgroups.

In figure 3, weekly employment status for patients diagnosed with stress disorder is shown for three different calendar time periods. A slightly higher level of employment (60%) at 5 years' follow-up was seen in the most recent calendar time period (2010–2013), as compared with approximately 50% in 2000–2004.

Prognostic model development
The study population available for prognostic model development decreased from 17 092 to 15 910 due to retirement, emigration or death from index date to the beginning of the fifth year of follow-up (see online supplemental table). The study population was further reduced to 15 547 due to missing information on non-dependent variables. Dichotomised outcome of high work participation in the fifth year of follow-up was used as dependent variable for both models (table 2).

In the model using multivariable logistic regression analyses, the 12 selected non-dependent variables were included in the analysis. Gender had a p-value of 0.9 and was excluded from the analyses according to the predefined steps in the backwards selection procedure. The remaining 11 non-dependent variables had p-values below 0.20 and were kept in the model. Variables with single subcategories with p-values above 0.20, for example, widowed, were kept in the analysis as the other subcategories in the same variable had p-values below 0.20. According to Riley *et al*[31] p-values and CIs should not be included in prognostic models. We decided, however, that p-values and CIs should be presented in the multivariable logistic regression analysis (table 2). Young age, being married or widow/ widower, having long further education, being a manager or professional or being diagnosed with stress disorder were all factors statistically significantly associated with high work participation at 5 years' follow-up. Additionally, not being sick notified at assessment, low level of prior healthcare utilisation, previous high work participation, no comorbid somatic disease and being assessed in most recent calendar years were also statistically significantly associated with high work participation at 5 years' follow-up.

In the second model, the regression model using the LASSO technique, the 12 non-dependent variables were also included. The LASSO model also found that all non-dependent variables except gender were important for the model. The purpose of a penalising model, such as the LASSO model, is to reduce the number of variables and additionally reduce subcategories within the variables as well as the size of the estimates to prevent over-optimism of the regression model. In this population, the LASSO model resulted in reduction of only two subcategories (two of the five geographical regions), as compared with the model using multivariable logistic regression analyses. The estimates in the LASSO model were lower than estimates presented in the multivariable logistic regression model; the tendencies were, however, identical.

Hosmer-Lemeshow goodness-of-fit of the multivariable model did not indicate model lack of fit (p=0.38). Comparing the two models, the LASSO goodness-of-fit deviance and deviance ratios were almost identical for the multivariable logistic regression and the LASSO model (deviance 1.19 vs 1.22 and deviance ratio 0.14 vs 0.11, respectively). In terms of discrimination, identical AUCs of the ROC of 0.72 (0.71–0.73) were found for the two models. A Brier score of 0.21 was found for both the models and Spiegelhalter's Z-scores of 0.54 for the logistic regression analysis and 0.80 for the LASSO model, where Z-scores>0.05 indicate acceptable discrimination. Calibration belt plots were made for both models and showed slim belt plots for both models (online supplemental figure).

DISCUSSION

In this cohort of 17822 patients with suspected work-related common mental disorders seen at departments of occupational medicine in Denmark in 2000–2013, we observed high labour market attachment during the years preceding the first contact. We consider this previous high labour market attachment as indicating a relatively healthy population until the patients begin suffering from a common mental disorder. We have not located other similar large-scale studies on this topic covering both the 5 years before and the 5 years after clinical assessment at a Department of Occupational Medicine. During the first year of follow-up, an increase, which was not, however, to the previous level, in the percentage of patients working was seen for all subgroups, after which practically no further increase was observed. This is in agreement with a recent systematic review reporting that common mental disorders are a major cause of long-term sick leave.[11] We also developed a prognostic model of high work participation, however it was not suitable for personal prognostication as ROC AUC estimates do not exceed 0.80 and are barely sufficient for prognostication at a population level, where they should lie between 0.70 and 0.80. Applying a machine-based LASSO model for prognostication of high work participation was not superior to a simple multivariable logistic regression model when comparing performance and calibrations of the two models.

When developing prognostic models, emphasis is not on comparing the size of individual ORs with one another. Emphasis is on the performance of the model.[31] Nevertheless, the findings that younger age, not being sick notified at assessment, and high previous work participation were associated with high work participation after a suggested work-related common mental disorder are in agreement with previous studies.[16 17 20 32] Our finding that a high level of further education was significantly associated with high work participation at 5 years' follow-up was not entirely in agreement with previously published conflicting results.[16 17 22–24] Only limited and sporadic treatment was offered to the patients at the departments of occupational medicine during 2000–2013, primarily restricted to patients with stress disorders. Among GPs, the municipal system and private psychologists, treatment offers may, as well, have varied (eg, therapy, medicine and exercise). A relevant concern is that the most resourceful and most well-educated patients may have received help from private psychologists to a greater extent than others, resulting in a higher degree of recovery.

The overall results from our and other relevant studies call for new and better intervention approaches that focus on significant, sustainable and long-term return to work for patients with work-related common mental disorders. Numerous randomised controlled studies (RCT)[6 7 18 33–38] have investigated the effects of various types of return-to-work interventions and reported at most only modest effect. The interventions included individual cognitive behavioural or problem-focused approaches to enhance individual coping and/or gradual return to work with or without workplace involvement. With regard to stress disorders, a Cochrane review with a limited number of studies,[39] found no substantial effect of cognitive behavioural or problem-focused interventions on return to work. Another review from 2018[40] found an overall little improvement in return to work among sick listed employees with common mental disorders after interventions, particularly, employees with stress disorders. Strong evidence for including workplace contact and moderate evidence for including graded return to work was reported. The effect of physical exercise on return to work after depression or other common mental disorders has rarely been studied. The results from a large RCT reported no effect of exercise on return to work after depression as compared with treatment as usual.[41] The majority of intervention studies addressing return to work have only employed short follow-up periods of 1 year, and follow-up studies addressing relapse are scarce.[15 41 42] Thus, so far, intervention studies have not showed large convincing improvements in return to work after common mental disorders. Additionally, recurrent sick leave or job loss have rarely been studied in a long-term perspective.[13 14]

In a recent position paper, Nielsen et al[15] argued that return to work research, to a large extent focuses primarily on resources enhancing return to work during the absence period, ignoring other resources that may facilitate sustainable return to work. They call for studies that follow returned workers over time to understand their return journey. Our study makes an early contribution to this agenda by providing an overall description of the long-term return to work journey among central diagnostic groups. Although more detailed studies are needed. Managing to separate patients in those with high work participation from those with low work participation after 5 years of follow-up could be a step towards studying resources facilitating sustainable return to work and towards development of a prognostic model that can be implemented in a clinical setting to potentially enhance resources that support long-term return to work among vulnerable patients.

Strengths and limitations

A strength of this study is the large and nation-wide patient cohort, which was followed for 5 years before and after the index date. The patients serve as their own controls regarding work status. Another strength is the use of nation-wide registries linked with a patient's social security number.[25] The availability of these registries is unique for Denmark, and provides us with a detailed endpoint to study and a wide range of prognostic variables, involving demographic, work and health characteristics with few missing data.

A limitation is the endpoint studied. Labour market attachment is an endpoint exposed to changing legal terms in a politically changing system. Over time several political interventions have been initiated in Denmark to increase the employment rate. The law

on permanent health-related public benefits was introduced in January 2013 and may have affected the outcome at 5 years' follow-up for patients seen in the most recent years. Financial fluctuations may also have impacted the numbers employed in different sectors of the labour market. However, many patients in this cohort had professions within the public sector, which is less frequently affected by financial fluctuations. Furthermore, we present figures for patients with stress disorder in three different calendar time periods and in the prognostic study, we included the continuous variable calendar year to deal with confounding due to calendar time periods. Our findings in the descriptive analyses as well as the prognostic study confirmed that labour market attachment was highest for the most recent calendar years, which could indicate some effect of previous political initiatives to improve labour market attachment.

Another limitation of the study is the lack of data from patient questionnaires and hospital records. Thus, we have no information on life style factors such as smoking habits and alcohol consumption, severity of the mental health symptoms, general work environment at the work place, the cognitive demands in performing the work, the triggering psychological exposures at the work place, the persons' own expectations of sick leave duration and other self-reported information. Besides we have no information on our professional conclusion on the work-relatedness of the common mental disorder. We have decided to use the term work-related mental disorder based on the fact that a GP have suggested the disorder to be triggered by work-exposures and have referred the patient to assessment at a Department of Occupational Medicine.

A third limitation of the study is the fact that organising a healthcare system with departments of occupational medicine is primarily seen in northern Europe, limiting the relevance of the study to other countries.

Conclusion

Most patients with common mental disorders in this previously healthy population, referred to departments of occupational medicine in Denmark, are working 1–5 years after assessment. Some patients are however not working 5 years after assessment especially among patients diagnosed with PTSD or depression. To select which patients are at low risk and which are at high risk of losing their labour market attachment, we tried to develop prognostic models for work participation 5 years after assessment. None of the models were, however, suitable for personal prognostication and are barely suitable for prognostication at a population level and none of the models included data from patient questionnaires or hospital records. We hope to improve the models in the future to a sufficient quality enabling us to implement a prognostic model in our daily clinical practice.

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