SICKNESS ABSENCE AND WORK DISABILITY

Predictors of disability pension in long-term sickness absence

Results from a population-based and prospective study in Norway 1994–1999

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Background: While several socio-demographic predictors of disability pension (DP) have been identified, less is known about the importance of the medical aspects. Methods: A representative sample of Norwegian long-term sickness absentees, 2043 women and 1585 men, with detailed diagnostic information based on the International Classification of Primary Care (ICPC) was followed up for 5 years. The date of granting DP was obtained from the Norwegian DP-register and used as the dependent variable in Cox multivariate regression analysis. Medical and socio-demographic factors were entered as explanatory variables. Results: Kaplan–Meier estimates of the 5 year risk of DP were 22.9% for the full sample, 22.5% for men and 23.3% for the women. Men on sick leave for mental health disorders had an increased disability risk. Except for pregnancy-related cases, which carried a very low risk for future DP, there was no significant difference between the main diagnostic groups among women. Previous sickness absence increased the disability risk but was significant only for total absence above 20 weeks in the 4 years preceding inclusion. Age was the strongest predictor of future DP. Increasing income decreased the risk, bur not linearly. Unemployment status in the year preceding inclusion increased disability risk for women, but not for men. Among cases with musculoskeletal disorders (54.5% of the sample), subgroups with different disability risks were identified in Cox' regression analysis, with a gender-specific pattern. Conclusion: In addition to previously known socio-demographic predictors, medical variables were important in identifying sickness absentees with an increased risk of DP.

Keywords: disability pension, long-term sickness absence, predictors, medical, socio-demographic

Income compensation for those who are permanently unable to work because of illness, injuries or handicaps is a key feature of modern welfare states. The Nordic countries have addressed this challenge by establishing disability pension (DP) schemes that cover the entire population of working age.[1,2] There are many studies of the occurrence[3–6] and predictors[7–11] of DP. The predictive role of socio-demographic factors for DP in general,[12–14] and in DP for specific causes such as back disease[15] and osteoarthrosis[16] has also been identified.

In Norway the number of people leaving the workforce with a DP has increased substantially over the last two decades: in 1980, 5.9% of the male and 6.2% of the female population aged 16–66 had obtained a DP.[17] Twenty years later the percentages were 8.1% for men and 11.2% for women.[18]

Most cases of DP start as a spell of long-term sickness. Surprisingly few studies have assessed possible predictors or risk factors of future DP among long-term sickness absentees.[19–21] In a registry-based prospective study of long-term sickness absentees in Norway between 1990 and 1995, socio-demographic predictors of disability pension were identified, along with important gender differences.[22]

The aims of the present study was to retest the importance of several socio-demographic factors among long-term sickness absentees as predictors for DP, using recent data. Second, we wanted to investigate whether medical factors also predict transition to DP. Finally, musculoskeletal problems have consistently made up the majority of cases in sickness absence studies.[23,24] Since detailed diagnostic information was available, it was possible to investigate the predictive value of different 'subgroups' of musculoskeletal disorders.

METHODS

The Norwegian sickness absence benefit scheme

All employees and registered unemployed persons are covered. Housewives and unregistered unemployed are not covered. Employers pay the benefits for the first two weeks; later the benefits are compensated by the National Insurance Services (NIS) for up to one year.

Long-term sickness absence

After 8 weeks sickness absence the responsible doctor is obliged to produce an 'eight weeks sickness absence certificate' including medical information and plans for treatment and rehabilitation. Therefore 8 weeks is considered as the starting point for long-term absence in Norway.[25]

The disability pension (DP) scheme

All inhabitants aged 16–66 years are eligible. DP is granted in cases of permanent, at least 50% incapacity for work. All relevant treatment and rehabilitation should have been tried.

Setting

The county Hordaland is located on the south-west coast of Norway and consists of one city (Bergen) and 33 rural municipalities. In 1994 the county had 10% of the Norwegian population with 106,674 vocational active men and 89,356 vocational active women eligible for sickness absence benefits.

Sample

During two periods in 1994 all 'eight weeks sickness absence certificates' in Hordaland County (n=4156) were collected and reviewed by one of the authors (PRR). Individuals above 62 years and a small number of cases that already had a partial disability pension were excluded. After further exclusion of 155 cases due

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to duplication, illegibility or lack of relevant information, the study sample comprised 3628 cases.

Source of data
Baseline variables were extracted from the 'eight weeks sickness absence certificates' and NIS case records. The outcome variable (granting of a DP) was obtained from the Norwegian DP register, which is considered to be complete.[14–16]

Socio-demographic variables
Age, sex and municipality of residence were extracted from the sickness certificates. The municipalities were divided into four groups:
- Urban,
- Intermediate urban/rural,
- Rural centres,
- Small rural municipalities.

Information on income (before tax) in the year before inclusion (1993) was found in the NIS case records together with information on receipt of unemployment benefits in 1993 and vocational rehabilitation support during follow-up.

Medical variables
Medical variables were collected from the sickness certificates.
- Type of doctor
The type of doctor responsible for the eight weeks' sickness certification (GPs, occupational physicians, private specialists or hospital doctors).
- Diagnosis
The main diagnosis formulated by the doctors. Nearly 20% of the certificates did not include a diagnosis. For these cases one of the authors (PR) defined a main diagnosis based on the medical information given on the certificates. The diagnoses were based on the Norwegian short version of the International Classification of Primary Care (ICPC).[26,27] Since the majority of sickness certificates are issued by GPs, ICPC has been used by NIS since 1990. Diagnoses based on ICD9 (from hospitals) were recoded into ICPC by means of a special recoding manual used in the NIS.
- Musculoskeletal subgroups
A total of 54.5% of the cases had a main diagnosis indicating problems of the musculoskeletal system (L diagnoses in ICPC), which were distributed among 44 different ICPC codes. The musculoskeletal cases were divided into seven subgroups and analysed separately.
- Prognosis
The prognosis assessed by the certifying doctor was defined according to one of the following categories: (A) the patient requires only further medical treatment in order to return to work, (B) unclear condition at eight weeks, (C) the patient requires comprehensive rehabilitation. In 15% of the certificates the doctor had not indicated a prognostic group.
- Days of sick leave
The number of NIS-compensated days of sick leave in 1990–93 (spells of more than 14 days) was found in the NIS case records.

Follow-up
The sample was followed up from the day of eight weeks sickness absence (in 1994) until 31 December 1999. Hence the follow-up time varied between 1825 days (5 years) and 2080 days for cases not censored by death or emigration. The date of obtaining DP, of death or emigration was ascertained for all cases. One hundred subjects died or emigrated during the follow-up period without obtaining a DP, while 40 patients died after they had received DP.

Statistical analysis
Survival analysis was performed based on Kaplan–Meier plots and Cox' multivariate regression analysis with granting of
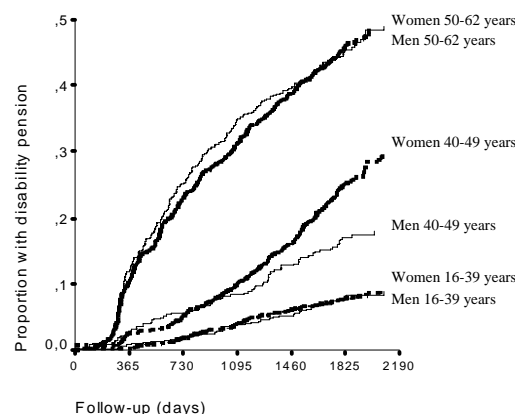
Figure 1 Kaplan–Meiers plot (1-survival): proportion with disability pension during follow-up, according to age and gender; full sample (N=3628)

disability pension, full or partial, as the dependent variable.[28] In order to identify predictors of DP, socio-demographic and medical factors were used as explanatory variables. The relative disability rates for each variable were identified holding the effect of other variables constant. In the regressions the variables were grouped and treated as categorical because of no obvious linearity. The analyses were carried out using the software program SPSS version 9.0.

RESULTS

The descriptive statistics of the sample are shown in *table 1*. Kaplan–Meier estimates for the 5 year risk of obtaining DP were 22.9% for the full sample, 22.5% for men and 23.3% for women. At the end of the follow-up, 491 women (24.0%) and 358 men (22.6%) had received a DP.

Figure 1 shows the cumulative disability rates during follow-up, according to gender and three age categories: 16–39, 40–49 and 50–62. Disability risk increased strongly with age for both genders. In the age group 40–49 the risk of DP was significantly higher for women than for men (see also *table 1*). However, no overall gender difference in disability rates was present. Low income levels were associated with higher disability rates, but the relationship between income and disability rates was not linear. The income distribution was different between men and women: among the men 11% earned less than NOK 100,000 (Euro 12,500) compared to 22% among the women, whereas 26% of the men and 5% of the women belonged to the highest income group (NOK ≥250,000). No urban–rural differences in disability rates were present.

An increasing number of sickness absence days in the four years before the inclusion period were related to elevated disability risk for both genders. There were no differences in disability rates according to the type of doctor responsible for sickness certification at eight weeks absence. Persons that had received unemployment benefits in 1993 had the same overall rate of DP as the rest of the sample.

The prognostic assessment given by doctors on the eight weeks sickness certificate was clearly related to subsequent risk of DP. Of the total sample, 16% were assessed by their doctors as having an unclear condition at eight weeks, and in this group 39% obtained a disability pension during follow-up. Among the 6% of sickness absentees assessed to be in need of comprehensive rehabilitation, 48% were granted a DP during follow-up. Patients assessed to be in need of medical treatment only had a disability rate of 18%.

Table 1 Long term sickness absentees granted disability pension (DP) during follow-up according to socio-demographic and medical variables. Percentages with 95% confidence interval (CI), N=3628

	All			Women			Men		
	N	%DP	95% CI	N	%DP	95% CI	N	%DP	95% CI
	3628	23	22–24	2043	24	22–26	1585	23	21–25
Socio-demographic variables									
Age groups (years)									
16–39	1531	8	7–10	913	8	6–10	618	8	6–10
40–49	992	22	20–25	542	27	23–31	450	17	13–20
50–59	865	42	38–45	482	43	38–47	383	40	35–45
60–62	240	60	53–66	106	60	51–70	134	59	51–67
Income 1993 (NOK)									
<100,000	637	25	22–28	456	27	20–31	181	21	16–30
100,000–149,999	732	23	20–26	584	23	20–27	148	22	16–29
150,000–199,999	1063	26	24–29	649	26	22–29	414	28	23–32
200,000–249,999	687	21	18–24	260	20	15–25	427	22	18–25
≥250,000	509	19	16–23	94	18	10–26	415	19	16–23
Municipality of residence									
Urban (Bergen)	1818	24	22–26	1070	24	22–27	748	23	20–26
Intermediate urban/rural	588	21	18–25	333	22	17–26	255	20	15–25
Rural centers	607	25	21–28	330	27	22–31	277	23	18–28
Small rural	615	23	20–27	310	23	19–28	305	23	19–28
Unemployment 1993									
No registered unemployment 1993	3081	23	22–25	1793	24	22–26	1288	23	21–25
Unemployed 1–12 months in 1993	547	23	20–27	250	27	21–32	297	21	16–25
Medical variables									
Sickness absence days 1990–93[a]									
None	1345	19	17–21	730	19	16–22	615	19	16–22
1–20	536	20	17–23	299	20	15–25	237	21	16–26
21–50	522	22	18–26	306	21	16–26	216	23	17–29
51–100	526	26	22–30	305	27	22–32	221	24	18–30
101–250	569	33	29–37	335	36	31–41	234	28	22–34
≥250	130	38	30–46	68	40	28–52	62	36	24–48
Certifying doctor									
General practitioner	2566	24	22–26	1563	25	23–27	1003	23	21–26
Occupational health physician	127	24	16–31	52	25	13–37	75	23	13–32
Private specialist	180	21	15–27	127	17	11–24	53	28	16–40
Hospital doctor	649	23	19–26	263	25	20–30	386	21	17–25
Other or unknown	106	16	9–23	38	11	17–30	68	19	10–28
Prognosis assessed by certifying doctor									
A: needs only medical treatment	2313	18	16–19	1384	19	17–21	929	16	14–18
B: unclear at 8 weeks	573	39	35–43	275	43	37–49	298	36	31–42
C: needs comprehensive rehab.	204	48	41–54	107	44	34–53	97	52	42–61
Missing	538	21	17–24	277	22	17–27	261	19	14–24
Main diagnostic groups (Chapter ICPC)									
Musculoskeletal (L)	1978	23	21–25	1104	27	24–29	874	18	15–20
Mental (P)	517	28	24–32	314	25	20–30	203	31	25–37
Pregnancy related (W)	239	0	0–1	239	0	0–1			
Cardiovascular (K)	228	32	26–38	60	37	25–49	168	30	23–37
All other	666	28	24–31	326	29	24–34	340	26	21–31

a: Compensated by NIS, spells >14 days.
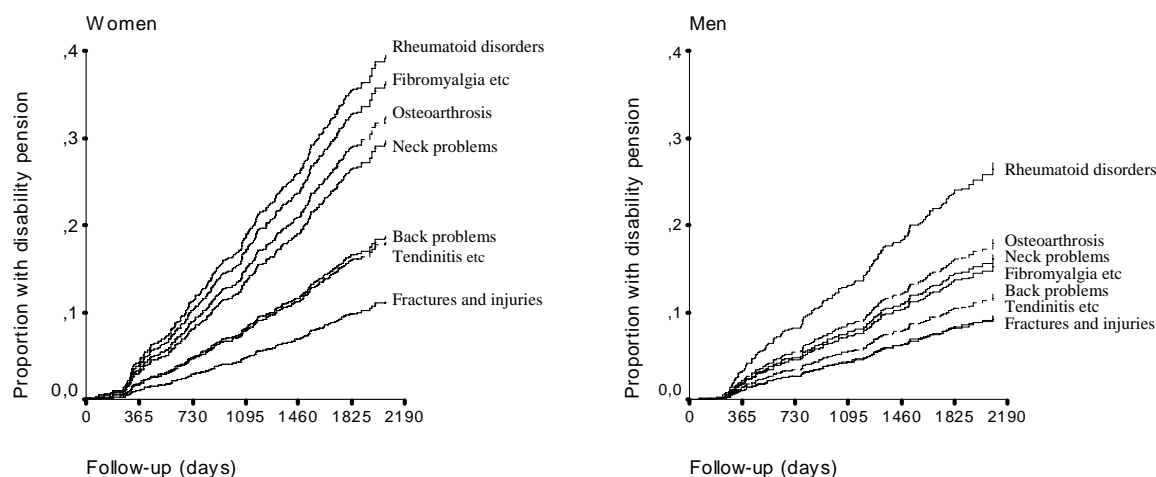
Figure 2 Proportion obtaining disability pension during follow-up, according to musculoskeletal subgroup, adjusted for age

More than half of the sample was unable to work because of a musculoskeletal disorder. Among these, women had a higher disability rate than men. Mental disorders accounted for 14% of the spells of sickness absence, and in this group men had higher disability rates than women. Of the 239 women on long-term sick leave for pregnancy-related problems, only one was granted a (partial) disability pension in the follow-up period. Cardiovascular diseases were more common among the men on sick leave (11% versus 3% among the women) but more women than men in this group were granted DP.

Multivariate analysis – all diagnoses
Cox's multivariate regression analysis including medical and socio-demographic explanatory variables was performed separate for each gender (*table 3*). A strong age-effect was evident for both genders and low income increased the disability risk. Unemployment in 1993 slightly increased the risk of DP among women, whereas no such effect was present for men.
Previous sickness absence (spells of 2 weeks or more) increased the rates of transition into DP, but only individuals with more than 100 compensated days (20 weeks) were at significantly increased risk.
For men, diagnosis of a mental disorder implied a significantly increased risk of DP compared to musculoskeletal disorders. For women, an elevated DP risk was present for those diagnosed with cardiovascular and 'other' (borderline significance). The

pregnancy-related cases had virtually no risk of future DP. The prognostic assessment by the attending physician had an independent and strong predictive role, especially for men.

The musculoskeletal subgroups
The 1,978 musculoskeletal cases were organized in seven subgroups according to ICPC diagnosis (*table 2*). As in previous studies, 'back problems' emerged as the largest subgroup, and in fact the most frequent diagnosis in the whole sample, 18% of the women and 21% of the men. The rate of transition to DP was slightly below the average for male back patients (17%) and close to average for women (21%). 'Tendinitis and other conditions' carried a favourable prognosis for both genders. This group (12% of the full sample) included conditions such as non-traumatic knee problems (e.g. L15, L97) and conditions often labelled as 'work-related upper limb disorders', e.g. L09, L92, L93.[29] 'Fractures and other injuries' (8% of the full sample) had the most favourable prognosis with respect to future DP status for both genders. In contrast, osteoarthrosis and rheumatoid disorders had significantly increased disability rates in both genders, when controlled by age.
Figure 2 shows the cumulative disability rates for the musculoskeletal subgroups, adjusted for age. Compared to back problems disability rates were low in both genders for 'fractures and other injuries' and for 'tendinitis and other conditions mainly affecting the extremities', whereas the prognoses for 'neck problems' and

Table 2 Musculoskeletal subgroups, according to ICPC diagnosis, and percentage obtaining disability pension during follow-up

Musculoskeletal subgroups	ICPC codes	All		Women		Men	
		N	DP %	N	DP (%)	N	DP (%)
Back problems	L02–L03, L84–L86	692	19	360	21	332	17
Neck problems	L01, L83	219	28	156	32	63	19
Fractures and other injuries	L72–L81, L96	306	14	117	20	189	11
Rheumatoid arthritis and related disorders	L88	77	44	49	45	28	43
Osteoarthrosis	L89–L91	70	56	33	64	37	49
Fibromyalgia and unspecified	L18–L20, L29, L99	174	32	148	32	26	27
Tendinitis and other disorders mainly affecting extremities	L04, L08–L17, L70–L71, L82, L87, L93, L95, L97	440	20	241	23	199	16
Sum		1978	23	1104	27	874	18

'fibromyalgia and unspecified' differed between women and men. 'Osteoarthrosis' and 'rheumatoid disorders' had elevated rates for DP in both genders after age adjustment.

The separate multivariate analysis for the musculoskeletal sub-groups (*table 4*) confirmed that cases with 'rheumatoid disorders' and 'osteoarthrosis' had increased disability rates for both genders, also after controlling for age, previous sickness absence, previous unemployment status and income. Among women, 'neck problems' and 'fibromyalgia and unspecified' also had significantly elevated disability risks compared to reference ('fractures and other injuries').

DISCUSSION

Main findings

The study confirmed that long-term sickness absentees have a high risk of future disability pension status: 23% of persons on sick leave for eight weeks were granted disability pension within five years. The study showed that in addition to socio-demo-graphic factors, medical information predicted subsequent transition to DP. This applied to diagnoses and prognoses assessed by the certifying doctor as well as previous sickness absence. The implications of the main diagnostic labels varied significantly between women and men.

Strengths and limitations of the study

This study is one of very few attempts to identify predictors of transition to permanent DP among long-term sickness absentees. The study was prospective and covered approximately 10% of long-term sickness absentees in Norway. All age groups were represented, except for those over 62 who were due to reach retirement pension during follow-up. It was possible to follow all subjects to end point or censoring by means of public registers (DP register and census data). Lastly, detailed medical informa-tion was available, in contrast to previous registry-based studies, where diagnostic information has been missing or limited to main groups.[30]

Table 3 Results of Cox regression analysis: relative risk (RR) of disability pension among women (n=2043) and men (n=1585) on long-term sick-leave according to socio-demographic and medical variables

	Women			Men		
		95% CI			95% CI	
	RR	Lower	Upper	RR	Lower	Upper
Age groups (years)						
16–39	1.00			1.00		
40–49	3.09	2.28	4.18	2.42	1.64	3.57
50–62	6.13	4.62	8.13	7.52	5.35	10.57
p for trend	<0.001			<0.001		
Income (NOK 1993)						
<100,000	2.57	1.43	4.64	1.59	1.03	2.45
100,000–149,999	1.78	1.00	3.19	1.46	0.93	2.31
150,000–199,999	2.11	1.19	3.76	1.92	1.39	2.64
200,000–249,999	1.27	0.68	2.37	1.40	1.00	1.95
≥250,000	1.00			1.00		
p for trend	<0.001			0.006		
Unemployment 1993						
No registered unemployment	1.00			1.00		
Unemployed 1–12 months	1.33	1.02	1.73	1.13	0.84	1.52
p for homogeneity	0.017			0.940		
Sickness absence days 1990–93						
No sickness absence	1.00			1.00		
1–20	1.12	0.81	1.56	1.20	0.83	1.73
21–50	1.07	0.78	1.46	1.07	0.74	1.53
51–100	1.16	0.85	1.57	1.25	0.88	1.77
101–250	1.60	1.23	2.09	1.49	1.06	2.08
>250	1.70	1.03	2.55	2.53	1.57	4.07
p for trend	<0.001			0.001		
Main diagnostic groups						
Musculoskeletal	1.00			1.00		
Mental	1.14	0.88	1.49	1.52	1.12	2.07
Cardiovascular	1.56	0.99	2.46	1.19	0.83	1.70
Pregnancy related	0.07	0.01	0.48	–	–	–
All other diagnoses	1.29	0.99	1.68	1.40	1.05	1.88
p for homogeneity	0.227			0.034		
Prognosis						
A: Needs medical treatment only	1.00			1.00		
B: Unclear	2.31	1.85	2.88	2.31	1.80	2.98
C: Needs comprehensive rehab.	2.32	1.69	3.19	4.30	3.08	6.00
p for homogeneity	<0.001			<0.001		

However, some important socio-demographic information was not available: Data on level of education, occupations, workplace factors, weekly working hours, number of children and household incomes would have made the analyses more complete. On the other hand, the effects of these variables have already been shown in previous studies from many countries.[7,12–14,22] The mechanisms explaining transition to DP among the youngest and oldest age groups probably differ, and separate analyses of the different age groups will be performed later. A longer inclusion period, preferably covering more than one calendar year, would have increased the generality of the study.

The role of medical predictors in long-term sickness absence
More than twenty years ago, DP was described as 'a yardstick of the population's health'.[3] Previous prospective studies based on health surveys in different population groups have identified medical predictors of DP such as psychosocial factors,[9] subjective health,[8,14] body mass index,[31] musculoskeletal,[32] and mental disorders[33] and abuse of drugs or alcohol.[34] The present study used routine medical information available from the NIS,

covering the past (previous sickness absence), the present (diagnosis of the index disease) and the future (prognostic assessments by the certifying doctor). All these variables had predictive implications for future DP.

Previous absence
Previous sickness absence may reflect an individual's health status over time and could be a proxy for long-standing health problems. Both total absence, and the length of previous periods of absence are regarded as predictors of long-term absence, and possibly also for disability pension.[20,21,35] It has been suggested that long-term sickness absence is largely caused by a small group of vulnerable individuals who after some years in the labour market receive a DP.[36] In the present study the effect of previous sickness absence was less than expected. In the multivariate analysis, only previous sickness absence of over 100 days (20 weeks) significantly increased the disability risk. Of the total sample 37% had no previous sickness absence, and among this group 19% obtained DP during follow-up. Thus, characteristics of the index disease may be of greater importance than previously assumed.

Table 4 Results of Cox'regression analysis: relative risk (RR) of disability pension among women (n=1104) and men (n=874) on sick leave with musculoskeletal diagnoses, according to medical and socio-demographic variables

| | Women | | | Men | | |
| | | 95% CI | | | 95% CI | |
	RR	Lower	Upper	RR	Lower	Upper
Musculoskeletal subgroups						
Fractures and injuries	1.00			1.00		
Tendinitis and similar	1.49	0.90	2.45	0.89	0.50	1.58
Back problems	1.54	0.95	2.49	1.17	0.69	1.96
Neck problems	2.80	1.68	4.64	1.63	0.79	3.36
Osteoarthrosis	3.56	2.13	5.98	1.77	0.74	4.23
Fibromyalgia and unspecified	3.48	1.92	6.34	2.38	1.23	4.60
Rheumatoid disease	3.47	1.90	6.33	3.06	1.47	6.35
p for homogeneity	0.000			0.000		
Sickness absence days 1990–93						
No sickness absence days	1.00			1.00		
1–20	1.12	0.77	1.62	1.17	0.69	1.99
21–50	0.81	0.54	1.20	1.21	0.72	2.03
51–100	0.98	0.67	1.43	1.59	0.97	2.59
101–250	1.57	1.13	2.19	1.65	1.04	2.64
≥250	1.78	1.04	3.03	1.64	0.75	3.55
P for trend	0.008			0.014		
Age groups (years)						
16–29	1.00			1.00		
30–39	3.30	1.52	7.15	3.76	1.08	13.02
40–49	7.97	3.83	16.57	9.14	2.79	29.95
50–62	16.72	8.12	34.44	30.14	9.41	96.58
p for trend	0.000			0.000		
Income groups (NOK1993)						
<100,000	1.00			1.00		
100,000–149,999	0.77	0.57	1.06	1.54	0.66	3.62
150,000–199,999	0.61	0.45	0.83	1.62	0.82	3.21
200,000–249,999	0.45	0.29	0.70	1.10	0.55	2.21
≥250,000	0.59	0.28	1.23	0.72	0.34	1.50
p for trend	0.000			0.021		
Unemployment 1993						
No registered unemployment	1.00			1.00		
Unemployment 1–12 months	1.24	0.86	1.79	0.81	0.50	1.32
p for homogeneity	0.246			0.405		

Diagnoses matters

In this study, gender-specific analysis showed that diagnosis of mental disorder implied a high disability risk for men. This agrees with previous research that has identified an elevated risk of marginalization among men on sick-leave because of mental disorder.[30,37–40] Among women, no significant differences were found among the main diagnostic groups (except for pregnancy related cases) when controlling for age, income and previous sick leave.

The musculoskeletal subgroups

The results of the present study clearly contradict the hypothesis of a generally increased disability risk with long-term sickness absence caused by musculoskeletal disorders.[20,21] However, musculoskeletal disorders (chapter L in ICPC) cover a wide range of conditions with different aetiologies and prognoses. One of the aims of this study was to disentangle the group certified sick with a musculoskeletal disorder. It was found that the prognostic implications of several musculoskeletal subgroups were different for men and women. Women on sick leave for 'neck problems' and 'fibromyalgia and unspecified' had a significantly increased disability risk compared to fractures and back disorders. 'Neck problems' and 'fibromyalgia and un-specified' were common among women and contributed to the overall higher disability risk for women with musculoskeletal problems. The poor understanding of these conditions,[41–43] and lack of effective treatment[44,45] may explain these findings.

Doctors' prognoses

In a quarter of the cases the doctors reported to the NIS that the problems were complex or that further investigations or interventions should be considered. Even after controlling for age, income and diagnosis the relative disability rates for these subjects were two to four times higher than for those considered to be in need of medical treatment only. This demonstrates that the doctor's prognostic assessment should be given considerable weight when selecting patients on sickness benefit for special rehabilitation measures. The high disability rates (48%) among cases where the doctors recommended multidisciplinary rehabilitation, may confirm widespread concern as to the effect of the vocational rehabilitation services.[46–48] In the present study only 73 women (3.6%) tried vocational rehabilitation during follow-up, of which 47% were granted DP. The situation for the men seemed somewhat more positive: 101 individuals tried vocational rehabilitation (6.4%), and of these 24% obtained a DP during follow-up.

Socio-demographic predictors

The present study confirmed previous findings from Norway of no overall gender difference in risk of transition from long-term sickness absence to DP.[22] A favourable long-term prognosis for women on sick leave for pregnancy-related conditions obviously contributed to this result. The uneven income distribution between the genders (*table 1*) is an important confounder. Controlling for income tends to remove the gender difference, and the disability risk may even be higher for men. A similar mechanism has been found previously with respect to the 'gender gap' in long-term sickness absence in Norway.[49] The non-linear protective income effect is probably caused by the large proportion of women working part-time. A generally compressed wage structure[50] may explain the modest income effects among the male sample.

The small effect of previous unemployment status may seem surprising. However, the unemployed/ job seekers were younger than the full sample. Receiving unemployment benefits only for a few months are common for persons entering the labour market, or between different jobs. If the analysis had been restricted to persons with long spells of unemployment the result might have been different.

Not surprisingly, the strongest predictor of transition from long-term sickness absence to DP is consistently found to be age. This might be caused by several factors: increasing somatic morbidity, a difficult labour market for the oldest age group and more lenient treatment of disability applications with increasing age. In a Dutch study based on survey data from more than 7000 long-term sickness absentees, their employers, doctors and social insurance personnel, it was found that age seemed to be a 'proxy' for labour market difficulties. Negative expectations of future work abilities increased progressively after age of 45 among all involved parties, regardless of the medical condition.[19]

Implications and further research

Research on the predictors of DP among long-term sickness absentees is at an early stage. Partly due to the lack of meaningful medical information, socio-demographic factors have often been the only variables of interest. If possible, further studies should be based on subdivision of the musculoskeletal disorders. With sufficient available data, a similar subdivision of 'mental health problems' might also be feasible, leading hopefully to a greater understanding of the adverse prognosis among men in this group. At present initiatives to promote an inclusive working culture at the workplaces have high priority in Norway together with individual interventions aimed at preventing unnecessary transitions from long-term sickness absence to permanent DP status.[36] The latter approach should be based on findings from this and other studies. Interventions should be targeted towards groups with high risk of permanent disability as assessed by medical and socio-demographic information.

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