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This study suggests that notification of an occupational disease increases the risk of work disability. Compensation systems should ensure that only workers with high odds of compensation are notified and physicians should consider the risk of exclusion from the job market before notifying a patient.

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Notification of occupational disease and the risk of work disability: a two-year follow-up study

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Objectives The aim of this study was to analyze if notification of an occupational disease increases the risk of work disability.

Methods We included 2304 patients examined at the Department of Occupational Medicine, Aarhus University Hospital, 1998–2005 and followed them for two years. A total of 564 patients were notified of an occupational disease when they were examined at baseline and 1740 patients were not. We obtained weekly information on sick payment, unemployment payment, disability pension, rehabilitation benefit, and other social benefits during the two years of follow-up from a national register. Using Cox regression models, we analyzed notification and adjusted hazard ratios (HR_{adj}) of work disability (defined as >12 weeks of social benefits during the first or second year of follow-up).

Results Prior to notification, notified patients had higher levels of clinical, occupational, and social characteristics that predict poorer vocational prognosis. Analyses that adjusted for these differences showed an increased risk of work disability following notification for patients who were working when notified at baseline (HR_{adj} 1.46, 95% CI 1.17–1.82). No effect was seen for patients who were not working.

Conclusions Notification of an occupational disease may, as an unintended side effect, increase the risk of work disability. A cautious interpretation is warranted because data analyses may not fully have accounted for the poorer vocational prognosis already present at baseline.

Key terms gainful employment; occupational health service; workers' compensation.

Workers who contract diseases caused by their work or working conditions have the right to compensation for disability, wage loss, and medical expenses according to most jurisdictions (1). Compensation systems vary between states and countries, but qualification for compensation usually requires that physicians make a notification or workers submit a claim to the compensation authorities. Processing of claims is often long-lasting, may require comprehensive documentation from workers, health and safety representatives, general practitioners, hospitals as well as expert testimony, and may have disabling consequences beyond the health condition that

prompted the claim (2). Poorer prognosis following workers' compensation claims has been reported for patients with head injury (3), chronic pain (4), low-back pain (5–14), neck pain (15), carpal tunnel syndrome (16), accidents (17), for a general working population (18), and following surgery for shoulder disorders (19–22) and lumbar spine diseases (23), when compared with patients not involved in a compensation claim. Affected outcomes have included patient satisfaction, function, quality of life, mental health, cognition, symptoms, return to work, and days away from work (17).

Studies of the health effects of worker's compensation

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notifications have to be interpreted with caution because of the inherited methodological weaknesses of observational studies, and a recent meta-review concluded that the evidence that compensation is associated with subsequent poorer health is equivocal (17). In addition to workers experiencing more strenuous working conditions, it is expected that disabled workers are more likely to be involved in a compensation claim than those less disabled or those with less strenuous working conditions, even if they are diagnosed with the same disorder (24, 25). This may confound associations between notification status and subsequent health and employment in line with *confounding by indication*. Confounding by indication occurs when a symptom or sign of disease is an indication of a given intervention and is therefore associated with both the intervention and a higher probability of the outcome (26). To avert confounding by indication, the patient groups compared must be strictly matched or analyses rigorously adjusted by health status as well as working conditions (27, 28).

In Denmark, all employees are covered by a worker's compensation insurance that covers occupational accidents and occupational diseases. The insurance is financed by the employers, administrated by a governmental board, the National Board of Industrial Injuries, and includes compensation for disability, wage loss, death, and medical expenses (29). These benefits are beyond medical treatment, sick leave compensation, disability pension, rehabilitation benefits, and unemployment payments that citizens may obtain regardless of any tort, culpa, cause, or reason. In general, diseases included in the Danish official list of occupational diseases are recognized if exposure intensity, duration, and timing is sufficient and no other factors are more likely to have caused the disease (30). During the past 20 years, several disorders defined by subjective complaints without well-defined objective criteria [such as chronic neck and shoulder pain (cervicobrachial syndrome) and persistent low-back pain] have become eligible for compensation. The Danish list also includes diseases with a low attributable fraction given exposure as hip osteoarthritis (the relative risk following many years of heavy lifting is <1.5) (30, 31). By law, all physicians and dentists are obliged to notify every patient with any suspected occupational disease to the compensation board.

Annually, about 18 000 compensation claims for occupational diseases are notified in Denmark, corresponding to 0.6% of all employed workers, and about 25% are recognized as a compensable condition (32). Compared with several other European countries, the number of notified workers is high, while the compensation proportion is low (33). Compensated workers received on average a total benefit of 30 000 euros in 2011.

Using a historical cohort of patients examined at a department of occupational medicine of a university

hospital, the aim of this study was to analyze whether notification of occupational disease, as an unintended side effect, increases the risk of work disability.

Methods

This was a follow-up study of patients examined for the first time at the Department of Occupational Medicine, Aarhus University Hospital, 1998–2005. Baseline was the day of examination when a patient was notified (or not notified) of an occupational disease, and the follow-up period was two years.

Patients

Candidates for the study were all 5394 patients examined following referral from the general practitioner, other medical specialists, labor union representatives, or workplaces. We excluded patients who (i) were not Danish residents (N=17), (ii) were <16 years or >59 years of age (N=367), (iii) received disability pension (N=112), (iv) only requested risk assessment related to their work during pregnancy (N=367), or (v) provided no information on work status (N=218). As the underlying timescale for the analysis was a year, we also excluded 6 patients who emigrated and 27 patients who died during the first year of follow-up. A total of 1977 patients had already been notified of an occupational disease prior to the examination, and 2304 patients remained for further analysis.

Clinical examination

The examination included medical, employment and exposure history, and a physical examination. If necessary the work place was visited for additional exposure information. One of twenty-one physicians undertook the examination; the majority were specialists in occupational medicine, or one of two psychologists in case of stress-related conditions.

At the time of the examination, the following were recorded as part of the routine registration: (i) the International Classification of Diseases (ICD-10) diagnosis made by the examining physician or psychologist, (ii) employment status (working, unemployed, sick-listed, or receiving social security benefits), (iii) occupation [5-level Danish version of the International Standard Classification of Occupations (ISCO), 2nd edition, 1968 (34)], (iv) occupational exposures [6-level Danish classification of occupational exposures, (35)], and (v) referring institution. During 2004–2005, 385 patients completed a Danish version of the short form 36 (SF-36) health survey questionnaire (36, 37) prior to the

consultation and were classified by measures of generic functional status: vitality, mental health, general health, physical function, and bodily pain, as well as the physical components summary (PCS) and the mental components summary (MCS).

Work disability

Sick payment, unemployment payment, disability pension, rehabilitation benefit, and other social benefits are accessible for all Danish citizens independently of the worker's compensation insurance. The Ministry of Employment keeps record of these payments for all citizens for every calendar year and calendar week. We obtained this information for all patients for the two years preceding notification (baseline) and the two years following notification (the follow-up period). We computed the number of weeks each patient received any payments during the last and the second last year before baseline and during the first and the second year of follow-up. We defined work disability as a year with >12 weeks of sick payment, unemployment payment, disability pension, rehabilitation benefit, or other social benefits (38). The Ministry of Employment provided no information on diagnosis for these payments, and we had no information on whether the patients were granted worker's compensation from the National Board of Industrial Injuries.

Statistical methods

We compared characteristics of notified and not notified patients at baseline by Chi square tests (proportions) and Wilcoxon rank sum test (medians). We estimated hazard ratios (HR) of work disability during follow-up by workers' notification status at baseline in Cox regression models. The underlying timescale for this analysis was a year since our definition of work disability required a full year of follow-up. Each patient was followed until he or she fulfilled the criteria of work disability during the first or the second year of follow-up. The 18 patients who died or emigrated during the second year of follow-up were censored at the end of the first year.

We adjusted for sex, age (continuous), calendar year (8 levels), work disability during the last year before baseline (yes/no), work disability during the second last year before baseline (yes/no), diagnosis (27 diagnoses or diagnostic groups), occupation (9 occupational groups), employment status at baseline (working, unemployed, sick-listed, or receiving social security benefits), exposure (7 levels), referring institution (general practitioner, labor union, or hospital department) and examining physician or psychologist (23 examiners). Covariates that affected the HR $\leq 10\%$ were deleted from the full model and this comprised the final model (39). We did separate analyses for patients who were working or not

working (unemployed, sick-listed, or receiving social security benefits) at baseline. We also did analyses that adjusted for the PCS and the MCS. In these analyses, we only included the 385 patients who completed the SF-36 questionnaire and furthermore collapsed the 9 occupational groups into 2 categories (blue- and white-collar worker), the 27 diagnostic groups into 4 major categories, and the 2 categories of unemployed and sick-listed into 1 variable for working status because of the limited number of patients. All analyses were conducted with SAS statistical software version 9.3 (SAS Institute, Inc, Cary, North Carolina).

Results

A total of 564 patients were notified of an occupational disease and 1740 were not. Table 1 shows that notified patients differed from those not notified by most characteristics at baseline. They were more often men, older, sick-listed, unemployed, receiving social security benefit, and diagnosed with irritant contact dermatitis, carpal tunnel syndrome, Raynaud's syndrome, dorsalgia, shoulder lesions, or other diseases of the musculoskeletal system and connective tissue. They were less often classified with an R (symptoms, signs and abnormal clinical and laboratory findings) or Z (factors influencing health status and contact with health services) ICD-10 diagnosis. Patients with an occupation as farm or gardening, industrial, construction, or blue-collar worker were more often notified of an occupational disease. This was also the case for patients referred by their labor union while there was no trend in notification rate by calendar year. Among the subset of patients who completed the SF-36 questionnaire, the notified patients reported poorer physical health, while there was no difference with respect to mental health between notified and not notified patients. The proportion that had experienced work disability during the last year before notification was higher for the notified (47.9%) than not notified patients (40.3%, $P=0.002$), but no difference was seen for the second last year before notification (27.3% versus 25.8%, $P=0.240$).

After two years of follow-up, 397 (70.4%) of the notified patients and 1038 (59.6%) of the non-notified patients experienced work disability (table 2). For this two-year period, the median duration off-work was 56 and 31 weeks for the notified and not notified patients, respectively. Work disability during the last year before notification was strongly associated with employment status at the time of notification, as expected, and the differences between the notified and the non-notified patients diminished when data were stratified by employment status.

Table 1. Baseline characteristics of 564 patients notified and 1740 patients not notified of occupational disease, Aarhus, Denmark, 1998–2005. [ICD=International Classification of Diseases]

	Notified (N=564)		Not notified (N=1740)		P-value
	N	%	N	%	
	Sex				
Women	228	40.4	985	56.6	
Men	336	59.6	755	44.4	
Age, median years	45		44		0.029
Calendar year, linear trend					0.213
1998	47	8.3	201	11.6	
1999	84	14.8	203	11.7	
2000	70	12.4	230	13.2	
2001	46	8.2	189	10.9	
2002	87	15.4	242	13.9	
2003	73	12.9	207	11.9	
2004	68	12.0	251	14.4	
2005	89	15.8	217	12.5	
Work disability prior to the time of notification					
During the last year	270	47.9	701	40.3	0.002
During the second last year	154	27.3	432	25.8	0.240
Employment status at the time of notification					0.002
Working	258	45.7	948	54.5	
Sick listed	210	37.2	571	32.8	
Unemployed	60	10.6	142	8.2	
Receiving social security benefits	36	6.4	79	4.5	
Diagnosis (ICD–10)					<0.001
Reaction to severe stress and adjustment disorders (F43)	32	5.7	99	5.7	
Other mental and behavioral disorders (F00–F99, except F43)	5	0.9	32	1.8	
Carpal tunnel syndrome (G56)	30	5.3	20	1.2	
Other diseases of the nervous system (G00–G99, except G56)	11	1.9	38	2.2	
Diseases of the eyes and adnexa (H00–H99)	11	1.9	31	1.8	
Raynaud's syndrome (I73)	26	4.6	14	0.8	
Other diseases of the circulatory system (I00–I99, except I73)	1	0.2	10	0.6	
Vasomotor and allergic rhinitis (J30)	8	1.4	14	0.8	
Asthma (J45)	15	2.7	45	2.6	
Other diseases of the respiratory system (J00–J99, except J30 and J45)	16	2.8	84	4.8	
Irritant contact dermatitis (L24)	44	7.8	28	1.6	
Other dermatitis (L30)	2	0.4	37	2.1	
Other diseases of the skin and subcutaneous tissue (L00–L99, except L24 and L30)	25	4.4	59	3.4	
Dorsalgia (M54)	81	14.4	121	7.0	
Other disorders of muscle (M62)	28	5.0	90	5.2	
Shoulder lesions (M75)	54	9.6	69	4.0	
Other enthesopathies (M77)	21	3.7	44	2.5	
Other soft tissue disorders not elsewhere classified (M79)	35	6.2	153	8.8	
Other diseases of the musculo-skeletal system and connective tissue (M00–M99, except M54, M62, M75, M77, M79)	63	11.2	112	6.4	
Symptoms, signs and abnormal clinical and laboratory findings (R00–R99)	1	0.2	52	3.0	
Occupational health examination not otherwise specified (Z04, Z10)	15	2.7	113	6.5	

Continued

Table 1. Continued

	Notified (N=564)		Not notified (N=1740)		P-value
	N	%	N	%	
	Problems related to employment and unemployment (Z56)	11	2.0	191	
Other factors influencing health status and contact with health services (Z00–Z99, except Z04, Z10, Z56 and Z57)	7	1.2	116	6.7	
Other diagnosis (A00–Z99)	15	2.7	49	2.8	
No diagnosis recorded	0	0.0	5	0.3	
Diagnosis characterized by objective findings (G56, I73, J45, L24, L30) ^a	117	20.7	144	8.3	<0.001
Occupation					<0.001
Farm and gardening worker	30	5.3	45	2.6	
Industrial worker	171	30.3	362	20.8	
Unskilled worker	41	7.3	140	8.1	
Transportation worker	40	7.1	106	6.1	
Construction worker	103	18.3	131	7.5	
Restaurant and other service worker	46	8.2	159	9.1	
Office workers and shop attendant	44	7.8	270	15.5	
Nurses and teacher	69	12.2	432	24.8	
No or unknown occupation	20	3.6	95	5.5	
Blue- versus white-collar worker					<0.001
White-collar worker	113	20.0	702	40.3	
Blue-collar worker	431	76.4	943	54.2	
No or unknown occupation	20	3.6	95	5.5	
Exposure					<0.001
Biological	13	2.3	17	1.0	
Chemical	76	13.5	359	20.6	
Ergonomic	287	50.9	453	26.0	
Physical	56	9.9	112	6.4	
Psychological	33	5.9	113	6.5	
Other	52	9.2	122	7.0	
No exposure	4	0.7	163	9.4	
Missing information	43	7.6	401	23.1	
Referring institution					<0.001
General practitioner	307	54.2	1070	61.5	
Labor union	202	35.8	478	27.5	
Hospital department	55	10.0	192	11.0	
Examination by					<0.001
Physician	523	92.7	1488	85.5	
Psychologist	41	7.3	252	14.5	
Self-assessed general health ^b					
Physical components summary (PCS), median score	36.1		40.0		0.008
Mental components summary (MCS), median score	40.5		42.4		0.719
Vitality, median score	30.0		35.0		0.126
Mental health, median score	56.0		58.0		0.875
General health, median score	47.0		55.0		0.005
Physical functioning, median score	75.0		80.0		0.036
Bodily pain, median score	32.0		41.0		0.011

^a Carpal tunnel syndrome, Raynaud's syndrome, asthma, irritant contact dermatitis, and other dermatitis.^b A total of 95 notified and 290 not notified patients completed the SF-36 self-assessment.

Table 2. Notification of occupational disease and hazard ratios (HR) of work disability during two years of follow-up by baseline working status at the time of notification, 2304 patients from Aarhus, Denmark, 1998–2007. [HR_{crude}=unadjusted HR; HR_{adj}=adjusted HR]

Baseline working status / notification status	All patients		Work disabled during the two years after notification								
	Work disabled during the last year before notification		Total		Model I		Model II ^a		Model III ^b		
	N	N	%	N	%	HR _{crude}	95% CI	HR _{adj}	95% CI	HR _{adj}	95% CI
All											
Not notified	1740	701	40.3	1038	59.7	1.00		1.00		1.00	
Notified	564	270	47.9	397	70.4	1.22	1.08–1.37	1.13	0.99–1.30	1.11	0.99–1.27
Not working											
Not notified	792	522	65.9	701	88.5	1.00		1.00		1.00	
Notified	306	211	69.0	273	89.2	1.01	0.88–1.16	0.99	0.85–1.17	0.99	0.85–1.15
Working											
Not notified	948	179	18.9	337	35.6	1.00		1.00		1.00	
Notified	258	59	22.9	124	48.1	1.41	1.15–1.75	1.45	1.12–1.83	1.46	1.17–1.82

^a Adjusted for sex (2 levels), age (continuous), calendar year (8 levels), diagnosis (27 levels), work disability during the last year (2 levels), work disability during the second last year (2 levels), sick-listed at the time of the examination (2 levels), unemployed at the time of the examination (2 levels), occupation (9 levels), referring institution (3 levels), exposure (7 levels), and identity of examining physician or psychologist (17 levels).

^b Adjusted for sex (2 levels), work disability during the last year (2 levels), work disability during the second last year (2 levels), work status at the time of the examination (2 levels), and exposure (7 levels).

The overall crude HR of work disability was 1.22 [95% confidence interval (95% CI) 1.08–1.37] (table 2). In the fully adjusted model, this estimate was reduced to 1.13 (95% CI 0.99–1.30). The final model, that included sex, employment status at baseline, work disability during the last and second last year prior to baseline, and occupational exposures, showed a HR of 1.11 (95% CI 0.99–1.27).

Analyses stratified by employment status at the time of notification revealed a crude HR of 1.41 (95% CI 1.15–1.75) and a finally adjusted HR of 1.46 (95% CI 1.17–1.82) among working patients (table 2). No effect of notification was seen for patients not working.

Among patients working at baseline, comparable effects of notification were seen across the major diagnostic entities as well as for diseases characterized by objective findings (table 3).

The HR of work disability adjusted for the PCS and MCS components was 2.07 (95% CI 1.17–3.66) among patients working at the time of notification, while no effect was seen for those not working, but this analysis included only 385 patients (table 4).

An additional analysis (data not shown) compared the prognosis of the 1977 patients who had been notified prior to the examination at the department of occupational medicine with the 1740 patients who had not been notified during the examination at the department. For patients working at the time of the examination (1032 notified versus 948 not notified patients), we observed an adjusted HR of work disability of 1.22 (95% CI 0.99–1.52). This HR was 0.98 (95% CI 0.86–1.10) for patients not working (945 notified versus 792 not notified patients).

Discussion

We observed an increased risk of work disability following notification of an occupational disease, but only among patients who were working when notified at baseline. No effect was seen for patients who were unemployed, sick-listed, or received social security benefits at baseline, but only about 10% of these patients were not work disabled and gainfully employed after two years of follow-up. The effect among patients who were working at baseline seemed to be independent of diagnosis and the presence of objective clinical findings. These overall results were in line with several previous reports of the effect of compensation claims and notifications on return to work or work status among patients with musculoskeletal system and connective tissue disorders (5–7, 9, 10, 12, 14). We are not aware of earlier studies, which have analyzed the effect of notification of respiratory, skin, or mental diseases.

At baseline, notified patients presented higher levels of clinical, occupational and social characteristics expected to predict poorer vocational prognosis (9, 14, 19, 21, 24). The key question is if we sufficiently accounted for these differences in the adjusted analyses of work disability. We were able to include more detailed information on occupation, occupational exposures, and prior work disability than done in most previous studies. The SF-36 questionnaire provided valid information on disease severity and functional status beyond diagnoses (37–40). But we only had access to this information for a subsample of patients. We had no information on lifestyle factors, expectations, personality trait, and education that may also have predicted work disability (8, 10). On the other hand, most patients referred to

Table 3. Notification of occupational disease and hazard ratio (HR) of work disability by four major diagnostic categories and a category of diagnoses characterized by objective findings among patients working at baseline at the time of notification, Aarhus, Denmark, 1998–2007. [HR_{crude}=unadjusted HR; HR_{adj}=adjusted HR.]

Baseline notification status	All patients			Work disabled during the two years after notification							
	Work disabled during the last year before notification			Total		Model I		Model II ^a		Model III ^b	
	N	N	%	N	%	HR _{crude}	95% CI	HR _{adj}	95% CI	HR _{adj}	95% CI
Mental and behavioral disorder (ICD-10, F00-F99)											
Not notified	35	17	48.6	15	42.9	1.00		1.00		1.00	
Notified	5	2	40.0	3	60.0	1.46	0.42–5.06	2.78	0.37–20.83	1.39	0.36–5.35
Diseases of the respiratory system (ICD-10, J00-J99)											
Not notified	102	22	21.6	32	31.4	1.00		1.00		1.00	
Notified	16	2	12.5	7	43.8	1.45	0.64–3.28	1.83	0.61–5.51	1.61	0.68–3.82
Diseases of the skin and subcutaneous tissue (ICD-10, L00-L99)											
Not notified	106	9	8.5	24	22.6	1.00		1.00		1.00	
Notified	53	11	20.8	20	37.7	1.75	0.96–3.16	2.09	0.80–5.48	1.84	0.92–3.69
Diseases of the musculoskeletal system and connective tissue (ICD-10, M00-M99)											
Not notified	279	67	24.0	121	42.7	1.00		1.00		1.00	
Notified	108	34	31.5	63	58.3	1.41	1.04–1.91	1.40	0.98–1.99	1.37	0.99–1.90
Diseases characterized by objective findings (ICD-10, G56, I73, J45, L24, L30)											
Not notified	104	14	13.5	26	25.0	1.00		1.00		1.00	
Notified	80	11	13.8	28	35.0	1.33	0.79–2.24	1.75	0.82–3.73	1.46	0.80–2.66

^a Adjusted for sex (2 levels), age (continuous), calendar year (8 levels), diagnosis (4 levels), work disability during the last year (2 levels), work disability during the second last year (2 levels), occupation (3 levels), referring institution (3 levels), exposure (7 levels), and identity of examining physician or psychologist (9 levels).

^b Adjusted for sex (2 levels), work disability during the last year (2 levels), and exposure (7 levels).

Table 4. Notification of occupational disease and hazard ratio (HR) of work disability by baseline working status at the time of notification. Results from a subset of 385 patients who reported general physical and mental health by completing the SF-36 questionnaire prior to notification, Aarhus, Denmark, 1998–2007. [HR_{crude}=unadjusted HR; HR_{adj}=adjusted HR.]

Baseline working status / notification status	All patients			Work disabled during the two years after notification							
	Work disabled during the last year before notification			Total		Model I		Model II ^a		Model III ^b	
	N	N	%	N	%	HR _{crude}	95% CI	HR _{adj}	95% CI	HR _{adj}	95% CI
All											
Not notified	290	140	48.3	189	65.2	1.00		1.00		1.00	
Notified	95	47	49.5	71	74.7	1.18	0.90–1.55	1.13	0.83–1.54	1.12	0.84–1.50
Not working											
Not notified	158	112	70.9	141	89.2	1.00		1.00		1.00	
Notified	59	41	69.5	52	88.1	0.99	0.72–1.36	0.97	0.68–1.38	0.97	0.70–1.36
Working											
Not notified	132	28	21.2	48	36.4	1.00		1.00		1.00	
Notified	36	6	16.7	19	52.8	1.60	0.94–2.73	2.63	1.30–5.31	2.07	1.17–3.66

^a Adjusted for sex (2 levels), age (continuous), calendar year (8 levels), diagnosis (4 levels), work disability during the last year (2 levels), work disability during the second last year (2 levels), work status (2 levels), occupation (3 levels), referring institution (3 levels), exposure (7 levels), identity of examining physician or psychologist (9 levels), physical component summary (pcs), and mental component summary (mcs).

^b Adjusted for sex (2 levels), diagnosis (4 levels), work disability during the last year (2 levels), physical component summary (PCS) and mental component summary (MCS).

this clinic of occupational medicine were blue-collar workers or middle-class; white-collar workers and few professionals or managers and factors related to social class were thus expected to be more homogenous than in the general population, and this should have reduced confounding. Introducing the potential confounders that we had access to into the statistical models only slightly affected HR and not always towards lower values. This does not indicate strong confounding effects. Residual confounding not captured in our adjusted models cannot, on the other hand, be ruled out in an observational study such as this. In particular, we were unable to adjust for physical and mental job demands, which obviously are linked to notification but are most likely also linked to the outcome. Most occupational disorders are chronic or recurrent and demanding job tasks and/or bad working conditions may, all things being equal, have impeded options for maintaining gainful employment.

All patients were included from the day it was decided to notify the workers' compensation board. From this day, follow-up was complete for notified and not notified patients during the subsequent two years except for the few patients who emigrated or died. This is expected to have increased the likelihood of detecting a true effect compared with previous studies that started follow-up on an arbitrary point in time after the notifications were made

Work disability was based on complete register data of unemployment payments, disability pension, sick pay, rehabilitation benefits, or other social benefits accessible for all Danish citizens. Thus differential reporting of outcome should not have biased results. Criteria for receiving these payments as well as notification for occupational disease may have changed during the study period and thus have effected results. We therefore adjusted all analyses for calendar year. Due to the prospective design, differential reporting of neither notifications nor potential confounders were an issue.

Even if the patients included in this study were a selected sample of persons notified to the workers' compensation board, the occupational composition is expected to have been comparable to all notified persons (32), and it may be reasonable to generalize results to this population and not only to those referred to a hospital department of occupational medicine.

The mechanisms responsible for the suggested unintended effect are probably complex. Californian workers' compensation data have shown that administrative delays increase the risk of chronic disability (40). A recent review concluded that the compensation process following occupational and traffic accidents slightly impair mental health when account is taken for mental health problems already present at baseline (41). The authors suggested that this effect may be attributed to secondary gain and secondary victimization. Others

have stressed the adverse effects of attorney involvement, but attorneys are rarely involved in compensation notifications in Denmark (42). One may speculate that health conditions defined only by subjective symptoms are more susceptible to such mechanism but we did not find support for this.

Workers' compensation notification signals that work may threaten workers' health and for that reason it is reasonable to anticipate that notified workers are cautious about continuing their present job. A physician or health and safety or labor union representative may also recommend them to quit the job. If colleagues have received compensation, this may further underpin the perception of the job as hazardous. And such experiences probably overrule epidemiologically based arguments about risk and prognosis.

The Danish list of occupational diseases includes health conditions with different levels of empirical evidence (30). The labor movement as well as socially indignant physicians have seen the inclusion of new diseases on the list of occupational diseases as a means to improve primary prevention as well as workers' social and working conditions (43). Our results suggest that the achievements may be bought at a price (44). In Denmark, three out of four notified patients are not compensated and end up with the suggested side effects only. The findings of this study underpin the need for actions that effectively reduce administrative delays in the compensation system and for changes of notification and acknowledgment procedures to ensure that only workers with high odds of compensation are notified. Furthermore, physicians and others in each individual case have to consider the risk of exclusion from the job market and thus the net gain for the patient before making a notification.

Our results are probably not only relevant for the Danish setting, but also other countries or states with comparable workers' compensation, social, and healthcare systems, such as other Scandinavian countries, but may not apply elsewhere (eg, when workers' compensation systems are the only access to healthcare or sick pay).

To conclude, this study suggests that notification of occupational disease, as an unintended side effect, increases the risk of work disability for patients who are working. A cautious interpretation is warranted because data analyses may not fully have accounted for the poorer vocational prognosis already present at baseline.

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