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To cite this article: Gunnar Tellnes, Dag Bruusgaard & Leiv Sandvik (1990) Occupational Factors in Sickness Certification, Scandinavian Journal of Primary Health Care, 8:1, 37-44, DOI: [10.3109/02813439008994927](https://doi.org/10.3109/02813439008994927)

To link to this article: <https://doi.org/10.3109/02813439008994927>



Published online: 12 Jul 2009.



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Occupational Factors in Sickness Certification

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Tellnes G, Bruusgaard D, Sandvik L. Occupational factors in sickness certification. Scand J Prim Health Care 1990; 8: 37-44.

Physical work load was assessed by doctors and patients to have contributed to the health problems leading to sickness certification in 48.4% of 1413 patients certified sick by 118 general practitioners in Buskerud county, Norway (1986). Correspondingly, psychological factors were considered contributory in 32.1%. The potential for prevention of health problems underlying sickness certificates was reported in 37.1%. As expected, the frequency of sickness certification in which physical work load and psychological factors were considered to have contributed varied with the patients' occupation, type of work, and health problem. Physical work load was assessed as contributory particularly in patients with musculoskeletal/connective tissue diseases whose work involved much walking and lifting (93.2%) or was physically strenuous (94.0%). Psychological factors were assessed as contributory in a high percentage of cases whose work was mostly sedentary. The findings indicate that the potentials for prevention as assessed by doctors and patients were highest when the health problems underlying sickness certification were associated with musculoskeletal/connective tissue diseases. The results indicate a potential for prevention and limitation of sickness certification which may be utilized by a better collaboration between community medicine and occupational health services.

Key words: sickness certification, epidemiology, occupational health, hygiene, general practice, community medicine, working environment.

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Sickness certification is a growing social and economic concern in most Western countries (1). Incapacity for work also creates organizational problems in industry, problems which may influence the working environment (2). Sickness certification has therefore become a subject of increasing interest to the scientific community, and has been studied from a number of different viewpoints, e.g. National Insurance, industry, and the doctor (3,4).

The decision to issue a sickness certificate is in general based on both the patient's health problems and the patient's working situation. While doctors are trained to diagnose diseases, their knowledge of the patients' working situations is most often indirect, obtained from the patients themselves. The extent to which the working environment in fact contributes to health problems that result in sickness certification has been little studied, though it would

seem to be of particular importance in reducing incapacity for work. It seemed relevant not only to estimate the contribution to sickness certification of physical work load and psychological factors at work, but also to investigate to what extent there is a potential for prevention of health problems which cause incapacity for work.

MATERIAL AND METHODS

Regulations

Sickness certification is a declaration given by a doctor to a person entitled to sickness benefits when that person is found to be incapacitated for work because of disease or illness. As a guiding principle, all employed persons in Norway are entitled to sickness benefits from the first day of sickness absence and up to one year. The first three days of sickness

Table I. Doctors' and patients' assessment of contributory causes of sickness certification and potentials for prevention of the underlying health problems. A study of 1413 sickness certificates in Buskerud county, Norway, 1986.

Questions	Doctor and patient in agreement answering Yes or No	Kappa coefficient	Doctor and/or patient answering Yes
	Percent		Percent
1. Has heavy physical work been a contributory cause to the health problem which resulted in sickness certification?	77.1	0.51	48.4
2. Have psychological problems or stress at work been a contributory cause to the health problem which resulted in sickness certification?	78.0	0.34	32.1
3. Is it possible to prevent the health problem causing this episode of sickness certification?	71.3	0.20	37.1

absence may be declared by self-certification. After one year, persons who are still incapable of work are entitled to rehabilitation benefit or disability pension. The regulations for sickness benefits in Norway have been described in more detail elsewhere (5,6).

Procedure

A study of sickness certification in April 1986 included 118 of the 122 general practitioners working in Buskerud county, Norway. The doctors were asked to fill in a questionnaire whenever they issued a sickness certificate, whether initial, continuation, or return-to-work. These terms have been defined previously (4). Doctors out of practice during the study-week (21–27 April 1986) were allowed to collect data during another week in the same spring. The questions (Table I) were filled in on the basis of the doctors' clinical assessment and knowledge of the patients' health problems, occupation, and working environment.

The patients certified sick received a questionnaire from the doctor when the consultation was finished, and they were asked to fill it in after leaving the office, and mail it to the authors. The forms filled in by the doctors and the patients, respectively, were linked by an identification number, making it possible to combine the answers (Table I).

Variables

Sociodemography. Information on sex, age, civil status, occupation, problems/worries at home or in the family, and problems/worries during leisure time, was given on the questionnaire by the patients. The occupational classification comes from the Nordic Standard for Classification of Occupations (7).

Diagnoses were registered in the questionnaire by the general practitioners and coded according to the International Classification of Health Problems in Primary Care (ICHPPC-1) (8), which is compatible with the International Classification of Diseases (ICD-8).

Type of work. This was assessed and registered by the doctors. Degree of physical work-load was classified according to a scale used by the Central Bureau of Statistics of Norway (Table II) (9).

Measurements

Working environment. Doctors and patients were asked to assess whether physical work load (heavy manual labour) or psychological factors (problems or stress) at work had contributed to the health problem which resulted in sickness certification (Table I). If either doctor or patient or both answered "yes", the working environment was considered as a "contributory cause".

Potential for prevention. The doctors and patients

Table II. Physical work load and psychological factors assessed as contributory causes of sickness certification and potentials for prevention according to the patients' sociodemographic status. The Chi-square test was used to test differences between frequencies*. Buskerud county, Norway, 1986.

Sociodemographic status	No. of patients certified sick	Assessed as contributory cause, percentage of patients		Assessed as potentially preventable, percentage of patients
		Physical work load	Psycho-logical factors	
Total	1413	48.4	32.1	37.1
Sex:				
Female	710	46.3	34.7	36.1
Male	703	50.5	29.6	38.2
P-value		NS	NS	NS
Age (years):				
16-19	30	43.3	20.0	60.0
20-29	300	43.3	29.3	35.3
30-39	315	47.0	35.6	40.0
40-49	304	47.4	31.3	41.1
50-59	248	51.2	34.3	33.9
60-69	216	56.5	31.5	30.1
P-value		<0.001	NS	<0.001
Civil status:				
Married/living as married	997	49.6	30.7	35.7
Unmarried	236	42.0	30.9	41.1
Divorced/separated	116	53.5	50.0	40.5
Widow/widower	51	45.1	29.4	37.3
Unknown	13	46.2	15.4	38.5
P-value		NS	<0.001	NS
Type of work:				
Mostly sedentary work	279	23.7	43.4	40.2
Work requiring much walking and standing	552	39.7	31.3	29.4
Work requiring much walking and lifting	462	68.4	27.7	45.9
Physically strenuous work	98	77.6	26.5	34.7
Unknown	22	31.8	27.3	18.2
P-value		<0.001	<0.001	<0.001

*NS = Non significant

were also asked to assess the "potential for preventing the health problem that had led to the actual episode of sickness certification" (Table I). This assessment should, in addition to factors at work, cover factors outside work as well. If either doctor or patient or both answered "yes" to the question, the health problem was registered as potentially preventable.

Agreement between doctor and patient. The kappa coefficient was used to adjust for random agreement between doctor and patient (10). Doctors' and patients' assessments were in agreement in a higher proportion of those reported to have physical work

load as a contributory cause to sickness certification than for those having psychological factors (Table I). The lowest agreement was found when doctors and patients assessed the potentials for prevention of health problems resulting in sickness certification.

Representativeness

The distribution of sex, age, and branch of industry of employed persons in Buskerud, and the number of residents per general practitioner, is roughly similar to that of Norway as a whole (5, 11). With respect to these variables, the external validity was found to be sufficient for the present study.

Table III. Physical work load and psychological factors assessed as contributory causes of sickness certification and potentials for prevention according to occupation. Frequencies presented are not adjusted for age, but those marked with a * were significantly different from the others when adjusted for age by the Mantel Haenszel test. Buskerud county, Norway, 1986.

Occupation	Code number ^a	No. of patients certified sick	Assessed as contributory cause, percentage of patients		Assessed as potentially preventable, percentage of patients
			Physical work load	Psycho-logical factors	
Engineers	00,01	36	13.9*	50.0*	33.3
Nurses, health workers	04	90	56.7*	37.8	45.6
Teachers, lectures, etc.	06	62	19.4*	35.5	33.9
Clerical workers	29	68	19.1*	44.1	44.1
Sales workers	30,31,32,33	94	41.5	38.3	38.3
Farmers, forest owners	40,41,44	52	82.7*	19.2*	30.8
Road transport work	64	45	60.0*	33.3	28.9
Postal and telecommunication work	67,68	38	34.2	21.1	26.3
Iron and metal ware work	73,74,75	99	50.5	28.3	38.4
Wood work	77	75	61.3*	20.0*	42.7
Graphic work	80	125	48.8	24.8	36.0
Machine, dock and warehouse work	87,88	44	63.6*	38.6	45.5
Domestic work, doorman work	91	76	59.2*	30.3	26.3
Building, caretaking, cleaning	93	99	66.7*	31.3	34.3
Others	—	410	45.1	33.2	38.1
Total		1413	48.4	32.1	37.1

^aNordic Standard for Classification of Occupations (7).

Statistics

The Statistical Analysis System was used to analyse the data (12). To test differences between frequencies (Table II), the Chi-square test was used. The Mantel-Haenszel test was used when comparing frequencies adjusted for age (Tables III, IV, and V) (13). A significance level of 5% was chosen.

RESULTS

The 118 general practitioners filled in 2052 "doctor-questionnaires" covering all sickness certificates issued by them during the study-week. The related "patient-questionnaire" was completed by 1413 patients (68.9%). The patients who did not fill in the questionnaires (31.1%) were comparable with those who did with respect to sex, age, and diagnoses.

Among the 1413 patients included, 41.7% received initial certificates and 58.3% continuation certificates. Only 8.3% were reported partially incapable of work.

Physical work load

Physical work load was assessed as a contributory cause of sickness certification in nearly half the patients (Table II). The proportion was similar in females and males, and increased significantly with age. Significant differences were found also with respect to type of work. Work requiring much walking and lifting, and physically strenuous work, were most frequently assessed as causes of health problems resulting in sickness certification.

The assessment of physical work load as a contributory cause of sickness certification varied dramatically with occupation (Table III). Particularly high frequencies were found in farmers and building/caretaking/cleaning workers. This assessment was made less frequently by engineers, teachers, and clerical workers.

The assessment of physical work load as a contributory cause of sickness certification was greatly influenced by the nature of the underlying health problem (Table IV). In this respect, musculoskele-

Table IV. Physical work load and psychological factors assessed as contributory causes of sickness certification and potentials for prevention according to underlying health problems (diagnostic group). Frequencies presented are not adjusted for age, but those with $n > 35$ marked with a * were significantly different from the others when adjusted for age by the Mantel-Haenszel test. Buskerud county, Norway, 1986.

Diagnostic group	(ICD)	No. of patients certified sick	Assessed as contributory cause, percentage of patients		Assessed as potentially preventable, percentage of patients
			Physical work load	Psycho-logical factors	
Infective & parasitic diseases	I	26	3.9	3.9	11.5
Neoplasms	II	20	35.0	20.0	20.0
Endocrine, nutritional & metabolic	III	14	35.7	35.7	35.7
Blood diseases	IV	4	50.0	50.0	50.0
Mental disorders	V	132	23.5*	75.8*	39.4
Nervous system, sense organ diseases	VI	29	27.6	27.6	10.3
Circulatory system diseases	VII	54	40.7	29.6	25.9
Respiratory system diseases	VIII	203	13.8*	16.3*	26.1*
Digestive system diseases	IX	43	25.6*	55.8*	34.9
Genitourinary tract diseases	X	30	30.0	23.3	13.3
Pregnancy, childbirth, puerperium	XI	29	48.3	13.8	10.3
Skin, subcutaneous tissue diseases	XII	18	27.8	22.2	50.0
Musculoskeletal, connective tissue diseases	XIII	608	78.3*	33.9	47.4*
Symptoms, signs, ill-defined cond.	XVI	48	27.1	50.0	27.1
Injuries & adverse effects	XVII	135	31.1*	7.4*	38.5
Unknown		20	50.0	30.0	20.0
Total		1413	48.4	32.1	37.1

tal/connective tissue diseases were most important, and infective diseases and respiratory system diseases least important.

Tabel V shows the differences in assessment of physical work load as a contributory cause of sickness certification according to type of work in pa-

Table V. Physical work load and psychological factors assessed as contributory causes of sickness certification, and potentials for prevention according to type of work in patients with musculoskeletal/connective tissue diseases. Frequencies presented are not adjusted for age, but those marked with a * were significantly different from the others when adjusted for age by the Mantel-Haenszel test. Buskerud county, Norway, 1986.

Type of work	No. of patients certified sick	Patients with musculoskeletal/ connective tissue diseases		Assessed as potentially preventable, percentage of patients
		Assessed as contributory cause, percentage of patients		
		Physical work load	Psycho-logical factors	
Mostly sedentary work	87	50.6*	50.6*	59.8
Work requiring much walking and standing	211	70.1	33.7	38.9
Work requiring much walking and lifting	249	93.2*	28.9	55.8
Physically strenuous work	50	94.0	34.0	28.0*
Unknown	11	45.5	18.2	9.1
Total	608	78.3	33.9	47.4

tients with musculoskeletal/connective tissue diseases. The frequency was significantly increased (statistically) after adjusting for age for those having work requiring much walking and lifting or physically strenuous work, when combined ($n=299$).

Psychological factors

Psychological factors were assessed as contributory causes of sickness certification in one third of the cases (Table II). Differences in proportions between sexes and between age groups were not significant. However, the contribution of psychological factors to sickness certification was significantly associated with civil status, most frequently in divorced/separated patients. With respect to type of work, psychological factors were assessed to have contributed to sickness certification most frequently in patients with mainly sedentary work (Table II).

As to occupation, the highest proportions were found for engineers, even after adjusting for age (Table III). Particularly low percentages were found in farmers and wood workers.

Described by diagnostic group, the differences were large, and psychological factors were assessed to be of particular importance in patients certified sick due to mental disorders and digestive system diseases (Table IV). The lowest percentages were reported for injuries and respiratory system diseases.

Table V shows that psychological factors were assessed as a contributory cause of sickness certification in half the patients with musculoskeletal/connective tissue diseases and mainly sedentary work.

Problems or worries at home or in the family were reported as contributory factors resulting in sickness certification by 11.9% of the patients, and problems/worries during leisure time by 6.5%. The association between such problems outside work and psychological factors at work were statistically significant ($p<0.001$). However, an association was not found for those of the patients who were responsible for children younger than 18 years old or for any chronically sick/handicapped within the family.

Potential for prevention

Health problems resulting in sickness certification were assessed as potentially preventable in more than one third of the cases (Table II). The assessment was similar for males and females, and it was significantly increased in patients 16–19 and 30–49 years of age. With respect to type of work, potentials

for prevention were assessed to be highest in situations involving on the one hand work requiring much walking and lifting, and on the other hand mostly sedentary work. As to occupation, differences in potentials for prevention were not significant (Table III).

Described by diagnostic groups, however, differences were significant, and the potential for prevention was highest in patients certified sick due to musculoskeletal/connective tissue diseases (Table IV).

DISCUSSION

The doctor-patient encounter is the setting where decisions on sickness certification have to be taken. The doctors' decisions are frequently influenced by the patients' opinions. These facts indicate the relevance of using both doctors' and patients' assessments as supplementary sources when measuring the association between working environment and sickness certification. The fact that 81% of all sickness certificates are issued by GPs (14) underlines the relevance of studying this subject in primary health care.

Because of differences in background, it is natural that doctors and patients sometimes have different understandings of both health problems and working environment. It is also natural that the difference is least when assessing physical work load, because such problems have usually been the issue when discussing working environment (Table I), and the kappa coefficient verifies this postulation.

The combined assessments by doctors and patients were judged to be relevant supplementary sources when measuring the potential for prevention. Planning of the prophylaxis of sickness certification was judged to be best, not only when it is based on information from both doctors and patients, but when it includes factors outside work in addition to factors at work.

Physical work load

Physical work load was assessed as a contributory cause of sickness certification in a particularly high proportion of patients whose work required much walking and lifting, or strenuous physical work. This is in agreement with a previous study of physical work load and sickness absence in southern Norway where number of days absent from work was positively correlated with the degree of physical work

load (15). Similar findings were reported in a study of sickness absence in persons working in nursing homes (2). Our findings show that this agreement was extremely high (93.2%) in patients with musculoskeletal/connective tissue diseases whose work required much walking and lifting, thus underlining the importance of improving the working environment for this group of persons.

Farmers were frequently assessed to have physical work load as a contributory cause of sickness certification. Farmers in Norway receive sickness benefits for the two first weeks of sickness certification only when they take out supplementary insurance (5). Because few farmers (5%) take out such an insurance, a majority of them probably do not contact a doctor to be certified sick for illnesses expected to last less than two weeks, e.g. respiratory system diseases. Differences in sickness benefit rights may explain, at least partly, differences observed between farmers and other manual workers.

Psychological factors

Psychological factors at work were frequently assessed to have contributed to sickness certification among engineers. It is probable that many engineers work in projects with contract deadlines that give psychological problems and stress, leading in turn to sickness certification. This interpretation would be in agreement with a study which showed a significant association between high intensity in the work situation and sickness absence due to mental disorders (16).

Psychological factors at work were frequently assessed as having contributed to sickness certification not only in persons certified sick due to mental disorders, but also in those with digestive system diseases (Table IV). These findings illustrate that psychological factors at work may be contributory causes of somatic diseases, resulting in sickness certification.

The significant association between psychological factors at work and civil status (Table II), and the similar association with problems/worries at home or in the family and during leisure time, suggests that psychological stress at work may partly have its roots in factors outside work, or vice versa. This underlines the importance of close co-operation between primary health care and occupational health to improve medical care and prevention.

Potentials for prevention

Doctors and patients reported that more than one third of the health problems causing sickness certification were potentially preventable. This is a surprisingly high proportion. The potential for prevention was assessed to be highest when the diagnosis underlying sickness certification was musculoskeletal/connective tissue diseases. In support of this, musculoskeletal/connective tissue diseases are also dominant with respect to the socioeconomic costs of sickness certification, accounting for 36% of the total number of days lost (11). These findings indicate the importance of giving priority to preventing these diseases.

The prevention of musculoskeletal/connective tissue diseases may be based on several models applicable at work as well as outside work (17,18). Examples of such prophylactic models are selection of the "right" worker, education in ergonomic principles, and introduction of changes in the working environment. Our study showed that physical work load was a contributory cause of sickness certification in patients with musculoskeletal/connective tissue diseases whose work required much walking and lifting. This finding indicates the importance of emphasizing prevention related to ergonomic principles.

The selection of measures to be included in a preventive programme, however, is outside the scope of this paper. The results of the present study point to problem areas where preventive programmes may be implemented with optimal cost-effectiveness. In view of the complexity of the problems involved, the success of such programmes would probably depend on the closest possible co-operation between occupational health services, community-oriented primary care, and patients certified sick.

ACKNOWLEDGEMENTS

The authors are much indebted to Professor Tor Bjerkedal, Professor Tor Norseth, and Professor Chr. F. Borchgrevink for comments on the manuscript. We thank the general practitioners and their patients in Buskerud county for registration of data. The study was supported by the Ministry of Health and Social Affairs, the National Insurance Administration, the Association of Norwegian Insurance Companies, and the Norwegian Employers' Confederation.

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Received November 1989

Accepted January 1990