ORIGINAL ARTICLE

Work factors as predictors of sickness absence: a three month prospective study of nurses' aides

W Eriksen, D Bruusgaard, S Knardahl

Occup Environ Med 2003;**60**:271–278

See end of article for authors' affiliations

Correspondence to: Dr W Eriksen, Department of General Practice and Community Medicine, University of Oslo, PO Box 1130 Blindern, 0318 Oslo, Norway; w.b.eriksen@samfunnsmed.uio.no

Accepted 10 July 2002

Aims: To identify the work factors that predict sickness absence in nurses' aides.
Methods: The sample comprised 5563 Norwegian nurses' aides, not on leave because of illness or pregnancy when they completed a mailed questionnaire in 1999. Of these, 4931 (88.6%) completed a second questionnaire three months later. The outcome measure was the three month incidence proportion of certified sickness absence (>3 days), as assessed by self reports at follow up.
Results: Perceived lack of encouraging and supportive culture in the work unit (odds ratio (OR) 1.73; 95% confidence interval (CI) 1.28 to 2.34), working in psychiatric and paediatric wards, having injured the neck in an accident, and health complaints were associated with higher risk of sickness absence, after adjustments for a series of physical, psychological, and organisational work factors, personal engagement in the work unit, demographic characteristics, and daily consumption of cigarettes. Having untraditional jobs (for nurses' aides) (OR 0.53; 95% CI 0.36 to 0.77), and engaging in aerobics or gym were associated with a lower risk of sickness absence.
Conclusions: The study suggests that the three month effects of work factors on rates of certified sickness absence are modest in nurses' aides. The most important work factor, in terms of predicting sickness absence, seems to be perceived lack of encouraging and supportive culture in the work unit.

Sickness absence represents a major problem in Western societies.[1] The nurses' aides, the main providers of practical patient care in the health service, are one of the occupational groups that exhibit the highest absence rates.[2]

The reasons for sickness absence are complex.[1 3] The causes of an illness may be numerous, and an ill person's ability to work and decision to be absent from work are determined not only by the severity of the health problem, but by a series of social, psychological, and physical factors. It seems likely that working conditions may contribute to illness, and, in case of illness, influence the perception of work ability and the decision to be absent from work.[1 3 4]

Nurses' aides have to cope with a series of physical and psychological demands at work, including mechanical exposures and frequent social encounters.[5] The impact of these challenges on rates of sickness absence remains to a large extent unclear. The relation between work factors and the occurrence of sickness absence has been investigated in many studies.[6–42] However, the results from studies of civil servants,[6–11] municipal employees,[12–15] industrial workers,[3 16–20] firemen,[21] transit operators,[22] post employees,[23] and mixed working populations[24–28] may not be representative for healthcare workers such as nurses' aides.

Main messages

- The three month effects of work factors on rates of certified sickness absence are modest in nurses' aides.
- The most important work factor, in terms of predicting certified sick leaves in nurses' aides, seems to be perceived lack of encouraging and supportive culture in the work unit.

Policy implications

- It is essential that leaders in the health services put more emphasis on creating an encouraging and supportive culture in their work units.

In nursing personnel [29–38] or mixed hospital employees,[39–42] a series of work factors, such as type of care unit,[29 30] patient/nurse ratio,[29] working schedule,[29] physical work load,[2 40] psychological job stress,[39] job strain,[38] and social support at work,[38] have been reported to be associated with rates of sickness absence. However, in many of these studies, the results may have been confounded by socioeconomic and cultural differences between nurses' aides and other groups of healthcare workers, such as registered nurses. In several studies, only a few work factors were explored at a time; as work factors may be correlated, the identified associations may in fact be due to the effects of unmeasured work factors. The effects of positive challenges in the job, rewards, organisational culture of the work unit, quality of the leadership, exposure to role conflicts at work, and exposure to threats and violence at work have hardly been investigated. It is also unclear how interactions between work factors, such as the moderating effects on job demands of control at work, mastery of work, and rewards,[4 43 44] influence the rates of sickness absence.

The objective of the present study was to identify the work factors that predict sickness absence in nurses' aides. We wanted to explore the impact of a wide spectrum of physical, psychological, and organisational work factors. The main focus was on the work factors' main effects. In addition, we wanted to investigate the potential interactions between job demands and mastery of work, rewards, and control at work.

METHODS

Design

The study had a prospective design.

Subjects

The nursing personnel in Norway include two large occupational groups: the registered nurses (graduate nurses), with three years training after high school; and the certified nurses' aides, with either a one year course after junior high school or a course that is part of a high school programme. In addition

Occup Environ Med: first published as 10.1136/oem.60.4.271 on 1 April 2003. Downloaded from http://oem.bmj.com/ on January 21, 2022 by guest. Protected by copyright.

to these two large groups, a smaller group of unlicensed assistive nursing personnel have no formal training and often hold temporary jobs.

The Norwegian Union of Health and Social Workers organises the great majority of the certified nurses' aides in Norway. During the last week of October 1999, a random sample of the nurses' aides organised in this union were mailed a questionnaire. After one reminder, 7478 of 12 000 (62.3%) consented to participate in the study and completed the questionnaire. The sample of the present study comprised the 5563 responders who were working more than 18 hours per week (that is, more than half-time job), and who were not on leave because of illness or pregnancy at baseline. Of these 5563 nurses' aides, 4931 (88.6%) completed and returned a second questionnaire three months later.

Dependent variable

At the three month follow up, the nurses' aides were asked whether they had been absent from work because of illness for more than three days in a row during the previous three months. In Norway, certification from a physician is needed when the absence lasts longer than three days.

The outcome measure was the proportion of subjects who had been absent from work for more than three successive days one or several times during the three month observation period, hereafter also referred to as the "three month incidence proportion" of sickness absence.

Independent variables

At baseline, demographic and familial characteristics, work related factors, health complaints, and behavioural characteristics were registered.

The type of ward in which the subjects were working was registered by asking "What is your main workplace?". There was a checklist with 12 optional answers.

Exposure to heavy physical work was measured with three questions exploring the frequency of moving patients manually in the bed, frequency of lifting or supporting patients manually between bed and chair, and frequency of lifting, carrying, or pushing heavy objects, such as heavy furniture and equipment. The first two questions were translations of questions developed and validated by British scientists.[45] The subjects were also asked to what extent their job required physical endurance.

Psychological, social, and organisational work factors were measured using questions in the General Nordic Questionnaire for Psychological and Social Factors at Work, "QPSNordic".[46] In the present study, the multi-item factors were expressed as quintiles of the mean of the item scores.

Unspecific sleep complaints were measured with a question in the Basic Nordic Sleep Questionnaire.[47] Affective symptoms were measured with five questions in the Symptom Check List (SCL); a sum of these five questions correlated in a former study at $r = 0.92$ with the global SCL-25 score.[48] Musculoskeletal pain was recorded with questions about the intensity of pain in 10 regions of the body. The intensity of musculoskeletal pain was defined as the intensity in the most painful part of the body. There was a question about fatigue and a question about long term health problems of any kind. Regular physical leisure activities and daily consumption of cigarettes were also recorded.

Ethics

The research protocol was approved by the appropriate ethics committee. Informed written consent was given by the responders.

Statistical analyses

Statistical analyses were conducted with the Statistical Package for Social Sciences (SPSS) version 6.1. The χ^2 test, Fisher's exact test, and logistic regression analysis were used.

Table 1 The responders' demographic characteristics at baseline, by the incidence proportion of sickness absence during the successive three months

Characteristics at baseline	n	Sickness absence, n (row %)
Total sample	4876†	1527 (31.3)
Age		
<30	342	111 (32.5)
30–39	918	289 (31.5)
40–49	2010	578 (28.8)
50–59	1404	483 (34.4)
>59	201	66 (32.8)
Gender		
Female	4684	1460 (31.2)
Male	191	67 (35.1)
Civil status		
Married or cohabiting	3899	1202 (30.8)
Single	971	325 (33.5)

†4931 subjects had filled in the questionnaire, but there was missing information on sickness absence in 55 subjects.

The logistic regression model was built in a traditional way, seeking the most parsimonious model that still explains the data, as recommended by Hosmer and Lemeshow.[49] The rationale for minimising the number of variables in the model is that the resultant model is more likely to be numerically stable, and is more easily generalised.[49]

The variables that were considered scientifically relevant for the logistic regression models were the work related factors, age, gender, familial characteristics (civil status, number of preschool children, special tasks of caring nature in leisure time, such as caring for old relatives), physical leisure time activities, daily consumption of cigarettes, former neck injury, and baseline health complaints. Albeit less specific, and representing another level than the other work factors, the variables that described the type of ward were considered as potential candidates for the model together with the other work factors, because they reflected aspects of work that were not fully reflected in the other variables.

Age, gender, and all scientifically relevant variables that were related to the dependent variable with a p value below 0.05 in univariate analyses were included in an automatic forward stepwise logistic regression analysis. The criteria for inclusion and exclusion during the automatic analytical process were $p = 0.05$ and $p = 0.10$, respectively, for the overall variables in likelihood ratio tests. When the univariate analyses yield many candidates for the model, as they did in this study, an automatic stepwise procedure may be appropriate.[49] In preliminary analyses, the four interaction terms "job demands × mastery of work", "job demands × rewards for good work", "job demands × control over work pace", and "job demands × control over decisions at work" were also entered as covariates, one at a time. Associations between the overall variables (scales) and the outcome measure were considered statistically significant when p values were lower than 0.05.

RESULTS

Dropouts

The subjects who responded to both questionnaires (hereafter referred to as responders) were older, were more often female, and were less bothered by affective symptoms and musculoskeletal pain at baseline than those who responded only to the first questionnaire (data not shown). The responders also reported less role conflicts at work, less suspicious culture in the work unit, less harassment at work, more fairness in the immediate superior's leadership, and more engagement in the work unit than the dropouts.

Occup Environ Med: first published as 10.1136/oem.60.4.271 on 1 April 2003. Downloaded from http://oem.bmj.com/ on January 21, 2022 by guest. Protected by copyright.

Table 2 The responders' main workplace at baseline, by the incidence proportion of sickness absence during the successive three months

Main workplace	n	Sickness absence, n (row %)
Somatic department (adults)	646	185 (28.6)
Psychiatric department (adults)	357	135 (37.8)**
Paediatric department	82	35 (42.7)*
Nursing home	2064	646 (31.3)
Old people's home, or unit of apartments for old people	462	143 (31.0)
Community nurse	773	252 (32.6)
Institution or dwelling unit for mentally handicapped	507	164 (32.3)
Polyclinic, child care, or institution for drug abusers	83	26 (31.3)
Other	221	49 (22.2)**

*p<0.05; **p<0.01; p values in χ^2 tests or Fisher's exact tests; subjects working in one type of workplace were compared with subjects not working in this type of workplace.
The workplace categories are not mutually exclusive; some subjects reported more than one workplace.

Background factors and sickness absence: univariate analyses

Table 1 presents the responders' demographic characteristics, by the three month incidence proportion of sickness absence. The great majority were middle aged, married or cohabiting women.

Sickness absence was more common in respondents who reported health complaints at baseline, more common in the 709 subjects who had ever changed work or work tasks because of pain, and more common in smokers (data not shown). Responders who engaged in aerobics or gym were less likely to be absent from work.

Work factors and sickness absence: univariate analyses

Sickness absence was more common in subjects who were working in paediatric and psychiatric wards, and less common in those who were working in places not specifically mentioned in the check list—that is, in "other workplaces" (table 2). A series of specific work factors, physical as well as psychological and organisational, were associated with the incidence proportion of sickness absence in univariate analyses (table 3). The following work factors were not associated with the incidence proportion of sickness absence in univariate analyses: number of work hours per week, frequency of night shifts, level of positive challenges, frequency of moving patients in the bed, and frequency of lifting or supporting patients between bed and chair (data not shown).

A total of 359 (7.3%) reported at follow up that they had changed work or work tasks during the three month observation period. There was no association between changes of work or work tasks during the observation period and the incidence proportion of sickness absence (data not shown).

Sickness absence was more common in subjects with low personal engagement in the work unit (data not shown). The number of years the respondents had been working as a nurses' aide and the level of perceived mastery of work were not associated with the incidence proportion of sickness absence.

Predictors of sickness absence: multivariate analyses

In a forward stepwise logistic regression analysis (table 4), perceived lack of encouraging and supportive culture in the work unit (odds ratio (OR) 1.73; 95% confidence interval (CI) 1.28 to 2.34), perceived unsuspicious culture in the work unit, working in psychiatric and paediatric wards, having injured the neck in an accident, having changed work or work tasks because of pain, musculoskeletal pain, and fatigue were associated with higher risk of sickness absence. Having jobs that are not common among nurses' aides (OR 0.53; 95% CI 0.36 to 0.77), and engaging in aerobics or gym were associated with lower risk of sickness absence. Preliminary analyses showed no interaction between quantitative job demands and mastery of work, rewards for good work, control over work pace, or control over decisions at work.

DISCUSSION

In this prospective study of Norwegian nurses' aides, perceived lack of encouraging and supportive culture in the work unit, perceived unsuspicious culture in the work unit, working in psychiatric and paediatric wards, having injured the neck in an accident, and health complaints were associated with a higher risk, whereas having untraditional jobs and engaging in aerobics or gym were associated with a lower risk of certified sickness absence.

Methodological considerations

The response rate in the first data collection was moderate (62%). However, the true response rate in vocationally active subjects was probably higher. The list of members of the Norwegian Association of Health and Social Workers also includes retired persons, and contacts by telephone during the data collection gave the impression that many non-working subjects were not motivated for participating in the study. The cohort that was established in 1999 was most likely representative for vocationally active nurses' aides in Norway. Even so, people may have chosen not to participate in the study for reasons other than retirement or not currently working in the field. Some may have been off sick and therefore did not respond, and those who did respond may have had more to say about the factors that contribute to sickness absence, such as low support at work. Hence, selection bias in the first sample may have influenced the results.

The number of dropouts between the first and the second data collection was low (11%), but there were some differences between the responders and the dropouts, which may have influenced the results. It is not likely, though, that selection bias due to withdrawal between the two data collections explains the main findings in this study.

A healthy worker selection[50] due to the fact that unhealthy persons may have avoided specific high exposure jobs or changed to lower exposure jobs, may have resulted in an underestimation of associations between work factors and sickness absence. However, the prospective design combined with adjustments for baseline health complaints and prior changes of work or work tasks because of pain probably reduced the impact of this effect.

The outcome measure, sickness absence of more than three successive days during the previous three months, was based on self reports. Patients in Norway have to contact a physician for sickness certification when the absence lasts longer than three days, and most people will recall such a consultation during the previous three months. Several studies have shown high agreement between self reported sickness absence and information from official registers.[51–53] The choice of measure of sickness absence may influence the spectrum of predictors that are found in studies like the present one[6]; it is generally accepted that short spells of sick leave, particularly uncertified ones, are more frequently related to subjective factors than are

Occup Environ Med: first published as 10.1136/oem.60.4.271 on 1 April 2003. Downloaded from http://oem.bmj.com/ on January 21, 2022 by guest. Protected by copyright.

Table 3 Physical, psychological, and organisational work factors at baseline, by the incidence proportion of sickness absence during the successive three months

Work characteristics at baseline	n	Sickness absence, n (row %)
Quantitative work demand		
1 (lowest quintile)	1137	318 (28.0)
2	581	175 (30.1)
3	1197	371 (31.0)
4	1134	366 (32.3)
5	815	292 (35.8)**
Frequency of lifting, carrying, or pushing heavy objects†		
0	1288	411 (31.9)
1–4	2529	772 (30.5)
5–9	509	155 (30.5)
10 or more	231	92 (39.8)*
The extent to which the work required physical endurance		
Never or very seldom	288	90 (31.3)
Rather seldom	432	122 (28.2)
Sometimes	1193	342 (28.7)
Rather often	1527	487 (31.9)
Very often or always	1367	464 (33.9)*
Personal control over decisions at work		
1 (lowest quintile)	679	249 (36.7)
2	1469	467 (31.8)
3	747	228 (30.5)
4	640	195 (30.5)
5	1316	381 (29.0)*
Personal control over work pace		
1 (lowest quintile)	727	260 (35.8)
2	1331	415 (31.2)
3	799	243 (30.4)
4	1250	387 (31.0)
5	751	216 (28.8)*
Fairness of the immediate superior's leadership		
1 (lowest quintile)	1080	399 (36.9)
2	502	171 (34.1)
3	1479	407 (27.5)
4	540	150 (27.8)
5	1255	396 (31.6)***
Support from the immediate superior		
1 (lowest quintile)	833	300 (36.0)
2	1280	414 (32.3)
3	683	207 (30.3)
4	960	258 (26.9)
5	1101	343 (31.2)**
Rewards for good work		
Not at all/very little	2004	697 (34.8)
Rather little	849	256 (30.2)
Some	1139	329 (28.9)
Rather much	651	180 (27.6)
Very much	154	41 (26.6)**
Encouraging and supportive culture in the work unit		
Not at all/very little	71	40 (56.3)
Rather little	281	124 (44.1)
To some extent	1131	356 (31.5)
Rather much	1987	601 (30.2)
Very much	1285	361 (28.1)***
Suspicious culture in the work unit		
Not at all/very little	2511	764 (30.4)
Rather little	1310	383 (29.2)
To some extent	587	212 (36.1)
Rather much	116	44 (37.9)
Very much	43	17 (39.5)**
Relaxing and pleasant culture in the work unit		
Not at all/very little	158	66 (41.8)
Rather little	378	146 (38.6)
To some extent	1196	390 (32.6)
Rather much	1967	569 (28.9)
Very much	943	278 (29.5)***
Level of role conflicts at work		
1 (lowest quintile)	774	217 (28.0)
2	1149	317 (27.6)
3	776	245 (31.6)
4	1394	447 (32.1)
5	753	293 (38.9)***
Threats or violence at work (previous 2 years)		
Never or very seldom	2981	882 (29.6)
Rather seldom	624	195 (31.3)
Sometimes	816	286 (35.0)
Rather often	342	117 (34.2)
Very often	96	40 (41.7)**
Harassment at work (previous 6 months)		
No	4646	1432 (30.8)
Yes	209	87 (41.6)**

*p<0.05; **p<0.01; ***p<0.001; p values for the overall variables (scales). †Times per average shift.

Occup Environ Med: first published as 10.1136/oem.60.4.271 on 1 April 2003. Downloaded from http://oem.bmj.com/ on January 21, 2022 by guest. Protected by copyright.

Table 4 Baseline characteristics that predicted sickness absence during the successive three months

Characteristics at baseline	OR (95% CI)	p value†
Working in a psychiatric ward		0.014
No	1.00	
Yes	1.39 (1.07 to 1.81)	
Working in a paediatric ward		0.043
No	1.00	
Yes	1.73 (1.03 to 2.91)	
Working in places that are not common to work in among nurses' aides		0.001
No	1.00	
Yes	0.53 (0.36 to 0.77)	
Encouraging and supportive culture in the work unit		0.002
Not at all, very little or rather little	1.73 (1.28 to 2.34)	
To some extent	0.99 (0.80 to 1.24)	
Rather much	1.07 (0.89 to 1.28)	
Very much	1.00	
Suspicious culture in the work unit		0.017
Not at all/very little	1.00	
Rather little	0.80 (0.68 to 0.95)	
To some extent	1.06 (0.84 to 1.33)	
Rather much or very much	0.71 (0.47 to 1.07)	
Had (ever) changed work or work tasks because of pain		0.009
No	1.00	
Yes	1.30 (1.07 to 1.59)	
Had (ever) injured the neck in an accident		0.001
No	1.00	
Yes	1.62 (1.25 to 2.09)	
Intensity of musculoskeletal pain		0.000
No pain	1.00	
A little	1.41 (1.07 to 1.86)	
Rather intense	1.82 (1.36 to 2.43)	
Intense	2.43 (1.77 to 3.35)	
Fatigue		0.001
Always fit	1.00	
Usually fit	1.03 (0.67 to 1.59)	
Varied between fit and fatigued	1.20 (0.78 to 1.85)	
Usually or always fatigued	1.73 (1.09 to 2.75)	
Long term health problems (any kind)		0.001
No problem	1.00	
Yes, but not bothered	1.34 (1.02 to 1.74)	
Yes, somewhat bothered	1.35 (1.12 to 1.62)	
Yes, a lot bothered	1.59 (1.19 to 2.13)	
Regular physical exercise in the leisure time (previous 3 months)		0.003
No regular exercise	1.00	
Slow walks‡	1.12 (0.90 to 1.38)	
Brisk walks‡‡	0.90 (0.73 to 1.10)	
Aerobics or gym‡‡	0.57 (0.40 to 0.82)	
Other activities or combinations	1.05 (0.87 to 1.27)	

The final equation in a forward stepwise logistic regression analysis, with likelihood ratio test used as the criterion for determining variables to be removed from the model. n=3938.
OR, odds ratio; 95% CI, 95% confidence interval.
†p values from likelihood ratio test if term (overall variable) removed.
‡as the only activity.
‡‡as the only activity or in combination with slow walks.
The overall rate of correct classification of the dependent variable (predicted outcome compared with the observed outcome) was estimated as 70.3%.
The factors not retained in the final equation were age, gender, the level of affective symptoms, sleep complaints, presence of widespread pain, daily consumption of cigarettes, amount of quantitative job demands, frequency of handling heavy objects at work, the extent to which the work required physical endurance, control over decisions at work, control over work pace, level of role conflicts at work, pleasant and relaxing organisational culture, rewards for good work, fairness in the immediate superior's leadership, support from the immediate superior, threats and violence at work, harassment at work, and personal engagement in the work unit.

longer spells.[1] Sickness absence may be affected by events that occur at the macro as well as local levels. However, we are not aware of any industrial dispute, pay negotation, freeze on recruitment, or downsizing taking place during the observation period.

The observation period was short: only three months. A short observation period has the advantage of giving less recall bias (more reliable measure of sickness absence), fewer changes in the work situation during the observation period, and less dropouts (reduced loss of participants in connection with removals). However, there are seasonal variations in sickness absence, often with a peak during the winter due to respiratory problems. As the observation period in the present study comprised three winter months, respiratory complaints may have become more predominant as a cause of absence than if the respondents had been observed during a whole year.

The validity and reliability of self reported work factors have been explored and discussed by several authors.[4 6 9] Some authors have found high correlations[4] and others have found

Occup Environ Med: first published as 10.1136/oem.60.4.271 on 1 April 2003. Downloaded from http://oem.bmj.com/ on January 21, 2022 by guest. Protected by copyright.

fair or modest correlations[6 9] between "objective" and self reported information on the psychosocial work environment. Few psychological aspects of the work situation may, however, be measured objectively. Intermethod surveys indicate that self reports have acceptable validity for gross activities in the job.[45 54 55] The questions in the present study that were used to assess the frequency of patient handling were found to have good validity in a British study.[45] The instruments that were used to measure psychosocial and organisational work factors were scales taken from the QPSNordic.[46] These scales have been found to have good construct and predictive validity as well as good internal consistency and test-retest reliability.[46]

Workers with health problems are probably more likely than other persons to perceive aspects of their work as strenuous or problematic.[55] This problem was taken into account by adjusting for the severity of common health complaints at the time the work factors were registered.

When many comparisons are conducted, the nominal p values for each variable may be misleading, because the risk of type I error cumulates with each statistical test performed.[56 57] There is, however, no fully satisfactory way of correcting p values in studies like the present one, with a large number of variables, and with many variables that are intercorrelated.[56 57] The disadvantage of the available correcting methods is that they are "conservative", erring on the side of safety. It is also important to acknowledge that implementation of multiple comparison procedures also has a philosophical component,[57] involving a researcher's position on the balance between statistical power and control over type I error. We found it appropriate not to reduce the statistical power by including conservative correcting procedures.

Work factors as predictors of sickness absence

Few have investigated how the organisational culture—that is, the behavioural and attitudinal characteristics of the people in the organisation,[58] is related to sickness absence. In the present study, perceived lack of encouraging and supportive culture in the work unit was the most important work factor, in terms of predicting sickness absence. In addition, sickness absence was lower in cultures that were perceived as suspicious. The associations showed threshold effects; step by step dose-response relations were not observed. The association between perceived suspicious organisational culture and low rates of sickness absence may be due to varying levels of social control in different workplaces, but the association was weak and should be interpreted with caution.

Low social support at work, albeit not as a characteristic of the organisational culture, has been found to predict sickness absence in civil servants,[6 8] municipal employees,[14] industrial employees,[17] and transit operators.[22] In a cross sectional study, Unden found an association between less "supportive atmosphere" at work and absenteeism in Swedish civil servants.[10] Studies showing lacking or positive associations between the level of social support at work and sickness absence are difficult to find. Social support refers to the resources provided for the individual by significant others, such as empathy, love, and caring (emotional support), technical and practical aid (instrumental support), advice and information (informational support), and feedback.[59] In earlier studies, sickness absence was predicted by low support from superiors[8 14 22] as well as coworkers,[8 14 17] but whether these effects stem from low emotional support, instrumental support, informational support, or feedback is difficult to say, as composite measures were used. In the present study, perceived support from the immediate superior (emotional and informational support) was not associated with the incidence of sickness absence. One explanation of the association between low social support at work and sickness absence may be that social support alters work demands, and, hence, reduces the risk of contracting health problems or makes it easier to keep on working despite health problems. Studies have shown that low social support is associated with higher psychiatric and cardiovascular morbidity.[7 60]

There are sparse data on how the type of care unit influences rates of sickness absence in nursing personnel. Borbounnais *et al* found increased absence rates for nurses in psychiatric wards, surgical wards, and short term care units.[29 30] In the present study, the responders who did not have the type of jobs that are common among nurses' aides, but who reported working in "other" workplaces, had a lower incidence of sickness absence. There was more sickness absence in paediatric and psychiatric wards. The subjects who did not have the type of jobs that are common among nurses' aides are probably a mixed group of employees with little or no contact with patients or social clientele at work, and the low absence rates in this group may suggest that frequent patient encounters are demanding. In psychiatric wards, the nursing personnel are daily exposed to patients' despair, anger, and anxiety. At the same time, many nurses' aides feel that they are incompetent in psychological issues.[5] This could be one reason why psychiatric nursing was a predictor of sickness absence both in an earlier study and in the present one. The finding of a high incidence of sickness absence in paediatric wards needs further confirmation, but could perhaps be due to the fact that children are often admitted to hospitals because of airway infections, resulting in infections in nursing personnel.[61]

Work schedules with evening and nights shifts have earlier been found to be associated with higher absence rates in nursing personnel.[29] Kleiven *et al* found no association between night shift work and sickness absence in employees in a Norwegian chemical plant, and after a review of 11 studies of various occupations, they concluded that there was no consistent association between shift work and sickness absence.[20] In the present study, the frequency of night shifts did not predict sickness absence.

Considering the large number of studies showing associations between heavy physical work and health problems in nursing personnel,[37] the lack of association between physical work factors and sickness absence was surprising. Healthy worker selection may have contributed to this.

At work, nurses' aides are exposed not only to heavy physical work tasks, but also to a large number of events, circumstances, and conditions that require acting or responding—that is, "job demands". In the present study, there was no association between the amount of quantitative job demands and sickness absence. There was also no difference in absence rates between nurses' aides working 19–36 hours per week and those who were working more than 36 hours. In a case-control study of 1165 pairs of hospital nurses in Quebec, Canada, a high number of patients per nurse was associated with sick leave in team leaders and assistant head nurses, but not in ordinary nurses.[29] In the same study, higher absence rates were seen in nurses with permanent full time jobs than in nurses with part time jobs or not permanent full time jobs.[29] Clarke and Hussey found no clear difference in absence rates between full time and part time nurses.[33] In prospective studies of occupations outside the health service, negative[6] as well as positive[14] and lacking[17] associations have been found between the amount of quantitative job demands and absence rates.

Control at work, which refers to the workers' objective or perceived freedom or possibility to exercise control, regulate, direct, and make decisions about their work, has been inversely associated with the occurrence of sickness absence in several prospective studies.[6 14 17] In other prospective studies,[16 18 22] as in the present one, there was no such association. Some studies suggest that the combination of high demands and low control at work ("job strain") produces adverse health effects or sickness absence,[4 6 38] while in other studies, this "job strain hypothesis" was not confirmed.[12 22] In

Occup Environ Med: first published as 10.1136/oem.60.4.271 on 1 April 2003. Downloaded from http://oem.bmj.com/ on January 21, 2022 by guest. Protected by copyright.

a study of 1793 Canadian nurses, Bourbonnais and Mondor found a modest association between job strain and uncertified short term absence, but no association with certified absence.[38] We found no interaction between the amount of quantitative job demands and the level of control at work, but did not use the questions that define job discretion, which are central in Karasek's job strain hypothesis.[62]

Mastery of work is the individual's perception that his or her responses produce a desirable outcome. Studies indicate that neuroendocrine activity is normalised and that disease is less likely to develop in an individual who perceives that his or her responses to challenge bring about a desirable outcome.[43] However, in the present study, there was no association between mastery of work and the occurrence of sickness absence, nor any interaction between mastery of work and the amount of job demands.

"The effort-reward imbalance model" maintains that high levels of efforts combined with low perceived rewards will produce adverse health effects.[44] In the present study, there was no association between reporting rewards for good work and the occurrence of sickness absence, and no interaction between the level of rewards and the amount of job demands. There was also no association between positive challenges at work and rates of sickness absence.

The exposure to specific work stressors, such as role conflicts, harrassment, threats and violence, and unfair leadership, were not related to the occurrence of sickness absence. Role conflicts at work have been shown to predict certified sickness absence in industrial workers.[18] "Job context stress", including role conflicts and role ambiguity, predicted sickness absence in hospital workers.[39] In cross sectional studies, harrassment at work was associated with sickness absence in hospital employees[41] and post employees.[23] Destructive leadership has been found to be associated with health complaints among the subordinates.[63]

Other predictors of sickness absence

Common health problems, including fatigue, musculoskeletal pain, and long term health problems of any kind, were predictors of sickness absence. Surprisingly, affective symptoms did not predict sickness absence. Low mood predicted low back pain absence in nurses,[36] while Estryn-Behar *et al* found no association between affective symptoms and all-cause absence in female hospital workers.[40] The relation between sleep complaints and sickness absence has been investigated in several studies, with inconsistent results.[26 64 65] In the present study, sleep complaints did not predict sickness absence.

There was no association between age and sickness absence. One explanation may be the high frequency of disability pensioning among nurses' aides[66]; nurses' aides who remain vocationally active despite higher age is a selected group. Several others have found lacking association between age and sickness absence in nursing personnel[2 29 36] and female hospital workers.[40]

There was no difference in absence rates between the sexes. Hensing *et al* found that men in extremely female dominated occupations had the highest rates of psychiatric sickness absence of all men, and suggested that this might be caused by the low integration of sexes at the workplace.[27]

Having injured the neck in an accident was a predictor of sickness absence. Neck injuries may be followed by chronic pain and dysfunction.[67]

In contrast to several other studies,[68 69] there was no association between smoking and sickness absence.

The relation between physical leisure time activity and all-cause sickness absence has been investigated in observational studies with prospective[13 70] and cross sectional design.[69 71] In several of these studies, associations were found between low activity and sickness absence,[70 71] but cross sectional designs and lack of adjustments for the severity of baseline health in the prospective study make it difficult to say whether these associations are due to effects of exercise or to the fact that unhealthy individuals may be less inclined to participate in physical activities. In the present study, subjects who engaged in aerobics or gym at least once a week were less often absent from work.

Confounding

The results may have been influenced by background factors for which we were not able to control. Among the potential confounders are personality factors, such as hostility and locus of control,[11 15 39] and lifestyle factors other than smoking and exercise, such as alcohol consumption.[72] Internal factors, such as hostility, poor self esteem, or unrealistic expectations about work and colleagues, could influence the reporting of the culture in the work unit as well as the decisions to be absent from work.

Conclusions

The study suggests that the three month effects of work factors on rates of certified sickness absence in nurses' aides are modest. The most important work factor, in terms of predicting sick leave, seems to be perceived lack of encouraging and supportive culture in the work unit. The effects of quantitative job demands in the present study were weak or lacking, both as main effect and in interaction with low levels of mastery, rewards, and control.

ACKNOWLEDGEMENTS

This study was supported by the Norwegian Research Council, EXTRA funds from the Norwegian Foundation for Health and Rehabilitation fund, the Norwegian Ministry of Health and Social Affairs, Rhône-Poulenc Rorer Ltd, Peter Møller AS, and Dr Trygve Gythfeldt Research Fund.

Authors' affiliations
W Eriksen, D Bruusgaard, Department of General Practice and Community Medicine, University of Oslo, Oslo, Norway
S Knardahl, National Institute of Occupational Health, Oslo, Norway, and Institute of Psychology, University of Oslo, Oslo, Norway

REFERENCES

1 **Luz J**, Green MS. Sickness absenteeism from work—a critical review of the literature. *Public Health Reviews* 1997;**25**:89–122.
2 **Fuortes LJ**, Shi Y, Zhang M, *et al*. Epidemiology of back injury in university hospital nurses from review of workers' compensation records and a case-control survey. *J Occup Med* 1994;**36**:1022–6.
3 **Kristensen TS**. Sickness absence and work strain among Danish slaughterhose workers: an analysis of absence from work regarded as coping behaviour. *Soc Sci Med* 1991;**32**:15–27.
4 **Karasek R**, Theorell T. Healthy work. *Stress, productivity, and the reconstruction of working life*. New York: Basic Books; 1990:80.
5 **Leppänen RA**, Olkinuora MA. Psychological stress experienced by health care personnel. *Scand J Work Environ Health* 1987;**13**:1–8.
6 **North FM**, Syme SL, Feeney A, *et al*. Psychosocial work environment and sickness absence among British civil servants: The Whitehall II study. *Am J Public Health* 1996;**86**:332–40.
7 **Stansfeld SA**, Fuhrer R, Head J, *et al*. Work and psychiatric disorder in the Whitehall II Study. *J Psychosom Res* 1997;**43**:73–81.
8 **Stansfeld SA**, Rael EGS, Head J, *et al*. Social support and psychiatric sickness absence: a prospective study of British civil servant. *Psychol Med* 1997;**27**:35–49.
9 **Spector PE**, Jex SM. Relations of job characteristics from multiple data sources with employee affect, absence, turnover intentions, and health. *J Appl Psychol* 1991;**76**:46–53.
10 **Unden AL**. Social support at work. *Homeostasis* 1994;**35**:63–70.
11 **Parkes KR**. Locus of control as moderator: an explanation for additive versus interactive findings in the demand-discretion model of work stress? *Br J Psychol* 1991;**82**:291–312.
12 **Vahtera J**, Pentti J, Uutela A. The effect of objective job demands on registered sickness absence spells; do personal, social and job-related resources act as moderators? *Work & Stress* 1996;**10**:286–308.
13 **Kivimäki M**, Vahtera J, Thomson L, *et al*. Psychosocial factors predicting employee sickness absence during economic decline. *J Applied Psychol* 1997;**82**:858–72.
14 **Vahtera J**, Kivimäki M, Pentti J, *et al*. Effect of change in the psychosocial work environment on sickness absence: a seven year follow up of initially healthy employees. *J Epidemiol Community Health* 2000;**54**:484–93.

Occup Environ Med: first published as 10.1136/oem.60.4.271 on 1 April 2003. Downloaded from http://oem.bmj.com/ on January 21, 2022 by guest. Protected by copyright.

15 **Vahtera J**, Kivimäki M, Uutela A, *et al*. Hostility and ill health: role of psychosocial resources in two contexts of working life. *J Psychosom Res* 2000;**48**:89–98.
16 **Wickstrom GJ**, Pentti J. Occupational factors affecting sick leave attributed to low-back pain. *Scand J Work Environ Health* 1998;**24**:145–52.
17 **Niedhammer I**, Bugel I, Goldberg M, *et al*. Psychosocial factors at work and sickness absence in the Gazel cohort: a prospective study. *Occup Environ Med* 1998;**55**:735–41.
18 **Heaney CA**, Clemans J. Occupational stress, physician-excused absences, and absences not excused by a physician. *Am J Health Promotion* 1995;**10**:117–24.
19 **Häkkänen M**, Viikari-Juntura E, Martikainen R. Job experience, work load, and risk of musculoskeletal disorders. *Occup Environ Med* 2001;**58**:129–35.
20 **Kleiven M**, Bøggild H, Jeppesen HJ. Shift work and sick leave. *Scand J Work Environ Health* 1998;**24**(suppl 3):128–33.
21 **Nuwayhid IA**, Stewart W, Johnson JV. Work activities and the onset of first-time low back pain among New York City fire fighters. *Am J Epidemiol* 1993;**137**:539–48.
22 **Krause N**, Ragland DR, Fisher JM, *et al*. Psychosocial job factors, physical workload, and incidence of work-related spinal injury: a 5-year prospective study of urban transit operators. *Spine* 1998;**23**:2507–16.
23 **Voss M**, Floderus B, Diderichsen F. Physical, psychosocial, and organizational factors relative to sickness absence: a study based on Sweden Post. *Occup Environ Med* 2001;**58**:178–84.
24 **Theorell T**, Harms-Ringdahl K, Ahlberg-Hultén, *et al*. Psychosocial job factors and symptoms from the locomotor system—a multicausal analysis. *Scand J Rehab Med* 1991;**23**:165–73.
25 **Tellnes G**, Bruusgaard D, Sandvik L. Occupational factors in sickness certification. *Scand J Prim Health Care* 1990;**8**:37–44.
26 **Leigh JP**. Employee and job attributes as predictors of absenteeism in a national sample of workers: the importance of health and dangerous working conditions. *Soc Sci Med* 1991;**33**:127–37.
27 **Hensing G**, Alexanderson K, Åkerlind I, *et al*. Sick-leave due to minor psychiatric morbidity: role of sex integration. *Soc Psychiatr Psychiatr Epidemiol* 1995;**30**:39–43.
28 **Müller CF**, Monrad T, Biering-Sørensen F, *et al*. The influence of previous low back trouble, general health, and working conditions on future sick-listing because of low back trouble. *Spine* 1999;**24**:1562–70.
29 **Bourbonnais R**, Vinet A, Vézina M, *et al*. Certified sick leave as a non-specific morbidity indicator: a case-referent study among nurses. *Br J Ind Med* 1992;**49**:673–78.
30 **Bourbonnais R**, Vinet A, Meyer F, *et al*. Certified sick leave and work load. A case referent study among nurses. *J Occup Med* 1992;**34**:69–74.
31 **Borda RG**, Norman IJ. Factors influencing turnover and absence of nurses: a research review. *Int J Nurs Stud* 1997;**34**:385–94.
32 **Parker PA**, Kulik JA. Burnout, self- and supervisor-rated job performance, and absenteeism among nurses. *J Behav Med* 1995;**18**:581–98.
33 **Clarke S**, Hussey DG. Sickness absence amongst nursing staff at two hospitals. *J Soc Occup Med* 1979;**29**:126–30.
34 **Larese F**, Fiorito A. Musculoskeletal disorders in hospital nurses: a comparison between two hospitals. *Ergonomics* 1994;**37**:1205–11.
35 **Stobbe TJ**, Plummer RW, Jensen RC, *et al*. Incidence of low back injuries among nursing personnel as a function of patient lifting frequency. *J Saf Sci* 1988;**19**:21–8.
36 **Smedley J**, Egger P, Cooper C, *et al*. Prospective cohort study of predictors of incident low back pain in nurses. *BMJ* 1997;**314**:1225–8.
37 **Lagerström M**, Hansson T, Hagberg M. Work-related low-back problems in nursing. *Scand J Work Environ Health* 1998;**24**:449–64.
38 **Bourbonnais R**, Mondor M. Job strain and sickness absence among nurses in the province of Québec. *Am J Ind Med* 2001;**39**:194–202.
39 **Arsenault A**, Dolan S. The role of personality, occupation and organization in understanding the relationship between job stress, performance and absenteeism. *J Occup Psychol* 1983;**56**:227–40.
40 **Estryn-Behar M**, Kaminski M, Peigne E, *et al*. Strenuous working conditions and musculo-skeletal disorders among female hospital workers. *Int Arch Occup Environ Health* 1990;**62**:47–57.
41 **Kivimäki M**, Elovainio M, Vahtera J. Workplace bullying and sickness absence in hospital staff. *Occup Environ Med* 2000;**57**:656–60.
42 **Pines A**, Skulkeo K, Pollak E, *et al*. Rates of sickness absenteeism among employees of a modern hospital: the role of demographic and occupational factors. *Br J Ind Med* 1985;**42**:326–35.
43 **Ursin H**, Baade E, Levine S. *Psychobiology of coping. A study of coping men*. NewYork: Academic Press, Inc., 1978.
44 **Siegrist J**. Adverse health effects of high effort-low reward conditions. *J Occup Health Psychol* 1996;**1**:27–37.
45 **Smedley J**, Egger P, Cooper C, *et al*. Manual handling activities and risk of low back pain in nurses. *Occup Environ Med* 1995;**52**:160–3.
46 **Dallner M**, Elo A-L, Gamberale F, *et al*. Validation of the General Nordic Questionnaire (QPSNordic) for Psychological and Social Factors at Work. *Nord* 2000:**12**.
47 **Partinen M**, Gislason T. Basic Nordic Sleep Questionnaire (BNSQ): a quantitated measure of subjective sleep complaints. *J Sleep Res* 1995;**4**(suppl 1):150–5.
48 **Tambs K**, Moum T. How well can a few questionnaire items indicate anxiety and depression? *Acta Psychiatr Scand* 1993;**87**:364–7.
49 **Hosmer DW**, Lemeshow D. *Applied logistic regression*. John Wiley & Sons, 1989.
50 **Kraus JF**, Gardner L, Collins J, *et al*. Design factors in epidemiologic cohort studies of work-related low back injury or pain. *Am J Ind Med* 1997;**32**:153–63.
51 **Severens JL**, Mulder J, Laheij RJF, *et al*. Precision and accuracy in measuring absence from work as a basis for calculating productivity costs in the Netherlands. *Soc Sci Med* 2000;**51**:243–9.
52 **Fredriksson K**, Toomingas A, Torgen M, *et al*. Validity and reliability of self-reported retrospectively collected data on sick leave related to musculoskeletal diseases. *Scand J Work Environ Health* 1998;**24**:425–31.
53 **Burdorf A**, Post W, Bruggeling T. Reliability of a questionnaire on sickness absence with specific attention to absence due to back pain and respiratory complaints. *Occup Environ Med* 1996;**53**:58–62.
54 **Burdorf A**. Reducing random measurement error in assessing postural load on the back in epidemiologic surveys. *Scand J Work Environ Health* 1995;**21**:15–23.
55 **Viikari-Juntura E**, Rauas S, Martikainen R, *et al*. Validity of self-reported physical work load in epidemiologic studies on musculoskeletal disorders. *Scand J Work Environ Health* 1996;**22**:251–9.
56 **Altman DG**. *Practical statistics for medical research*. London: Chapman & Hall, 1991.
57 **Hancock GR**, Klockars AJ. The quest for alpha: developments in multiple comparison procedures in the quarter century since Games (1971). *Rev Educ Res* 1996;**66**:269–306.
58 **Schein E**. Organizational culture. *American Psychologist* 1990;**45**:109–19.
59 **House JS**. *Work stress and social support*. Reading, MA: Addison Wesley, 1981.
60 **Eriksen W**. The role of social support in the pathogenesis of coronary heart disease. A literature review. *Fam Pract* 1994;**11**:201–9.
61 **Linnemann CC Jr**, Ramundo N, Perlstein PH, *et al*. Use of pertussis vaccine in an epidemic involving hospital staff. *Lancet* 1975;**2**:540–3.
62 **Karasek RA**. Job demands, job decision latitude and mental strain: implications for job redesign. *Adm Sci Quart* 1979;**24**:285–308.
63 **Skogstad A**. Effect of leadership behaviour on job satisfaction, health and efficiency. Doctoral thesis. Department of Psychosocial Science, Faculty of Psychology, University of Bergen, Bergen, 1997.
64 **Kupperman M**, Lubeck DP, Mazonson PD, *et al*. Sleep problems and their correlates in a working population. *J Gen Intern Med* 1995;**10**:25–32.
65 **Eriksen W**, Natvig B, Bruusgaard D. Sleep problems as a predictor of long-term work disability. A 4-year prospective study. *Scand J Public Health* 2001;**29**:23–31.
66 **Bjerkedal T**, Wergeland E. Disability pension because of musculoskeletal disease among women in different occupations in Norway 1993 (in Norwegian). *Tidsskr Nor Lægeforen* 1995;**115**:3522–7.
67 **Jonsson H Jr**, Cesarini K, Sahlstedt B, *et al*. Findings and outcome in whiplash-type neck distortions. *Spine* 1994;**19**:2733–43.
68 **Bush R**, Wooden M. Smoking and absence from work: Australian evidence. *Soc Sci Med* 1995;**41**:437–46.
69 **Bertera RL**. The effects of behavioral risks on absenteeism and health-care costs in the workplace. *J Occup Med* 1991;**33**:1119–24.
70 **Vahtera J**, Kivimäki M, Koskenvuo M, *et al*. Hostility and registered sickness absence: a prospective study of municipal employees. *Psychol Med* 1997;**27**:693–701.
71 **Muto T**, Sakurai H. Relation between exercise and absenteeism due to illness and injury in manufacturing companies in Japan. *J Occup Med* 1993;**35**:995–9.
72 **Marmot MG**, North F, Feeney A, *et al*. Alcohol consumption and sickness absence: from the Whitehall II study. *Addiction* 1993;**88**:369–82.

Occup Environ Med: first published as 10.1136/oem.60.4.271 on 1 April 2003. Downloaded from http://oem.bmj.com/ on January 21, 2022 by guest. Protected by copyright.