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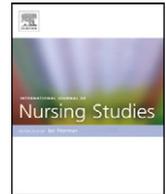
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Effort–reward imbalance is associated with the frequency of sickness absence among female hospital nurses: A cross-sectional study

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ABSTRACT

Background: Most research on sickness absence among nurses has focused on long-term work disability. Absence from work due to short-term sickness, however, is more common and frequent short absences result in understaffing and increased workload of nursing teams.

Objectives: To investigate health and work factors in relation to the frequency of short-term sickness absence among nurses.

Design: A cross-sectional study linking self-reported health and work factors to the frequency of registered sickness absence episodes in the preceding 3 years.

Settings: A regional hospital in the Dutch province Friesland employing 1153 persons.

Participants: 459 female nurses working at least 3 years in the clinical wards ($n = 337$) or the outpatient clinic ($n = 122$) of the hospital.

Methods: Perceived general health, mental health, demand/control (DC) ratio, workplace social support, effort/reward (ER) ratio, and over-commitment (i.e. the inability to withdraw from work obligations) were assessed by a self-administered questionnaire. The associations between the questionnaire results and the registered number of sickness absence episodes were analysed by negative binomial regression analysis, distinguishing between short (1–7 days) and long (>7 days) sickness absence episodes and controlling for age, hours worked, and duration of employment.

Results: 328 (71%) female nurses completed their questionnaires and of these 291 were eligible for analysis. High frequent absentees perceived poorer health, had lower over-commitment scores, and reported higher ER-ratios than low frequent absentees. Esteem rewards were related to sickness absence whereas monetary rewards were not. Feeling respect from the supervisor was associated with fewer short sickness absence episodes and respect from co-workers was associated with fewer long sickness absence episodes. **Conclusions:** Effort–reward imbalance was associated with frequent short sickness absence episodes among nurses. Work efforts and rewards ought to be potentially considered when managing nurses who are frequently absent from work as these factors can be dealt with by managers.

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What is already known about the topic?

- Although frequent short sickness absence episodes result in understaffing and the intention to leave a job, little is known about this type of absenteeism among nurses.

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- Short-term sickness absence among nurses was found to be associated with job strain, low support at work, and kinship responsibility.

What this paper adds

- Frequent absentees reported poor general- but not mental health and high effort/reward ratios.
- Frequent absentees also had low over-commitment scores indicating that they had less difficulty to withdraw from work.
- These factors should be included in future prospective research on sickness absence frequency to develop sickness policies that effectively reduce absenteeism among nurses.

1. Introduction

In the past, sickness absence was considered a socio-economic and political topic rather than a medical or public health matter. This changed when it was reported that high levels of sickness absence predicted future health outcomes, early retirement, and mortality (Vathera et al., 2004; Head et al., 2008; Ferrie et al., 2009). Nowadays, sickness absence is seen as a major public health problem and sickness absence research is a top priority in Europe (Gimeno et al., 2004). Research on sickness absence in health care has focused on long-term disability. Factors that increased the likelihood of long-term sickness absence among 2293 Swedish nurses were working in geriatric care, being socially excluded by superiors and/or work-mates, organizational changes, and poor self-rated general health (Josephson et al., 2008).

Short-term sickness absence, however, is far more common (Statistics Netherlands) than the long-term type. Frequent short absence episodes result in understaffing and herewith influence nursing efficiency and effectiveness (Gauci Borda and Norman, 1997; Hurst, 2008). Staff shortages and the subsequent increase in workload also result in escalating levels of negative work stress in health care (Plant and Coombes, 2003).

1.1. Work stress models

Within the last decades, two main concepts modelling the adverse health effects of work stress were developed. The Demand–Control (DC) model characterizes work by a combination of job demands and job control. According to this model, job control provides resources to deal with the demands. It is assumed that the combination of high demands and low control results in psychological stress reactions (Karasek and Theorell, 1990). Job support received from supervisors and co-workers was also found to buffer the impact of job demands (Johnson and Hall, 1988). Thus, the DC-model postulates that potential adverse health effects of demanding work can be counteracted by high levels of both job control and job support. Many studies have tested this hypothesis, but the results did not always support it (De Lange et al., 2003). One of the criticisms of the

DC-model is that workers will respond differently to the same constellation of demand and control conditions, as the model lacks a measure for inter-individual worker differences (Frese and Zapf, 1988). The effort–reward imbalance (ERI) model takes inter-individual differences into account (Siegrist et al., 1990). According to the ERI-model, a person who responds in an inflexible way to situations of high efforts and low rewards will be more stressed and disease prone than a person in the same situation with flexible coping behaviour (Siegrist, 1996).

The ERI-model states that there should be a balance between what the employee gives ('effort') and what he or she receives ('reward'). Failed reciprocity between efforts and rewards elicits stress and, if sustained, results in adverse health outcomes. High efforts in combination with low rewards were reported to be associated with poor self-rated health of Danish nurses working in hospitals or in primary care (Weyers et al., 2006). Lavoie-Tremblay et al. (2008) found that 43% of junior hospital nurses perceived an effort–reward imbalance and that they were more likely to report high levels of psychological distress.

The ERI-model also predicts that effort–reward imbalance affects the well-being of employees who are unable to withdraw from work obligations more as compared to their less committed counterparts (Van Veghel et al., 2001). More precisely, over-committed employees are likely to misjudge the balance between the efforts the work requires and the resources they have to cope with these efforts.

1.2. The frequency of sickness absence

Although absenteeism is an expensive and difficult problem for society and work places, little is known about the sickness absence frequency. Large-scale European studies have reported on the prospective associations between psychosocial work environment and the number of short sickness absence episodes. In the British Whitehall II studies and the French GAZEL cohort studies, it was found that job demands were particularly associated with sickness absence episodes lasting 1–7 days (North et al., 1996; Melchior et al., 2003). Moreau et al. (2004) followed 20,643 employees working in four Belgian companies for a year and found that working in jobs with combined high job demands, low control, and low support was associated with repetitive episodes of sickness absence.

In a study of 1793 Canadian nurses, short-term sickness absence was also found to be associated with job strain in terms of high demands, low control, and low social support at work (Bourbonnais and Mondor, 2001). Kinship responsibility has been reported to be positively related to the number of sickness absence episodes among female nurses, but the weak relationship suggested that other factors may be more important with respect to the frequency of sickness absence (Gauci Borda and Norman, 1997).

Nurse managers need to know the factors associated with the frequency of short sickness absence episodes to develop policies that ensure a well-considered management of frequent absenteeism. Therefore, we investigated health and work perceptions of hospital nurses by questionnaire and linked the results to their sickness

absence frequency registered in the preceding 3 years. We hypothesized that the factors of the ERI-model were differentially associated with short-term sickness absence as compared to those of the DC-model, as the ERI-model includes personal coping flexibility and short-term absenteeism is considered to be a type of coping behaviour (Kohler and Matthieu, 1993; Mechanic, 1995; Petrie and Weinman, 1997).

1.3. Study setting

In the Netherlands, employees report sick to their employer when they are too ill to attend work. The employer sends a sick report to the occupational health service on the first day of absence. When a sick-listed employee resumes work within the first 2 weeks of the first day of sickness absence, the employer reports the return to work date to the occupational health service. Such short episodes are registered, but not medically certified. A sick-listed employee will usually visit an occupational health provider in the third week of sickness absence. The occupational health provider inquires into the medical symptoms, diagnosis, and treatment, as well as work-related factors and private problems that might hinder return to work. The occupational health provider determines whether the employee is work incapacitated and if so issues a medical sick-leave certificate. Medical, social, and vocational information are updated in follow-up assessments every 4–6 weeks and the occupational health provider motivates sick-listed employees to return to work as quickly as possible. Employers pay sickness absence benefits up to 100% of the employee's income for a maximum period of 2 years after which employees without work ability receive disability pension.

2. Subjects and methods

2.1. Study population and design

The study population consisted of nurses working at least 3 years in the clinical wards ($n = 358$) or outpatient clinic ($n = 122$) of a regional hospital in the Dutch province Friesland employing a total of 1153 persons. Gender differences are well known in both work stress research and sickness absence research. Therefore, men and women must be analysed separately. The male group, however, was excluded for the further analyses due to a low number of male nurses ($n = 21$) working in-hospital at the time of study. The 459 female nurses received a questionnaire from the human resources department of the hospital and were asked to return the completed questionnaire by post to the occupational health service. The self-administered questionnaire assessed eight dimensions: general health, mental health, job demands, job control, job support, work efforts, work rewards, and over-commitment. This cross-sectional study linked the questionnaire data to sickness absence registry data of an occupational health service, containing the first and last day of all sickness absence episodes lasting at least 1 day for each person in the three preceding years.

Approval was sought from the Medical Ethics Committee of the University Medical Center Groningen, who advised that ethical clearance was not required for this questionnaire survey. Study participants gave informed consent on linking the questionnaire scores to their registered sickness absence data.

2.2. Study questionnaire

The SF-12 Health Survey, a short version of the SF-36, measures the physical and mental health-related quality of life (Ware et al., 1996). General health was assessed using a single item asking for an overall rating of health on a 5-point Likert-type scale ranging from 0 (bad) to 4 (excellent), which is one of the most widely used general measures of health status (Stewart and Ware, 1992; Krause and Jay, 1994). Mental health was measured with the Mental Health Inventory (MHI-5) subscale (Cronbach's α in this study = 0.84) of the SF-12 Health Survey, consisting of 5 questions about mood and anxiety, which were scored on a 4-point Likert-type scale ranging from "always" to "never" (Stewart and Ware, 1992). The scores were expressed as percentages of the maximum score possible for each subscale and higher scores indicated better health.

Job demands, control, and support were assessed using 8 of the 10 items in the short form described by Storms et al. (2001), which was derived from the Dutch Job Content Questionnaire; 2 items on job satisfaction and job insecurity were not included as factors of the DC-model. Job demands were measured with 4 items about handling heavy loads, toxic exposure, hazardous conditions, and having to work hard. Job control was measured with 2 items about skill discretion and decision latitude. Job support was measured with 2 items: a considerate supervisor and friendly co-workers. All items were scored on a 4-point Likert-type scale ranging from "strongly agree" to "strongly disagree". High scores correspond to high demands, control, and support. The demand/control ratio (DC-ratio) was calculated dividing the score on job demands by 2 times the score on job control. A high DC-ratio reflects work stress in terms of high demands and/or low control.

Work efforts and work rewards were assessed using the Dutch Effort–Reward Imbalance Questionnaire (Hanson et al., 2000). The subscale extrinsic efforts consisted of 5 items (Cronbach's α in this study = 0.70), referring to perceived work conditions such as workload, time pressure, and frequent interruptions, which were scored on a 4-point Likert-type scale ranging from "strongly agree" to "strongly disagree". The subscale rewards consisted of 5 items (Cronbach's α in this study = 0.73) on esteem reward (4 items about respect from both supervisor and colleagues and educational opportunities) and monetary gratification (1 item) each measured with a 4-point Likert-type scale ranging from "strongly agree" to "strongly disagree". High scores on work efforts correspond to high efforts and high scores on rewards to high rewards. The effort/reward ratio (ER-ratio) was calculated dividing the score on work efforts by the score on work rewards. A high ER-ratio reflects work stress in terms of high efforts and/or low rewards.

We used the 5 items of the subscale inability to withdraw from work obligations (Cronbach's α in this study = 0.76) of the Effort–Reward Imbalance Questionnaire as a proxy for over-commitment (Hanson et al., 2000). These five items were “I get easily overwhelmed by time pressure at work”, “I can easily relax and ‘switch off’ work at home”, “I rarely let go of work”, “Work is still on my mind when I go to bed”, “As soon as I get up in the morning I start thinking about work problems”, and “People close to me say I sacrifice too much for my job”. All questionnaire scores were expressed as percentages of the maximum score possible for each subscale.

2.3. Data analysis

Both short-term self-certified sickness absence and long-term medically certified sickness absence were registered by the occupational health service in number of absence episodes and duration for each person. The calendar days between the first and last day of sickness absence were regarded as sick days, irrespective of the actual working hours and regarding partial days off work as full sick days. We counted the total number of sick days of each employee between 1 January 2006 and 31 December 2008. The distribution of the number of sick days was positively skewed (mean = 61.7, SD = 112.5; median = 17) and normal distribution was approximated by log-transformation using the natural logarithm (mean = 2.8, SD = 1.8; median = 2.9). The association of the log-transformed number of sick days with health and work characteristics was analysed using multiple linear regression analyses.

The frequency of sickness absence is usually assessed as the number of episodes absent. We counted the

number of sickness absence episodes in the 3 years preceding completion of the questionnaire and distinguished between short episodes (1–7 days) and long episodes (>7 days) for each individual. The number of sickness absence episodes is a type of count data for which Poisson regression is commonly used. The Poisson model implies that the variance is equal to the mean (μ). However, we found considerable excess residual variation (‘over-dispersion’) for the rates of short sickness absence episodes when all investigated factors were taken into account. Therefore, the associations of health and work characteristics with the number of sickness absence episodes were investigated using negative binomial regression analysis, which is an alternative model for counts derived from the Poisson distribution by adding a quadratic term $K(\mu)^2$ where K is the over-dispersion parameter (Hilbe, 2007). The negative binomial model allows for variation due to factors not included in the model (Dean and Lawless, 1989) and fitted our data better.

Age and duration of employment at the time the questionnaire was completed were retrieved from the human resources department of the hospital together with the number of hours worked during the 3 years preceding the study. These factors were added as covariates to all regression models. The significance level was set at 5%.

3. Results

Of the distributed 459 questionnaires, 328 were returned to the occupational health service resulting in a response rate of 71%. Table 1 shows the age, duration of employment, number of hours worked, and sickness

Table 1
Characteristics of the study population.

	In-hospital		Mann–Whitney U-test	Outpatient		Mann–Whitney U-test
	Participants	Non-participants		Participants	Non-participants	
<i>n</i>	218	119		110	12	
Mean (SD) age in years	41.9 (9.0)	42.2 (9.9)	<i>P</i> = 0.77	40.2 (8.8)	40.2 (5.8)	<i>P</i> = 0.97
Mean (SD) years employed	14.1 (7.8)	13.7 (8.5)	<i>P</i> = 0.55	13.4 (8.4)	13.1 (8.1)	<i>P</i> = 0.85
Mean (SD) hours worked	2006 (887)	1494 (1045)	<i>P</i> < 0.01	2192 (778)	2250 (1008)	<i>P</i> = 0.69
Mean (SD) sick days	66.4 (108.0)	71.8 (117.5)	<i>P</i> = 0.92	56.5 (119.0)	44.0 (69.9)	<i>P</i> = 0.50
Percentiles						
25	5.00	2.00		12.00	9.25	
50	18.00	20.00		25.00	20.50	
75	79.25	107.00		49.00	63.00	
Mean (SD) short episodes	3.0 (3.4)	2.8 (2.9)	<i>P</i> = 0.80	3.9 (2.4)	3.7 (1.6)	<i>P</i> = 0.97
Percentiles						
25	1.00	1.00		2.00	2.00	
50	2.00	2.00	<i>P</i> = 0.22	4.00	3.50	<i>P</i> = 0.95
75	4.00	4.00		6.00	5.25	
Mean (SD) long episodes	0.9 (1.3)	1.1 (1.5)		0.9 (1.0)	1.0 (1.5)	
Percentiles						
25	0.00	0.00		0.00	0.00	
50	0.00	1.00		1.00	0.50	
75	1.00	2.00		1.00	1.75	

The table shows the characteristics of the study population consisting of 459 female nurses and the distribution of sickness absence among them, using non-parametric Mann–Whitney U-test to compare participants with non-participants. SD: standard deviation.

Table 2
General health, work characteristics, and sickness absence.

	Mean (SD)	Sickness absence days B (95% CI)	Short episodes RR (95% CI)	Long episodes RR (95% CI)
Age ^a	41.4 (8.9)	-0.27 (-0.52 to -0.03) [*]	0.81 (0.71–0.93) ^{**}	0.73 (0.57–0.93) [†]
Hours worked ^b	2066.4 (853.2)	0.74 (-0.06 to 1.55)	4.11 (3.06–5.53) ^{**}	0.62 (0.30–1.27)
Years employed ^a	13.8 (7.9)	0.15 (-0.13 to 0.43)	1.11 (0.96–1.29)	1.13 (0.86–1.49)
Ward (in-hospital/outpatient)	82%/18%	-0.19 (-0.75 to 0.38)	0.85 (0.65–1.13)	1.39 (0.79–2.44)
General health	79.9 (14.7)	-0.39 (-0.72 to -0.06) [*]	0.73 (0.61–0.87) ^{**}	0.68 (0.50–0.93) [†]
DC-ratio	1.0 (0.3)	-0.85 (-1.70 to -0.01) [*]	0.58 (0.36–0.92) [†]	0.81 (0.35–1.84)
Support	75.0 (15.0)	0.12 (-0.09 to 0.32)	1.03 (0.93–1.15)	1.24 (1.03–1.50) [†]
ER-ratio	1.0 (0.3)	0.40 (-0.30 to 1.10)	1.65 (1.16–2.34) ^{**}	0.95 (0.45–2.04)
Over-commitment	49.1 (11.3)	-0.07 (-0.16 to 0.02)	0.95 (0.90–0.99) [†]	0.96 (0.88–1.04)

The table shows the regression coefficients (B) of multiple regression analysis of log-transformed sick days and their 95% confidence intervals (CI), as well as the rate ratios (RR) of negative binomial analysis of short and long sickness absence episodes and their 95% CI. SD: standard deviation; DC-ratio: demand/control ratio; ER-ratio: effort/reward ratio.

^a The regression coefficient and rate ratios show the effect of a 10-year increase of the variable.

^b The regression coefficient and rate ratios show the effect of a 100-h increase of the hours worked.

^{*} $P < 0.05$.

^{**} $P < 0.01$.

Table 3
Mental health, work characteristics, and sickness absence.

	Sickness absence days B (95% CI)	Short episodes RR (95% CI)	Long episodes RR (95% CI)
Age ^a	-0.25 (-0.51 to 0.00) [*]	0.82 (0.71–0.93) ^{**}	0.73 (0.57–0.93) [†]
Hours worked ^b	0.74 (-0.08 to 1.55)	4.35 (2.77–6.83) ^{**}	0.59 (0.29–1.21)
Years employed ^a	0.11 (-0.17 to 0.40)	1.07 (0.92–1.25)	1.13 (0.85–1.51)
Ward (in-hospital/outpatient)	-0.13 (-0.70 to 0.45)	0.89 (0.67–1.18)	1.36 (0.78–2.40)
Mental Health Inventory			
Nervous ^c	0.01 (-0.45 to 0.47)	0.97 (0.76–1.23)	0.92 (0.60–1.40)
Happy ^d	0.12 (-0.36 to 0.59)	1.07 (0.84–1.37)	1.17 (0.75–1.83)
Calm ^d	-0.26 (-0.75 to 0.22)	0.93 (0.73–1.19)	1.02 (0.65–1.60)
Depressive ^c	0.43 (-0.11 to 0.97)	1.36 (1.04–1.79) [*]	1.08 (0.66–1.75)
DC-ratio	-1.00 (-1.85 to -0.16) [*]	0.51 (0.32–0.82) ^{**}	0.73 (0.33–1.64)
Support	0.10 (-0.11 to 0.31)	1.02 (0.91–1.13)	1.25 (1.03–1.52) [†]
ER-ratio	0.33 (-0.39 to 1.04)	1.55 (1.08–2.22) [*]	0.95 (0.45–2.02)
Over-commitment	-0.04 (-0.14 to 0.05)	0.96 (0.92–1.01)	0.97 (0.89–1.06)

The table shows the regression coefficients (B) of multiple regression analysis of log-transformed sick days and their 95% confidence intervals (CI), as well as the rate ratios (RR) of negative binomial analysis of short and long sickness absence episodes and their 95% CI. DC-ratio: demand/control ratio; ER-ratio: effort/reward ratio.

^a The regression coefficient and rate ratios show the effect of a 10-year increase of the variable.

^b The regression coefficient and rate ratios show the effect of a 100-h increase of the hours worked.

^c Always, regularly, sometimes relative to never.

^d Never, sometimes, regularly relative to always.

^{*} $P < 0.05$.

^{**} $P < 0.01$.

absence characteristics of participating and non-participating female nurses, distinguishing between nurses working in-hospital (response rate 65%) and nurses working outpatient (response rate 90%). In-hospital participants worked more hours ($P < 0.01$) than non-participants, but they did not differ in sickness absence characteristics.

3.1. Associations of sickness absence with general health and work

Age and general health were inversely associated with all sickness absence measures, as is shown in Table 2. The DC-ratio was inversely related to both the number of sick days ($P = 0.05$) and the number of short sickness absence episodes ($P < 0.01$). Workplace social support was positively associated ($P = 0.03$) with the number of long sickness absence episodes. The ER-ratio was positively

related to the number of short sickness absence episodes ($P < 0.01$) and over-commitment inversely ($P = 0.02$).

3.2. Associations of sickness absence with mental health and work

Depressive symptoms, measured with 2 items of the MHI-5, were positively associated with the number of short sickness absence episodes, which means that nurses who sometimes or regularly feel depressed have more short sickness absence episodes than those who never feel depressed (Table 3). Mental health was neither associated with the number of sick days nor with the number of long sickness absence episodes. The other associations were in agreement with the regression model based on general health with the exception that the relationship with over-commitment was not significant ($P = 0.14$).

3.3. Associations of sickness absence with separate efforts and rewards

When analysed separately, the effort 'working over-time' was positively associated with the number of sick days (regression coefficient (B)=0.71; 95% confidence interval [CI]: 0.13–1.30; $P=0.02$) and the reward 'receive respect from supervisor' inversely ($B=-0.67$; 95% CI: -1.33 to -0.01; $P=0.05$). Respect received from the supervisor was also inversely related to the number of short sickness absence episodes (RR=0.51; 95% CI: 0.28–0.92; $P=0.03$), whereas respect from co-workers was inversely related to the number of long sickness absence episodes (rate ratio [RR]=0.70; 95% CI: 0.51–0.95; $P=0.02$). The other effort and reward items were not associated with sickness absence.

4. Discussion

Our study showed that the frequency of sickness absence increased with the number of hours worked and that good health was associated with low sickness absence. The study adds that employees who are frequently absent report lower DC-ratios and higher ER-ratios than those with few sickness absence episodes. High frequent absentees also had lower over-commitment scores.

4.1. Strengths and weaknesses of the study

The strength of our study is that we used registered sickness absence data instead of self-reported sickness absence and we had complete sickness absence data over a 3-year period. All employees were nurses and comparable with regard to working conditions, work environment, and organizational policies. This is important because recurrent changes in working conditions and policies were found to be associated with job distress among nurses (Verhaege et al., 2008).

The major limitation of the study is its cross-sectional design precluding prospective associations and causal relations. Also, the women in our study population were working in the hospital for at least 3 years and may be a selection of women who are healthy and enjoy their work. It should also be noted that questionnaire results may be distorted by response styles and personality characteristics. We tried to take this weakness into account by using validated instruments in the questionnaire. Furthermore, the questionnaires were not anonymous, which may have biased the responses. We tried to minimize the effect of this by asking the respondents to return their questionnaire to the occupational health service instead of their employer.

Finally, information about family life was not available. A poor balance between work and family obligations may lead to an elevated risk of ill health (Emslie et al., 2004; Jansen et al., 2006) or at least an increased need for absence from work (Hackett and Bycio, 1996; Gauci Borda and Norman, 1997; Väänänen et al., 2008).

4.2. Work stress and sickness absence frequency

The Demand–Control (DC) model focuses on the quantity of exposure to working conditions and the relieving effects of job control and support, whereas the effort–reward imbalance (ERI) model also takes an individual's coping flexibility into account. As short-term absenteeism is regarded as a coping behaviour, we expected the ER-ratio to be differently associated with the number of short-term sickness absence episodes than the DC-ratio, which was confirmed by the results.

A high DC-ratio was associated with fewer sick days and fewer short sickness absence episodes. The British Whitehall II study has shown that high job demands were associated with fewer short episodes of sickness absence in men (RR=0.75; 95% CI: 0.69–0.80), but not in women (RR=0.93; 95% CI: 0.84–1.03). Our findings contradict the results of Melchior et al. (2003) and Moreau et al. (2004) who reported that high job demands were associated with more sickness absence episodes among French blue collar and Belgian white collar workers, respectively. These different results may be due to vocational factors. Employees working in health care are known to feel a special responsibility and attendance-pressure to go ill to work, because other people depend on their care (Aronsson and Gustafsson, 2005).

A high ER-ratio was associated with more short episodes of sickness absence. Similar findings have been reported in previous studies of nurses where poor self-rated health was observed among nursing staff characterized by high efforts in combination with low rewards (Bakker et al., 2000; Niedhammer et al., 2004; Weyers et al., 2006). Also, another study has shown that ER-ratios above 1 were associated with an increased risk of adverse health effects, because the efforts made were not counterbalanced by sufficient rewards (Hasselhorn et al., 2003). These studies together support a causal relationship between effort–reward imbalance and poor health among nurses.

Besides adverse health effects, poor well-being has been reported to be associated with high efforts and low rewards (Siegrist, 1996; De Jonge et al., 2000; Van Veghel et al., 2001). Well-being is an umbrella term for different valuations that people make regarding their lives, the events happening to them, and the circumstances in which they live and work (Diener, 2006; Camfield and Skevington, 2008). When effort–reward imbalance is associated with both poor well-being and frequent short sickness absence episodes, the frequency of sickness absence might be a sign of poor well-being. Esteem rewards such as feeling respected by supervisor and co-workers were significantly associated with the sickness absence frequency. Respect from the supervisor was associated with fewer short sickness absence episodes and respect from co-workers was related to fewer long sickness absence episodes. Possibly, feeling respected at work is an important facet of a person's well-being. This may explain the results of De Jonge et al. (2000), who found that work efforts and rewards were stronger predictors of poor well-being than job demands and control. After all, the DC-model does not include respect felt at work. Respect from

co-workers may explain why sickness absence levels are lower in wards with team nursing as compared to wards with primary nursing (Kivimäki et al., 2004). We assume that employees who experience poor respect at work may find it easier to report sick when not in optimal health. This hypothesis, however, remains to be tested in prospective studies.

4.3. Over-commitment and sickness absence frequency

We found that low frequent absentees had higher over-commitment scores than high frequent absentees. Over-committed employees who find it difficult to withdraw from work obligations are likely to be present at work even when sick, which is known as sickness presence (Hansen and Andersen, 2008). The highest sickness presence levels are found in the care, welfare, and education sectors where employees are responsible for others (Aronsson and Gustafsson, 2005). Over-commitment and the responsibility in caring for others can give the feeling that work is demanding, which may explain the finding that high DC-ratios were associated with fewer short sickness absence episodes. Earlier, it was reported that sickness presence levels among workers in Nordic elderly care rose more sharply with increasing levels of job stress than sickness absence levels (Elstad and Vabø, 2008). It would be interesting to study the relationship between over-commitment and sickness presence among nurses, as it has recently been reported that sickness presence leads to sickness absence on the long term (Bergström et al., 2009). If over-committed nurses are prone to be sickness present, then they may be recognized as a risk group that needs special attention to prevent sickness absence.

5. Conclusions and practical implications

Frequent short episodes of sickness absence are associated with poor general health, effort–reward imbalance and less commitment to work. When women are frequently absent, the occupational health provider should not only look for signs of chronic disease, but also inquire about work efforts and rewards, respect experienced at the workplace, and work-related well-being. Understanding the relationship between the work environment and the health status of nurses is imperative for creating interventions to successfully recruit and retain them at work. Future research should investigate the prospective relationships of efforts, rewards and commitment to work with the frequency of sickness absence to develop effective sickness policies that ensure well-considered management of absenteeism among nurses.

Managers of the regional hospital, from which our study population was recruited, invite employees who have been absent due to sickness ≥ 3 times in a calendar year to discuss their absenteeism. Such briefings are likely to degenerate into discussions on whether the employee was legitimately absent from work due to illness or not. This can be prevented when managers gently explore how frequent absentees conceptualize work efforts and rewards to discover major motivators and barriers to well-being in work (Kiefer, 2008). Adding motivators and

removing barriers where possible is an example of well-considered management, which may have beneficial effects on an employee's health and well-being, reduce their sickness absence frequency, and promote job retention. If future research confirms a prospective relationship between effort–reward imbalance and sickness absence frequency, then line managers should learn the principles of the ERI-model and get further training to enable them to provide pro-active support to frequent absentees. This knowledge can then be incorporated in nursing work design and management.

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