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Original Article

Work ability in nursing: relationship with psychological demands and control over the work

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Objective: to evaluate the association between psychological demands, control over the work and the reduction of work ability of nursing professionals. Method: this cross-sectional study involved 498 nursing professionals of a university hospital in the State of Rio Grande do Sul, Brazil. Data collection was carried out in 2009 using the Brazilian versions of the Work Ability Index and Job Stress Scale, with logistic regression models used for the data analysis. Results: the prevalence of 43.3% for reduced work ability and 29.7% for high-strain in the job (high psychological demand and low control) were observed. The chances for professionals presenting reduced work ability under high-strain were higher and significant when compared to those classified as being under low-strain, even after adjusting for potential confounders, except for age and gender. Conclusion: a high prevalence of reduced work ability was observed. This evidence indicates the need for investigation and detailed analysis of the psychosocial aspects of the professionals with regard to the health/disease process of nursing professionals.

Descriptors: Work; Nursing; Work Capacity Evaluation; Occupational Health; Stress, Psychological; Occupational Diseases.

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Introduction

Work ability is a condition resulting from the combination of the work environment and the lifestyle of the worker, influenced by factors such as sociodemographic characteristics, lifestyle and the intrinsic aspects of the activity performed[1-2]. Its concept is based on both the individual perceptions regarding the demands of the work, as well as coping with them[2]. In the mid 1980's, with the intention of creating an instrument for evaluating work ability, Finnish researchers developed the Work Ability Index (WAI). This evaluation is very important, since the work, as well as possibly exerting a positive influence in that it promotes professional recognition, can also lead to psychological distress when the employees submit to the constraint conferred by it[1].

Considering Nursing, it can be said that the work process constituted inside the health practices is complementary, interdependent and collective[3-4]. This form of organization presents a technical division of labor, in which the actions are hierarchized by complexity of concept and implementation, which requires different skills for the management of the various instruments and methods[4]. It is also essential to consider that nursing work in general presents some characteristics inherent to the profession, such as often working in situations of critical illness, on the border of life and death, which make it a profession in which the workers are susceptible to stress and illness[5-6]. Many of these situations can be related to the psychosocial aspects of the work, specifically the psychological demands and control over the work activities[7].

The psychosocial dimension of the work has attracted the attention of scholars throughout the last four decades and theoretical and methodological proposals have been drawn up from the perspective of presenting investigative models. Among the theoretical frameworks that evaluate these aspects, there is the Demand/Control Model (DCM)[7]. This is a two-dimensional model that relates two psychosocial aspects in the work environment to the risk of illness, the psychological demands and control the worker has over the work[7]. The *psychological demands* dimension refers to pressures, such as time/speed in performing the activity and conflict between contradictory demands. The *control* dimension relates to the possibility of the worker making use of their intellectual abilities and having sufficient authority to decide how and when to carry out the activities[7-8].

The DCM is a theoretical and methodological model that proposes an evaluation of the work environment from the combination of high and low levels of these two dimensions, configured as four specific work situations that suggest different risks to health. These are, *high-strain* jobs (combination of high psychological demands and low control – highest risk category); *active* jobs (high demand and high control); *low-strain* jobs (low demand and high control – lowest risk category) and *passive* jobs (low demand and low control)[7]. Thus, the interaction between high psychological demands and low job control of the workers regarding the activities they perform configures as a situation of *high-strain in the job*, with the result of occupational stress[7]. Given that stress is harmful to people's health and can influence the individual's ability to perform the work, investigating the elements that this triggers, as well as their consequences, can provide support that will assist in planning actions of health promotion, maintenance or the restoration of the work ability, for the physical and mental well-being of the worker.

To support this study a search was conducted, in May 2013, in databases Latin American Health Science Literature (LILACS) and Medical Literature Analysis and Retrieval System Online (MEDLINE) using the following descriptors: "evaluation of work ability" and "psychological stress" and "physiological stress". Two Brazilians articles were located that concomitantly used the DCM and the WAI[9-10]. Of these, one[10], developed with workers from a bus transportation company, showed a positive association between stress and a reduction in the work ability. The other[9], with nursing staff, showed no association in this relationship.

With the aim of deepening our understanding of this relationship, the present study was proposed with the following guiding question: is there an association between psychological demands, control over the work, and reduced work ability in nursing staff of a university hospital in Rio Grande do Sul, Brazil?

The hypothesis proposed for the study was that high psychological demands and low work control (*high-strain*) are positively associated with a reduction in work ability. In this context, the aim of the study was to evaluate the association between psychological demands, job control, and reduced work ability in nursing staff of a university hospital in Rio Grande do Sul.

Methods

This epidemiological cross-sectional study was performed at the University Hospital of Santa Maria (HUSM), located in the Central-West Region of Rio Grande do Sul, Brazil. The study population consisted of 592 nursing staff (nurses, technicians and auxiliary nurses). All members of the permanent staff (employed through public examinations) were included, and those who were absent or on sick leave during the collection period were excluded. Data collection took place between September and December 2009, during the working hours of the study participants, and was performed by certified research assistants. A questionnaire was used containing questions about sociodemographic data (gender, age, education, race, marital status), employment data (function, work shift, working hours, additional employment), the psychosocial dimensions (psychological demands and work control) and questions that evaluate the Work Ability Index (WAI).

The psychosocial dimensions (exposure) were evaluated using the Job Stress Scale (JSS)[8], which is the reduced version of the Job Content Questionnaire (JCQ)[7] translated and validated for Portuguese. In this scale, the scores for *psychological demand* and *control* were obtained through the sum of the points assigned to each question, ranging 5-20 points and 6-24 points, respectively[8]. According to these scores, both the *psychological demand* variable and the *control* variable were dichotomized into "*low demand*", "*high demand*" and "*low control*", and "*high control*", using the mean score as the cutoff point. From these two dichotomized dimensions four groups were constructed: *low-strain, active job, passive job*, and *high-strain*. The Cronbach's alpha coefficients for *psychological demand* and *control* were 0.72 and 0.55, respectively. During the analyzes three reference categories were considered: *low psychological demand, low control* and the *low-strain* quadrant.

The work ability (outcome) was evaluated using the Brazilian version[2] of the WAI. The WAI is calculated based on the answers of the workers to questions concerning work demands, health status, and physical, mental and social capacities. The score for the WAI ranges from 7 to 49 points[2]. The result depicts the concept the worker has of his/her work ability: poor, moderate, good or excellent work ability[2]. For the bivariate and multivariate analyses the work ability was dichotomized into reduced (poor and moderate) and good (good and excellent) abilities.

The data were entered in the Epi-Info®, version 6.4 program, with independent double entry. After checking for errors and inconsistencies, the data analysis was performed using the PASW Statistics® (Predictive Analytics Software from SPSS Inc., Chicago – USA) version 18.0 for Windows. Bivariate analyzes were performed to check the association between exposure and outcome with each of the covariates studied. The chi-square test was used to check whether the associations found presented statistical significance ($p<0.05$). In the bivariate analyzes, the covariates shown to be potential confounding factors (associated with both the exposure and the outcome) were: gender, age, education, function and, time in the job. For the selection of the potential confounding variables, a significance level of 25% ($p\leq0.25$) was established. Binary logistic regression models (Enter method) were run with all these variables. The variables were removed from the models when p values of >25% were presented.

To verify the adequacy of the regression models, the Hosmer-Lemeshow Test[11] was used. In this test, the values range from zero (0) to 1, with values closer to 1, showing better adequacy of the model[11]. The measure of association used was the Odds Ratio (OR), with a 95% confidence interval. The project was approved by the Research Ethics Committee of the *Universidade Federal de Santa Maria* – UFSM/RS (CAAE: 0070.0.243.000-09) on 23/06/2009. The participants signed the Terms of Free Prior Informed Consent, and were informed of the voluntary nature of their participation in the study.

Results

Of the total of 592 individuals, 498 (84%) nursing staff participated in the study. The 94 (16%) losses resulted from refusals to participate. The sociodemographic profile indicates that 437 (87.8%) nursing staff were female, 425 (85.3%) self-reported white race, 163 (32.7%) aged 47 to 69 years, mean 41.3 years (±8.9 years, minimum age 24 and maximum 69 years), and that 129 (36.5%) of the technicians/auxiliary nurses had completed undergraduate courses and 32 (9.1%) postgraduate courses.

In relation to the marital status, 345 (69.3%) of the workers were married or cohabited with a partner. With regard to the function performed, 222 (44.6%) were nursing technicians, 144 (28.9%) nurses, and 132 (26.5%) auxiliary nurses. Concerning the work shift and weekly working hours, 199 (40%) worked on the

nightshift, 311 (62.4%) had a workload of 36 hours per week and 89 (17.9%) had other employment.

With regard to the evaluation of the WAI, 206 (41.4%) workers presented good work ability; 187 (37.6%) moderate ability; 76 (15.3%) excellent ability; and 29 (5.7%) poor work ability. The prevalence of workers with reduced work ability (low and moderate ability), in the period evaluated, was 43.3%.

When analyzing the work ability of the nursing staff according to the sociodemographic variables, it was shown that 200 (45.8%) female workers and 83 (50.9%) aged ≥47 years presented reduced work ability ($p<0.05$). In relation to the work variables, it was found that 53 (36.8%) nurses, 163 (46%), technicians/auxiliary nurses, 127 (44.3%) nightshift workers, 111 (46.8%) with more than 14 years in the job and 185 (45.2%) who had no other employment presented reduced work ability ($p>0.05$).

The frequency of workers in the four quadrants of the DCM was as follows: 103 (20.7%) in *low-strain*, 98 (19.7%) in *passive job*, 149 (29.9%) in *active job* and 148 (29.7%) in *high-strain*. It was found that the female workers, married, aged ≥37 years, who had completed high school or an undergraduate course presented higher frequencies in the *high-strain* quadrant ($p<0.001$).

When evaluating the work variables, it was observed that among the 76 (56.8%) nurses the frequencies were higher in the *active job* quadrant, and, among the 127 (35.9%) technicians and auxiliary nurses, the frequencies were higher in the *high-strain* quadrant ($p<0.001$). Among the workers who worked on the dayshift, the *high-strain* quadrant was highlighted (N=66; 31.3%) followed by the *active job* quadrant (N=65; 30.8%); nightshift workers had higher frequencies in the *active job* quadrant (N=84; 29.3%), followed by the *high-strain* quadrant (N=82; 28.6%). Among the 31 (34.8%) workers who reported other employment the *active job* quadrant was predominant and for the 126 (30.8%) who reported having only one job, there were higher frequencies in the *high-strain* quadrant, as was also the case for the 67 (28.3%) workers with 14 or more years in the job.

Table 1 - Crude and adjusted associations between the quadrants of the DCM and reduced work ability in nursing staff. Santa Maria, RS, Brazil, 2009

Variables	Reduced Work Ability			
	Crude Association*	Adjusted Association		
		Model 1†	Model 2‡	Model 3§
	Odds Ratio (95% Confidence Interval)	Odds Ratio (95% Confidence Interval)	Odds Ratio (95% Confidence Interval)	Odds Ratio (95% Confidence Interval)
Quadrants Control Demand Model				
Low-Strain	1	1	1	1
Passive Job	1.13 (0.63-2.00)	1.08 (0.57-2.02)	1.03 (0.56-1.90)	1.03(0.56-1.90)
Active Job	1.23 (0.73-2.07)	1.52 (0.86-2.69)	1.42 (0.81-2.48)	1.42 (0.81-2.48)
High-Strain	2.09 (1.25-3.51)	2.07 (1.17-3.65)	2.01 (1.15-3.51)	2.01 (1.15-3.51)
Gender				
Male		1	1	1
Female		2.48 (1.29-4.77)	2.46 (1.29-4.71)	2.74 (1.45-5.19)
Age group				
24 to 36 years		1	1	
37 to 46 years		1.42 (0.83-2.42)	1.30 (0.81-2.08)	
47 to 69 years		2.11 (1.15-3.87)	1.90 (1.19-3.04)	
Education				
High School		0.79 (0.39-1.60)		
Undergraduate		1.19 (0.61-2.34)		
Postgraduate		1		
Function				
Nurse		1	1	1
Technician/auxiliary		1.69 (0.84-3.40)	1.54 (0.98-2.42)	1.45 (0.94-2.25)
Time in the Job				
≤13 years		1		
>14 years		0.94 (0.58-1.54)		

*Hosmer and Lemeshow Test=1.00; †Hosmer and Lemeshow Test=0.375; ‡Hosmer and Lemeshow Test=0.564; §Hosmer and Lemeshow Test=0.171

Model 2 was the one that best explained the association between high-strain and reduced work ability[11]. The chances of the workers presenting reduced work ability remain in the *high-strain* group (OR=2.01; 95%CI =1.15-3.51), even after adjusting for the potential confounding variables, except for gender and age.

Discussion

The results of this study indicate that nursing staff subjected to *high-strain* in the workplace are more likely to be classified with reduced work ability, when compared to those under *low-strain*, even after adjusting for function. The age and gender of the employees were not confounding factors, i.e., these variables were associated with the reduction of the WAI.

The work process in a hospital environment, especially in teaching institutions, demands important attributions, since the severity and complexity of the inpatients of large reference hospitals impose the need to deal with sophisticated equipment, and perform complex procedures and constant clinical evaluations with immediate decision making. According to the DCM[7], the objective work environment leads to the perceived psychological environment, which in turn produces affective and behavioral responses that can result in illness (physical or mental). In this case, such demands may influence the work ability of the professionals. However, the association found in this study differs from results shown in other studies: one[12], conducted in a public hospital in São Paulo with the nursing staff, and another[9], with nurses in a hospital group in Porto Alegre/Rio Grande do Sul, showed no statistically significant association between *high-strain* and reduced nursing work ability.

Despite the divergence of results, it is important to reflect on the high percentage of workers in this study classified in the *high-strain* quadrant. According to the DCM, workers subjected to high demands or psychological pressure in their work combined with low control or low decision making power to cope with them are more susceptible to the risk of illness due to psychological deterioration[7]. In this sense, the results of this study showed that to be a technician/auxiliary nurse, to have been in the job for 14 years or more and to have completed high school or an undergraduate degree are conditions that can lead to the development of stress, given that these workers were classified in the *high-strain* quadrant ($p<0.05$). These results corroborate those of another study[13], performed in an emergency room of a hospital in the South of Brazil, in which it was found that to be a technician/auxiliary nurse, with more than 15 years in the job, and to have low social support cause a greater chance of having *high deterioration.*

Regarding the classification of the nursing staff in the quadrants of the DCM in relation to age, the studies are not consensual. One study[14] conducted in a public hospital in Salvador/Bahia concluded that younger individuals, aged up to 35 years, were found in the *high-strain* quadrant ($p=0.395$). Another study*(13)* evidenced a higher frequency in the *passive job* quadrant for all the age groups evaluated ($p=0.654$). In this study, it was shown that younger workers (24-36 years) were found in higher frequency in the *active job* quadrant, and those 37 years of age or more, in the *high-strain* quadrant, suggesting that, as the worker ages the demands of the job on these workers may also increase or be perceived by them as raised. This situation may have direct effects on health and productivity[7].

Taking into account that the factors that lead to decreased work ability are more frequently observed in workers who are around 45 years of age[2], it was observed that 83 (50.9%) workers aged ≥47 years presented significantly reduced work ability. Accordingly, when considering that the workers today, remain longer in the labor market, it is essential that measures regarding attention to their health are implemented, aiming for active aging of these workers and the maintenance of their work ability[1].

Regarding the function, the predominance of nurses in the *active job* quadrant corroborates other studies[6,9,14-15]. Nurses have more autonomy to make decisions, to control their own activities, and to use their skills. In this regard, it was noted that the nurses have been making efforts to develop an autonomous professional practice, being aware that changes in their professional practice are needed, as well as further scientific knowledge and the incorporation of this into their actions[16].

The fact that the technicians/auxiliary nurses find themselves in the *high-strain* followed by the *passive job* quadrants should be viewed carefully because, according to the theoretical framework adopted in this article, these are the situations most harmful to health that carry the greater risk of illness[7]. This hypothesis is strengthened by the identification that 163 (46%) of the technicians/auxiliary nurses studied presented reduced

work ability (p=0.059). Inherent characteristics of these workers, such as daily routines and repetitive tasks can result in a lack of interest in the work.

Furthermore, the deficit of employees that many Brazilian health institutions face, coupled with high demand from patients and care dependency sometimes causes workers to develop their activities under time pressure, with low concentration levels and interruption of tasks, since there is a high overload of activities.

It must be take into account that a significant percentage (45.6%, N=161) of technicians and auxiliary nurses in the institution studied hold a degree (undergraduate and postgraduate), which is more than is required for the position. This is due to the fact that the institution has a Jobs and Salaries Plan that encourages qualification, resulting in increases in salary. However, there is no change in the employment contract, therefore they can not perform activities of higher qualifications, which they have the ability to exercise. This situation may be contributing to this functional category being in the *high-strain* and *passive job* quadrants. In this context, to perform a task short of their qualification may cause the worker to experience feelings of unworthiness, uselessness and disqualification[17]. Therefore, the hospital management has a key role with regard to the training of workers who remain in the function, even after the pursuit of a higher level of education/qualification. It is up to the management to develop valorization strategies for these workers, beyond the increase in remuneration, so that that this higher qualification will also result in greater autonomy in the work process.

In the evaluation of the working shift, 66 (31.3%) of the workers who performed their activities on the dayshift presented a higher percentage in the *high-strain* quadrant when compared to the nightshift workers. It is believed that this result refers to the specific characteristics of the field of study: during the morning and afternoon, large numbers of people transit through the hospital (doctors, healthcare area students, companions), as well as this being the time for visiting. All these factors, added to specific routine nursing activities that are developed during the daytime, such as hygiene, dressing changes, preparation and transportation of patients, guidance provided for patients and families, and hospitalizations and discharges, contribute to the predominance of workers in this quadrant. However, despite being in the quadrant of increased risk, they have a higher percentage of good/excellent work ability (p=0.645). The investigation of the factors that contribute to the classification of workers of this shift in the higher risk of illness quadrant, as well as the adoption of measures that mitigate or eliminate these risks is of great importance in order to maintain their functional capacity.

Unlike another study[13] which indicated that workers who are only employed in the institution studied presented a greater percentage in the *passive job* followed by the *low-strain* (p=0.361) quadrants, in the present study, in addition to the prevalence in the *high-strain* quadrant, 185 (45.2%) of them were classified as having reduced work ability. One possible explanation for this result may be related to the fact that many workers are not limited to only working the weekly contracted hours. Often the performance of overtime, which may be responsible for the overload of these workers, is carried out during the days and shifts in which they should be off work. Another factor to consider is related to the large number of workers who seek professional qualification, which causes many professionals to dedicate what should be their rest periods to studying. These aspects, not investigated in this study, deserve further study, as this is a common reality in Brazilian hospitals.

Accordingly, the results of a study[18] which aimed to analyze factors associated with workload and the professional work period and the total work period (professional + home) in nursing professionals revealed that there was a significant association between long professional work periods and reports of lack of time for rest and leisure. Although there are difficulties in establishing a safe limit for the duration of the periods due to the variety of conditions involved, it is known that long working hours involve direct effects, such as a reduction in the time available for other activities, increased exposure to the demands, and risks in the work[18].

Knowing that workers in the *high-strain* quadrant are more susceptible to stress and, consequently, decreases in the work ability, the results of this study indicate that intervention measures for health promotion of the worker and maintenance of their functional capacity should be adopted and active. The ideal job is one that represents a state of relaxation bought about by conditions with low psychological demand and high levels of control (*low-strain*)[7]. However, in looking for this ideal situation, it should be remembered that it is not just the freedom of action to accomplish the formal task of the work that relieves tension[7], but

the freedom to participate in the small activities, such as coffee breaks and other social activities with co-workers also needs to be considered[7]. In addition, investments in maintaining the functional ability lead to positive results, not only for the worker, who may have an independent and active life[2], but also for the whole management process.

Conclusion

The results of this study confirm the research hypothesis, since they indicate that nursing workers exposed to *high-strain* in their work, have reduced work ability after adjusting for function. Age and gender were associated with reduced work ability. The evidence points to the need for investigation and detailed analysis of the psychosocial aspects related to the health/disease process of nursing staff and indicates some factors that may be contributing to the reduction in work ability, and, more broadly, to the emergence of future injuries to the health of these workers.

Due to Nursing being a profession that involves daily contact with highly stressful situations which may in the long run, reverberate in the health of workers, as well as due to the shared and complementary work process that leads to the reduction of autonomy and decision making (mainly in technicians/auxiliary nurses), it is necessary to rethink the quotidian practices in the healthcare work in the hospital context. The inclusion of measures to alleviate job strain and, consequently, reduce the psychological demands should be considered, as it is not always possible to increase the decision power/autonomy of the worker. These aspects may contribute to the reestablishment and maintenance of good/excellent work ability.

Investments in better working conditions, in all the life stages of the worker, will have repercussions not only in their health, but in the work, as this will result in fewer temporary and permanent absences. The impossibility of predicting cause and effect (cross-sectional studies) is one of the limitations of the study, as well as not including the absent workers, especially those absent due to illness, as there may be an effect bias for the healthy worker.

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