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Need for recovery assessment among nursing professionals and call center operators

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Abstract. The present study descriptively compares the need for recovery (NFR) among 128 nursing professionals (nurses) and 223 call center operators according cutoff points in the literature (45 and 50) and by means of statistical tests, and verifies the association between NFR scores and the presence of musculoskeletal symptoms. NFR was evaluated with the Need for Recovery Scale and musculoskeletal symptoms were evaluated with the Nordic Musculoskeletal Questionnaire. At a 45 point cutoff, 22% of the call-center workers and 33% of the nurses were classified as fatigued; at a 50 point cutoff, 13% of the call center operators and 27% of the nurses were classified as fatigued. The nurses had higher fatigue levels than the call center workers ($p=0.015$). Significant correlations were found between NFR scores and musculoskeletal symptoms reported during the previous 12 months ($r=0.299$, $p<0.001$) and 7 days ($r=0.314$, $p<0.001$). Regarding cutoff points and statistical tests, the NFR scale identified higher fatigue levels among the nurses and was demonstrated to be a useful tool for evaluating worker well-being.

Keywords: cutoff point, fatigue scale, Brazilian workers

1. Introduction

Work factors play an important role in both fatigue etiology and its cumulative process, which could lead to either temporary complaints or severe health problems among workers [6]. According to the Meijman et al. effort-recuperation model [17], workers with sufficient recovery time won't perceive residual fatigue symptoms at the beginning of the next working day. On the other hand, when workers present residual fatigue symptoms from the previous day's efforts, a cumulative fatigue process could be involved. In such cases, severe fatigue-related behavioral, cognitive and emotional symptoms could be presented by the worker, which could result in absenteeism, accidents, reduced work capacity and performance and a higher risk of developing Burnout Syndrome [4,16,17,19]. Thus, identifying work situations that induce the cumulative fatigue process could help occupational health services prevent long-term fatigue effects among workers.

There are several methods available for assessing fatigue in workers. The Need for Recovery Scale (NFR) is a subjective scale developed to evaluate early fatigue symptoms such as irritability, overload, social withdrawal, lethargy and reduced performance [17]. Studies have demonstrated the psychometric quality of NFR for assessing fatigue symptoms, as well as its internal consistency (Chrombach alfa above 0.8), stability and sensitivity to changes [3,18].

The NFR scale has been cross-culturally adapted and validated for Brazilian Portuguese (as the Escala de Necessidade de Descanso - ENEDE) according to standards proposed in the literature [11]. Good results for psychometric parameters were also found in the Brazilian NFR regarding construct validity, internal consistency and stability [11]. The NFR scale was also found to be useful for identifying different overload conditions and, thus, for defining ergonomic intervention priorities in the workplace [12].

Although many studies have analyzed the NFR's ability to assess fatigue in the workplace, the need for

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recovery is a recent concept, having emerged between 1985 and 1995 [18]. Thus, this matter still requires further research. The correct NFR cutoff points for identifying fatigued workers is one important point for such investigation. Kiss and Meester [8] proposed a cutoff point of 50 for comparing older and younger workers regarding subjective fatigue. However, in a more recent study, the same group [7] also considered a cutoff point of 45 for public sector workers, based on an analysis of long-terms psychosomatic effects.

Since studies using the NFR with Brazilian workers are scarce, descriptive studies presenting NFR score results among Brazilian workers should be conducted to determine the distribution and level of need for recovery in different job types. Another non-explored issue among Brazilian workers is the relation between NFR scores and musculoskeletal symptoms. Kiss and Meester [8] found that musculoskeletal disorders are the most important factor in the higher levels of need for recovery for elderly workers (>45 years). Since musculoskeletal symptoms are a frequent complaint among workers, exploring the correlation between musculoskeletal complaints and fatigue could help clarify the relationship between these two frequent and critical issues among workers.

Certain jobs, such as nursing, present greater occupational demands. The types of shifts and high physical and psychological workload nursing professionals are exposed to could lead to chronic fatigue [10,14]. In addition to affecting the health of nurses, fatigue could also interfere in their performance and increase errors, which could compromise patient safety [13]. Gurgueira et al. [5] verified that Brazilian nursing professionals presented a high prevalence of musculoskeletal symptoms, resulting in doctor's appointments and absenteeism. Thus, monitoring fatigue levels among nursing professionals with the NFR scale and the presence of musculoskeletal symptoms could contribute to appropriate recommendations regarding preventive safety practice. For comparison, telemarketing call center operators, who also have a recognized risk of fatigue due to mentally demanding work [20], were also evaluated with the NFR scale.

Therefore, the present study had three main objectives: (1) to describe the need for recovery among telemarketing call center operators and nursing professionals according to the cutoff points available in the literature - 45 and 50, as suggested by Kiss et al. [7] and Kiss and Meester [8], respectively; (2) to compare the need for recovery in these two groups and (3) to verify the association between NFR scores and the presence of musculoskeletal symptoms in both groups.

2. Methods

2.1. Subjects

A total sample of 351 workers participated in this study. Of this total, 223 were telemarketing call center operators (N=198 women and N=25 men, mean age 29±10 years), representing 37.2% of the company's operators. The other 128 were nursing professionals (N=113 women and N=15 men, mean age 35±10 years), representing 30.5% of the evaluated hospital's nursing staff. For inclusion, workers had to complete the entire questionnaire and to have been working at their current job for at least 3 months.

2.1.2. Ethical aspects

All workers were informed about the research procedures and signed an informed consent form. This study was approved by Research Ethics Committee of the Federal University of São Carlos, São Paulo, Brazil (Protocol No. 1080.0.000.135-10).

2.2. Procedures

The data collection was performed by means of questionnaires. Personal and occupational data were investigated in the first part of the questionnaire. The second part of the questionnaire included the Brazilian version of Need for Recovery scale [11] to assess workers fatigue symptoms and the Brazilian version of Nordic Musculoskeletal Questionnaire [1] to assess musculoskeletal symptoms.

The Brazilian version of Need for Recovery scale is an 11 item scale with 4 response options, scored according to a Likert scale principle. Four possible responses were used instead of a dichotomous scale to improve the discriminatory power of the Brazilian NFR [11]. The scores in this version, like the original scale, vary between from 0 to 100, with higher scores indicating higher levels of need for recovery.

The questionnaires were filled at the workplace while the workers were on duty. Brief comments regarding the questionnaire contents were provided.

Instructions on the importance of completely filling out the questionnaires and assurance of confidentiality were also provided.

2.3. Data analyses

The frequency of scores above and below the cutoff points suggested by the literature (45 and 50) as determined and presented as a percentage of the total number of subjects for each group.

The presence of musculoskeletal symptoms according to the Nordic Musculoskeletal Questionnaire was considered as categorical data for the analyses. A lack of symptoms was scored as zero (0), and the number of symptomatic regions received a corresponding value varying from 1 to 9. Since the NFR data were not normally distributed in the Shapiro-Wilk Test, the Mann-Whitnney test was used for pair comparisons between groups and the Spearman test was used to verify the correlation between NFR scores and age, and NFR scores and musculoskeletal symptoms.

The data were analyzed using SPSS 11.5 software.

3. Results

The cutoff points of 45 and 50 allowed the identification of different percentages of fatigued workers in each group, as can be seen in Table 1. Considering both cutoff points, a higher percentage of nursing professionals were fatigued than call center operators.

Table 1
Frequency of scores above and below the cutoff points of 45 and 50 of Need for Recovery

	Cutoff point of 45		Cutoff point of 50	
Groups	Percentage of scores below 45	Percentage of scores above 45	Percentage of scores below 50	Percentage of scores above 50
Call center operators	78%	22%	87%	13%
Nursing professionals	67%	33%	73%	27%

Considering the two groups together, the mean and standard deviation of NFR were 36.11±16.18. However, the mean of NFR scores were different between the groups of workers ($p=0.015$). Nursing professionals (39.32±18.41) presented higher levels of NFR scores than call center operators (34.27±14.47). The two groups of workers also differed regarding age, with call center operators being younger than nursing professionals ($p<0.01$). There was no significant correlation between age and NFR scores for either call center operators ($r=-0.098$, $p=0.15$) or nursing professionals ($r=-0.159$, $p=0.09$)

Statistically significant correlations were found between the NFR scores and the presence of musculoskeletal symptoms reported during the previous 12 months ($r=0.299$, $p<0.001$) and the previous 7 days ($r=0.314$, $p<0.001$), considering both groups together. For each group, correlations between NFR and musculoskeletal symptoms reported during the previous 12 months and the previous 7 days were also significant for nurses ($r=0.25$, $p=0.005$; $r=0.27$, $p=0.002$, respectively) and call center operators ($r=0.29$, $p<0.001$, $r=0.316$, $p<0.001$, respectively).

4. Discussion

Although only a five point difference existed between the two cutoff points proposed by Kiss et al. [7] and Kiss and Meester [8], these two values had distinct results. Thus, the fact that different proposed cutoff points could present different sensitivity and specificity values should be taken into consideration when using the NFR to assess worker fatigue symptoms.

It is also important to point out that the Brazilian NFR includes four possible responses, while the original scale is dichotomous. For this reason, new studies using a scale with four response options should be conducted to identify the optimal cutoff point for Brazilian workers. Determining the optimal cutoff point would allow health practitioners to identify workers at risk for long-term fatigue symptoms [2].

The work conditions involved in different job types are determinant for the cumulative fatigue process and include psychosocial and physical demands, social support, working hours, effort-reward balance [6]. Thus, the identified differences between nursing professionals and call center operators regarding the means and the numbers of workers considered fatigued were expected, since nursing and call-center workers are submitted to different work demands. Nursing professionals are submitted to diverse factors that could contribute to fatigue development: low salary, frequent substituting for absent coworkers, low social support, lack of communication, difficult work shifts, low decision-making power, accelerated work pace, stress, the need for constant attentiveness and physically demanding work [9,10]. On the other hand, call center operators could present complaints of fatigue and mental exhaustion due to mentally and time-constraining work, high productivity requirements and the low work control [20].

A variety of NFR score means and standard deviations have already been reported by epidemiological studies in the available literature, but few studies present the scores according to each evaluated job type. Sluiter et al. [15] reported NFR scores of 43.34±29.79 among 922 hospital nurses, which was the highest need for recovery level compared to the other evaluated workers (coach drivers, bus drivers, construction workers, ambulance workers and truck drivers). Higher levels of need for recovery were also found among Brazilian nursing professionals than call center operators. Thus, comparing the need for recovery levels between nurses and other workers reinforces the need for nurses to have cumulative fatigue process interventions in their occupational settings.

According to a study by Kiss and Meester [8], the presence of musculoskeletal disorders was the most influential factor for high levels of NFR among elderly workers (OR 2.10, IC 1.12-3.96), although it was not a significant factor for young workers. For young workers (<45 years), work pressure and negative emotional stimuli were the factors that best explained the high NFR [8]. According to the results of present study, scores on the NFR scale were positively associated with the number of symptomatic body regions reported in the previous 12 months and the previous 7 days. It is worth to mention that evaluated workers in the present study are younger than 45 years old. The design of the present study does not allow conclusions regarding whether musculoskeletal symptoms are caused by or are a contributing factor to fatigue symptoms. However, the identified correlation between these aspects reveals the potential usefulness of the NFR scale for the evaluation of these variables and for monitoring worker well-being.

5. Conclusions

Higher levels of need for recovery were found among Brazilian nursing professionals than call center operators when using cutoff points available in the literature and statistical tests. The Need for Recovery scale was a useful tool for monitoring these workers' well-being and demonstrates the need for interventions in the nurses' occupational settings to prevent the process of cumulative fatigue.

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