

The impact of distance learning on nursing workers' health – a randomized clinical trial

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ABSTRACT: **Introduction:** Repetitive strain injuries and work-related musculoskeletal disorders are musculoskeletal problems. Nursing is one of the areas most affected by these issues because of the profession's risk factors. **Objective:** To evaluate the impact of a distance learning course about prevention of repetitive strain injuries/work-related musculoskeletal disorders on quality of life, discomfort and pain, and presenteeism and absenteeism in nursing professionals. **Methodology:** Sixty nursing workers participated in the clinical trial and were randomized into two groups. The intervention group took an eight-hour distance learning course and the control group saw a thirty-minute educational lecture. **Results:** Regarding perceived quality of life, better results were not observed in the intervention group. Presenteeism decreased in both groups. The number of sick leave hours was lower in the intervention group. Both groups showed high prevalence of discomfort and pain. **Conclusion:** Actions such as lectures and distance learning courses about prevention of repetitive strain injuries/work-related musculoskeletal disorders may lead to positive effects on nursing workers' health. **Keywords:** Musculoskeletal Diseases, Nursing, Prevention, Quality of Life, Occupational Health

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I. INTRODUCTION

Work routines in nursing are marked by anguish, suffering, and concern, reflected in absenteeism and presenteeism rates, resulting from the development of diseases and incapacity in workers, which emphasizes the need for specific and qualified care.¹ The main cause of morbidity among nurses is musculoskeletal disorders.² Nursing is a category that is prone to developing these issues because of the nature of the professional activity.³ Different strategies are applied to prevent these problems in the work environment. Interventions in hospital settings concentrate their actions without taking into account the specific activities and demands of each profession. The actions currently proposed a focus on offering exercises in the workplace, educational lectures, and ergonomics. They show different and often controversial results. Consequently, there is little evidence addressing perceptions of improved quality of life by workers after preventive intervention for repetitive strain injuries (RSI) and work-related musculoskeletal disorders (WRMSD).^{4,5}

The objective of the present study was to evaluate the impact of a distance learning course about RSI/WRMSD on quality of life, discomfort and pain, and presenteeism and absenteeism in a group of nursing professionals working in a teaching hospital.

II. METHODS

This was a randomized clinical trial based on the comparison of the effects of a distance learning course about RSI/WRMSD prevention and an educational lecture on workers in five open inpatient units at a teaching hospital in the South region of Brazil after an eight-week follow-up. The study was approved by the Research Ethics Committee at Hospital das Clínicas de Porto Alegre as per report 16-041 and registered at ClinicalTrials.gov under the code NCT03385954.

Nursing aides and technicians and nurses who worked in open inpatient units at the teaching hospital participated in the present study. Workers who had a self-referred RSI/WRMSD diagnosis were excluded. Data collection occurred between August and November 2017 in the participants' workplace, in rooms in the inpatient units. During

the development of the study, the workers received the forms to be filled out in the room where data collection was supposed to happen, and the evaluator collected the forms after they were completed. The procedure was carried out three times: before the intervention; two weeks after the intervention; and eight weeks after the intervention. Information on the number of sick leave hours was obtained from the hospital human resources department.

The intervention group participated in an eight-hour distance learning course made available in the Moodle system of the hospital for two weeks. The course content included explanations of RSIs and work-related diseases, work-related tips, and guidance on preventive health actions. The control group saw a thirty-minute educational lecture in the workplace. The activity was scheduled in advance, carried out in groups of three to five workers, and addressed the same topics discussed in the distance learning course.

Quality of life was assessed using the Medical Outcomes Study Short Form 36 (SF-36) translated and validated in Portuguese. This instrument has 36 questions that evaluate eight domains related to quality of life: vitality; physical functioning; bodily pain; general health perceptions; physical role functioning; emotional role functioning; social role functioning; and mental health. The score of each domain ranges from 0 to 100, and the higher the score, the higher the quality of life.⁶

Presenteeism was verified using the Stanford Presenteeism Scale (SPS-6). It is made up of six items utilizing a Likert scale, and the total score obtained after summing the points in each item can vary between 6 to 30. A low score, from 6 to 18, indicates a reduction in performance, and a high score, closer to 30, points to a greater capacity of workers to focus and carry out all their tasks despite having a health issue. It is originally applied using the self-report method, in which respondents choose to what extent they agree with the statements that describe how their health condition does or does not affect their work.⁷

Absenteeism was verified by consulting the records of the human resources department at two points: before the intervention (June and July); and two months after the intervention (October and November).

Discomfort and pain were assessed using the discomfort and pain diagram by Corlett and Bishop, which aims to measure the occurrence of discomfort in localized parts of the body. The instrument consists of a paper sheet with a body map divided into 27 regions; it uses a 9-cm visual analogue scale, which allows continuous data collection for each part of the body.⁸

Characterization of the participants was carried out by applying a questionnaire designed especially for use in the present study to gather sociodemographic and occupational information about the workers.

Participant names were drawn from among all the employees who worked in the three shifts (morning, afternoon, and night). Randomization was carried out by allocating the participants into the groups at random, with each one of the groups (intervention and control) having 38 participants.

III. RESULTS AND DISCUSSION

Sixty workers participated in the study up to its completion, 29 in the intervention group and 31 in the control group. Women prevailed, nursing technicians were the most prevalent professional category, and most participants had only one employment bond and exercised regularly.

Comparison of quality of life in intervention and control groups did not show improved perceptions in the intervention group, with no significant difference between the groups over time. The domain that had the lowest score in both groups was bodily pain, with 52.8 points (SD = 24.1) in the intervention group and 54.1 points (SD = 29.5) in the control group. This domain showed higher scores in both groups at the end of the follow-up, 55.2 (SD = 24.8) and 57.0 (SD = 26.9), respectively.

The domains with the highest scores were emotional role functioning in the intervention group, with 83.9 points (SD = 35.2), and physical functioning in the control group, with 80.6 points (SD = 17.6).

Given that behavior influences perceptions of quality of life, the process of behavior change is not simple. It must take into consideration individual requirements, the possibility that interventions are carried out over time, and contextual aspects. Different strategies must be implemented to achieve such changes, providing adequate recognition of the behaviors and encouraging active participation in the change process and, consequently, perceptions of quality of life.⁹

Other studies have reported lower scores for nursing workers in the bodily pain domain, with an average of 71.05 points.^{10,11}

It is necessary to consider that quality of life is related to musculoskeletal pain. Workers who do not report pain show higher indexes of quality of life.¹² The present study did not approach aspects related to relief of pain symptoms.

An investigation comparing an RSI/WRMSD prevention educational program and a general health educational program during a 26-

week follow-up did not find differences in the quality of life scores of the examined workers. The follow-up in this study was longer than that in the present investigation, yet the interventions had no impact on quality of life,¹³ which suggests the importance of designing studies with longer follow-up.

The results of the present investigation point to the existence of presenteeism in both groups, with a reduction in work performance. When the dimensions were analyzed separately, it is possible to observe that the physical functioning dimension revealed a decrease in the capacity to complete work activities. The emotional role functioning dimension also showed a reduced score, demonstrating that the workers found it difficult to avoid distraction during work activities. After the intervention, a decrease in presenteeism was found in both groups.

Hospital settings have a high frequency of employees who do not request leave from work, even if they are not in the best condition. Data obtained in ... corroborate the results reported in the literature that have identified a high frequency of nursing workers who say they continue working despite their health issues.^{7,14}

Studies have shown positive results regarding presenteeism based on implementing broad actions in multidimensional programs, with an approach that includes the participation of employees, in addition to carrying out organizational and environmental changes, and providing encouragement for workers. The interventions that lead to positive results are longer, more intense, and more frequent, following behavior change theory.⁴

In the present study, both groups showed high prevalence of pain and discomfort, with 86.2% in the intervention group and 87.1% in the control group. The body parts that showed the highest pain prevalence were lower back region, neck, and upper back region, in descending order. The intervention group did not show a statistically significant difference in comparison with the control group, although there was a relevant reduction in the scores obtained before the intervention and eight weeks later.

Discomfort and pain were perceived by most participants in both groups, with prevalence similar to or higher than that reported in other studies that have examined musculoskeletal symptoms in nursing workers.^{3,12} The literature mentions the same regions as being affected by discomfort and pain (lower back region and neck), and lumbar pain is responsible for the highest number of sick days among nursing workers.^{3,12,15,16} Discomfort and pain did not change after the intervention, which may be related

to the constant presence of risk, ergonomic, and organizational factors and excess working hours, items that were not approached in the implemented intervention.¹⁵

Previous studies have shown that physical exercises in the workplace are more efficient than physical exercises at home in reducing pain, and that absenteeism decreases after interventions that include exercises in the workplace. The intervention in the present study did not include the practice of physical exercises in the workplace and was limited to guidance about their importance. However, the number of sick leave hours decreased in the intervention group.^{17,18} Most of the participants reported doing physical exercises, which differs from the results found in another study showing that 57.4% of the sample did not exercise.¹⁹ The results found in the present investigation may be explained by the hospital providing spaces adequate for exercising in the work environment.

Absenteeism was observed before and after the intervention. However, the results showed that the number of sick leave hours decreased from 22.3 (SD = 44.2) before the intervention to 7.7 after it (SD = 8.1) in the intervention group ($p < 0.001$).

Because of their working conditions, nursing professionals are prone to developing diseases that predispose them to absenteeism. It is known that the highest indexes of work leave of these professionals are related to lumbar pain, with a high percentage of decreased functional capacity, in agreement with the findings of the present study.¹²

Similar investigations have shown that strategies to minimize absenteeism rates are important and can be carried out by implementing programs and preventive actions that seek to improve working conditions and increase ways to cope with unfavorable environmental conditions.²⁰

The intervention strategy used in the presented study, which consisted of offering an eight-hour distance learning course made available in the Moodle system for two weeks, included working tips, explanations and procedures to prevent RSI/WRMSD, and practical tips for everyday life, making literature on the subject available. Evaluating the workers' learning through theoretical tests did not show better results in perceptions of quality of life.

Another factor that may have contributed to the results in the present study is motivation to participate in the course. The hospital where the investigation was carried out has many mandatory distance learning courses for all the employees, which may have caused overload and discouraged them from taking the course. As a consequence, there may have been losses in the quality of

learning for workers who did not fulfill the program workload, or even disinterested participation, aimed only at fulfilling an obligation.

IV. CONCLUSION

In comparison with an education lecture, the distance learning course for prevention of RSI/WRMSD in the format proposed in the present study did not impact perceptions of quality of life among nursing workers from open inpatient units at a teaching hospital. Better results were not observed in the evaluated domains.

However, presenteeism, discomfort, and pain decreased in both groups, demonstrating that there was a reduction in the presence of these employees at work associated with feeling sick and/or any physical or psychological issue. The intervention group showed a reduction in the number of sick leave hours.

It is possible to infer that actions such as lectures and distance learning courses on the prevention of RSI/WRMSD may be associated with positive effects on the health of nursing teams. Studies with a longer follow-up and broader actions that also consider the elimination of ergonomic and organizational risk factors must be carried out to extend the findings of the present study, given that there was an increase in the scores obtained by the workers evaluated in the present study.

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