

Gender and Its Influence on the Prevalence of Musculoskeletal Disorders in Nurses

O Gênero e Sua Influência na Prevalência de Distúrbios Muscoloesqueléticos em Enfermeiros
El Género y Su Influencia en la Prevalencia de Trastornos Muscoloesqueléticos en Enfermeras

RESUMO

O posto de trabalho do enfermeiro, quando inadequado, proporcionará um ambiente com risco para doenças. Objetivo: analisar a influência do no adoecimento em enfermeiros. Método: A amostra foi de 60 sujeitos, sendo 30♂ e 30♀. Foram verificados desconfortos e força de Prensão Manual. Resultado da força foi ♂43,8 kgf(±4,57) e ♀28,9 kgf (±2,51), $p \geq 0,05$. Resultados: Os desconfortos foram na cervical, ombros, torácica, cotovelo, punhos, quadril, coxas, joelho, pés e lombar, (♀70,2%♂60,2%). Conclusão: é necessária uma ergonomia de correção neste ambiente, para que a organização do trabalho respeite as distribuindo o atendimento dos pacientes de características fisiológicas dos enfermeiros.

DESCRIPTORES: Hospital; Ergonomia; Trabalho.

ABSTRACT

The nurse's workstation, when inadequate, will provide an environment with a risk of illness. Objective: to analyze the influence of this on illness in nurses. Method: The sample consisted of 60 subjects, 30 men and 30 women. Discomfort and handgrip strength were assessed. The results for handgrip strength were 43.8 kgf (±4.57) for men and 28.9 kgf (±2.51) for women, $p \geq 0.05$. Results: Discomfort was found in the cervical, shoulders, thoracic, elbow, wrists, hips, thighs, knees, feet, and lumbar regions (70.2% for women and 60.2% for women). Conclusion: Corrective ergonomics are necessary in this environment so that the organization of work respects the physiological characteristics of nurses, distributing patient care accordingly.

DESCRIPTORS: Hospital; Ergonomics; Work.

RESUMEN

Cuando el puesto de trabajo de enfermería es inadecuado, crea un entorno con riesgo de enfermedad. Objetivo: analizar la influencia de este factor en la incidencia de enfermedades en el personal de enfermería. Método: La muestra estuvo compuesta por 60 sujetos, 30 hombres y 30 mujeres. Se evaluaron la incomodidad y la fuerza de presión manual. Los resultados de la fuerza de presión manual fueron de 43,8 kgf (±4,57) para los hombres y de 28,9 kgf (±2,51) para las mujeres ($p \geq 0,05$). Resultados: Se observó incomodidad en las regiones cervical, hombros, torácica, codo, muñecas, caderas, muslos, rodillas, pies y lumbar (70,2 % en hombres y 60,2 % en mujeres). Conclusión: Es necesario implementar medidas ergonómicas correctivas en este entorno para que la organización del trabajo respete las características fisiológicas del personal de enfermería y se distribuya la atención al paciente de manera adecuada.

DESCRIPTORES: Hospital; Ergonomía; Trabajo.

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INTRODUCTION

Brazilian hospital work environments have been causing significant morbidity among their employees. The presence of low back pain in hospitals is increasing ^(1,2). This is particularly true for women (♀), who, due to their different physiology compared to men (♂), especially in terms of strength, suffer from this condition at a rate of 7:1 compared to men. In this regard, intensive care units (ICUs) and medical clinics stand out as environments where the transfer and transport of patients are constant, with patients having high body mass, which can reach values above 150 kg ⁽²⁻⁴⁾.

This environment, when ergonomically incorrect, will provide nursing professionals with an environment with a high risk of developing work-related musculoskeletal disorders (WMSDs) ^(4,5). It can also lead to depression in workers ⁽⁶⁾.

According to Bongers et al., ⁽⁷⁾ this has led to a major public health problem, as indicated by the high rates of Repetitive Strain Injuries (RSI) and Work-Related Musculoskeletal Disorders (WMSD) in all segments of work, especially in hospitals, which involve the transport and handling of patients ^(4,5,8). Nursing professionals are an example of workers who are

frequently exposed to various health risks, given the specific characteristics of their work, which range from interaction with patients to direct and indirect handling of bodily fluids and blood ^(9,4). In today's world, musculoskeletal disorders of the spine are present in all segments of human life, in sports, leisure, and especially at work, most of which occur due to a lack of ergonomics ^(10,5).

In hospitals, the handling of patients, and more specifically their transportation by nursing staff to different activities, such as examinations, changes in posture for medical reasons or at the patients' own request, bathing, among others, represents in itself an ergonomic risk activity ^(3,4). Thus, it reflects the importance of the practice of ergonomics in hospital environments, which comprises the set of scientific knowledge related to humans and necessary for the design of instruments, machines, devices, and environments that can be used with maximum comfort, safety, and efficiency in the workplace, involving the application of knowledge of anatomy, physiology, psychology, biomechanics, and anthropometry in the solution that arises from this relationship ⁽¹⁰⁾. Rest breaks, overtime, work shifts, task rotations, repetitive movements, gender, age, etc., become important variables for maintaining

the health of workers in the nursing field ^(4,5).

The musculoskeletal system performs its biomechanical functions through postures and movements, which occur through its structure, basically through lever systems, which allow the maintenance of postures and the execution of movements ⁽¹¹⁾. Basic muscle tone and the ability to contract and relax muscles allow the lever systems to be maintained in different postures and to move ⁽¹²⁾. The nervous control of postures and movements occurs partly through conscious will and partly through automated and standardized motor response systems ⁽¹³⁾.

It is important to note that transporting a patient from the bed to the shower chair is a complex procedure, since both the safety of the patient and the professional providing the care must be observed, exposing the spine, especially the lumbar region, to a significant load ^(1,14). In this sense, to reduce the risk of injury to both the professional and the client, they must use proper body mechanics when moving themselves or a client. Mechanics is the coordinated effort of the musculoskeletal and nervous systems to maintain proper balance, posture, and body alignment during bending, moving, lifting loads, and performing daily activities ^(15,16).

Healthcare professionals who provide direct care to patients must perform their duties safely, conscientiously, and therapeutically. Lifting patients and transporting them safely are important factors that must be considered in order to maintain a safe environment. By applying correct body mechanics and appropriate lifting techniques, professionals can avoid both spinal injuries and accidents involving patients^(14,3).

In this sense, this study aimed to analyze the influence of gender on physical complaints/discomfort and its relationship with the use of force in nurses at a hospital in western Paraná, Brazil.

METHOD

The sample consisted of 60 nursing professionals, including 37 nurses and 23 technicians, 30 of whom were male (35.7 ± 7.2 years) and 30 female (34.7 ± 7.1 years), working at a private hospital in western Paraná, Brazil. The study included nurses and nursing technicians working morning, afternoon, and night shifts in the Intensive Care Unit (ICU), infirmary, and emergency room. All participants included in the study signed an informed consent form, and data collection was then initiated.

The assessment of bodily discomfort/pain was performed using the Corlet diagram. This method divides the human body into several segments, facilitating the location of areas where workers feel discomfort/pain. It was performed at the end of the work period, reporting the painful regions. The level of discomfort/pain was assessed using a scale from 0 (zero) to 10 (ten), with 0 (zero) for "extremely comfortable" to 10 (ten) for "extremely uncomfortable," marked linearly from left to right. For this study, only values above 6 (six) were used.

Handgrip strength was measured

using the protocol proposed by Reis and Moro (2012), following the guidelines of the Brazilian Hand Therapy Association, and verified using the Jamar[®] dynamometer, performed on the dominant hand (DH). The JAMAR[®] dynamometer consists of a hydraulic system with two interconnected stainless steel bars; it has a handle that can be adjusted to five positions; as the subject squeezes the handles, they move closer together, causing a change in the resistance of

the gauges, producing a voltage proportional to the grip strength exerted by the hand, which is recorded on the device in kilograms/force [Kgf] or pounds/inch.

The test was performed according to guidelines from the Brazilian Hand Therapy Association, which recommends performing the test in the third position, based on the average anthropometry of Brazilian subjects' hands⁽⁶⁾.

Figure 01 – Hand Grip Strength



Source – REIS and MORO, 2012

As shown in Figure 01, to assess handgrip strength, the subject was seated on an adjustable bench with their thighs resting on the seat and both feet flat on the floor, ankles neutralized, knees flexed at 90°, spine and hips resting on the back of the chair with a 90° flexion. With regard to the upper limb, the subject's elbow was flexed at 90°, shoulder in moderate abduction, forearm in a neutral position in pronation and supination, and wrist at 0° to 30° of extension, 0°

to 15° of ulnar deviation. The subjects were instructed to begin the grip test after receiving a verbal command from the evaluator. Three repetitions were performed, and the best strength was recorded. The pause between repetitions of the strength test was 60 seconds.

Organizational data were collected through a questionnaire, noting age, sex, work schedule, breaks, number of patients seen, and duration of each visit. The postures adopted during the transport and movement of pa-

tients were recorded through photos and videos taken with a Sony DSC-HX5 10.2-megapixel digital camera during the workday.

The films were analyzed using the Kinovea program, available at: <http://www.kinovea.org/en/>, which provided storage and editing conditions for better exploration of the postures during the transport and movement of patients.

Statistical analysis was performed using the Bioestatic 5.0 program, with descriptive statistics for analysis of the areas of discomfort and a t-test to verify the difference in strength between genders at a statistical significance level of 0.05. Research approved by the UNIP Human Research Ethics Committee under CAAE No. 46121415.3.0000.5512.

RESULTS AND DISCUSSION

The data will be presented and discussed, first commenting on the postures adopted in bedside care and then on the percentage of discomfort/pain among male and female nurses.

Figure 02 – Patient Care in the ICU



Source: Author

Figure 02 shows the procedure for patient care in the ICU surveyed, showing that the total time spent caring for an ICU patient ranges from 60 to 70 minutes, which includes bed making, joint mobilization, secretion aspiration, and changing position. Regarding spinal posture, it was found that, during 45 minutes of the total time dedicated to patient care, nurses remain with their torso bent at an angle greater than 45 degrees. Regarding the knee joint, it was noted that for 25 minutes of the total time, nurses remain with their knees bent. The joints of the arms, forearms, wrists, and hands are used throughout the entire care period. In this sense, it was

possible to conclude that the spine is heavily strained during patient care. Thus, this activity, which requires the use of force, combined with trunk inclination and manual grip strength, contributes to illness in the hospital surveyed, representing a high ergonomic risk⁽¹⁷⁾.

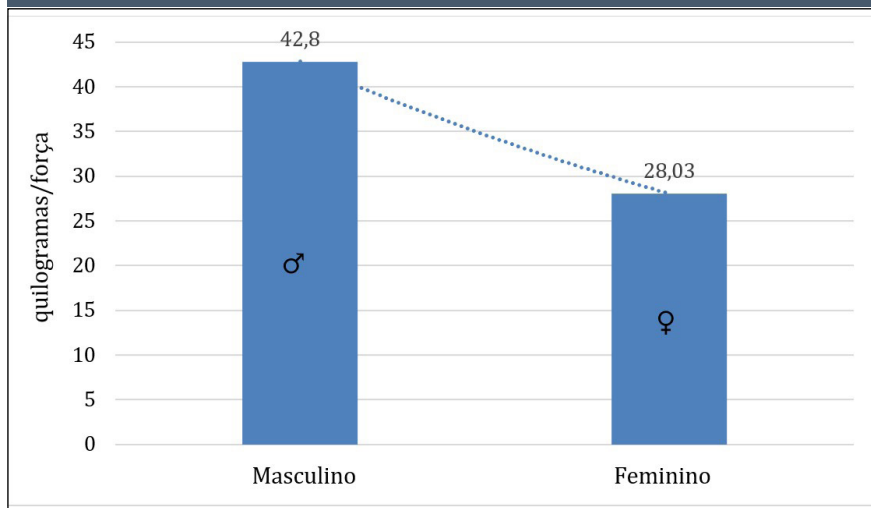
It was found that 100% of the workers surveyed perform tasks requiring the use of force, particularly changing the patient's position, transferring and transporting patients whose body weight ranges from 40 to 110 kg. With regard to hand grip strength (MD), shown in graph 01, males (♂) had an average of 43.80 kgf (± 4.66) and females (♀) had an average of 28.03 kgf (± 2.31), showing

a significant difference in handgrip strength between males and females ($t = \text{Calculated } -15.63 < t \text{ tabulated } 1.69$ at a significance level of 0.05).

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Graph 01 – Difference in Strength between Male and Female Genders



Source: authors

In this sense, it is clear that women, who physiologically have lower

strength levels than men, with a strength percentage 43.14% lower than men in this study, are more

prone to illness. Thus, it is important to highlight that in activities involving the transport and handling of patients, the organization of work in the hospital surveyed should provide for the involvement of male and female nurses, according to the body mass of the patients, which in this study ranged from 40 to 110 kg. Since when female workers perform their tasks in the same work organization as male workers, they will certainly become ill ⁽¹⁸⁾.

Regarding discomfort/pain, Table 01 shows the percentage of discomfort/pain regions for females and males. It can be observed that females presented a higher number of discomforts/pains in all joints evaluated, except in the hip region, which can be explained by the anatomy of females, who have wider hips than males ⁽¹⁹⁾.

Table 01 - Percentage of Discomfort/Pain Areas.

REGION	Percentage of Discomfort/Pain Areas	
	♂	♀
Cervical (B)	37%	52
Shoulders (C)	33	41
Thoracic (E)	35	59
Elbow (E)	4.8	7.8
Wrists/hands (H-I)	15.5	20.5
Lower back (G)	60.2	70.2
Hip (J)	37.4	28.3
Thighs (L)	12.3	27.8
Knees (M)	40.1	50.3
Ankles/feet (W)	36.2	41

Source: authors

As mentioned above, the body mass of the patients seen during this study ranged from 40 to 110 kg. In this sense, due to the significant difference in strength between males and females, it can also be observed in musculoskeletal disorders, as shown in Figure 04, in which females are more fatigued than males.

It is important to note that the physiology of females differs from

that of males. When exposed to the same type of task requiring the use of force, females will have to expend more biomechanical energy than males ^(20,21). It is important to conduct a detailed analysis of tasks that require a lot of strength when women are involved ⁽²²⁾.

CONCLUSION

This research concludes that in the

workplace studied, physiological differences between genders should be considered. In this sense, it became evident that the environment studied contributes to the emergence of WMSDs. It is important to highlight that the results showed that in jobs requiring the use of force, in the case of hospital environments, activities involving the manipulation of patients, which involve transfer and transport, should respect the physiological dif-

ferences between males and females. In this sense, ergonomics will play a fundamental role in the organization of daily activities, distributing patient care to nurses according to their body weight, separating lighter patients from heavier ones according to gen-

der, providing all nurses, whether male or female, with a healthy, comfortable, and more humanized environment. It is suggested that obese patients weighing over 80 kg should be transferred and transported by male nurses, thus avoiding illness in

the workplace, or, whenever possible, providing mechanical means for this activity, so as not to compromise the psychophysiological integrity of nurses.

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