

MUSCOSKELETAL DISORDERS IN ICU NURSING STAFF



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RESUMEN

Musculoskeletal diseases, which are of occupational origin, have become the focus of surveillance attention in terms of occupational health, due to the existence of several cases of this type, it is implied that there are still more cases unreported by organizations. (Acuna, L.; Garcia, M.; Ramirez, 2020) A systematic literature review was conducted during the month of June 2021, with the purpose of exposing a reflective critical analysis of the content of the scientific literature published during the last five to eight years - reflective analysis of the content of the scientific literature published during the last five to eight years,

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on the subject of musculoskeletal disorders in the nursing staff in the intensive care unit. It was found that the nursing assistants in the intensive care unit presented a high prevalence of osteo-muscular symptomatology (79%), the most affected parts were the lower back (24.5%) and the upper back (17.5%). Most of the assistants have received medical incapacity for this cause (65%). It is important to provide mandatory training in the different clinical areas to raise awareness of the risks to which health personnel are exposed due to poor body mechanics and lack of knowledge about patient mobilization, which can lead to musculoskeletal problems, as shown in the indicators of this type of injury, causing total or permanent incapacity for work activities as well as health staff.

Keywords: Injuries, Nursing Staff, Patients, Health, Musculoskeletal Disorders, Intensive Care Unit.

INTRODUCTION

Musculoskeletal disorders (MSDs) are alterations suffered by body structures such as muscles, joints, tendons (Luttmann A, Jäger M, Griefahn B, Caffier G, LiebersF, Steinberg U., 2014), ligaments, nerves, bones and the circulatory system, caused, aggravated or accelerated by exposure to certain risk factors at work and the effects of the environment in which this takes place.(p.1).

This term (National Institute for Occupational Safety and Health (NIOSH), 2020) refers to physical and functional alterations of the locomotor system: muscles, tendons, nerves, ligaments, joints, cartilage and/or bones, neck or back. (p.3).

(Paredes Rizo ML, Vázquez Ubago M., 2020) Its main symptoms are: pain, swelling, stiffness, numbness and tingling. Those whose origin is occupational, are caused or aggravated by the work and the environment in which it takes place, for example, most MSDs are caused by repeated exposure to loads over time. (P.61).

Musculoskeletal disorders (MSDs) (Deeney, C.,& O’Sullivan L., 2009) generate high economic losses, in the United States of America; the total associated cost increased from \$81 billion in 1986 to \$215 billion in 2005, most of the direct cost is represented by lost work days, compensation and treatment, in addition 28% of the general population presented work disability.(p.239)

The intensive care nurse provides care to patients with critical hospital situation, who

present a severe imbalance of one or more major physiological systems (Paradigma Group., 2017), with actual or potential life liability, using a methodology based on the advances produced in the area of health care, ethics and scientific evidence.(p.5)

Consequently, within the intensive care ward the nursing staff must cover with the strenuous needs that arise when caring for a patient given that, it is part of their hard work.

This professional responsibility turns the work in these services into a highly stressful and exhausting task (Lospitao, S., 2017). In other words, it is the professional competence of the nurse to provide optimal and safe care that favors the recovery of the patient in the shortest possible time, minimizing complications that may arise, without

patient in the shortest possible time, minimizing complications that may arise, however, the work environment, furniture, technology, work climate, emergency conditions, among others, may contribute to the emergence of health risks for these professionals (p.2).

Nursing workers face inadequate working conditions in their work environment, (De Souza C, Lima JL, Antunes E, Schumacher K, Moreira R, De Almeida T., 2015) that can lead to ergonomic risks, such as factors related to the environment (inadequate and obsolete furniture and equipment), which overloads the body segments (p.3).

It is evident that the work performed every day by the nursing staff working in the intensive care ward, attending the patients in this ward, is a risky and especially exhausting task for the nurse, wearing out his or her muscles.

A risk factor for MSDs (Owen B, Keene K, Olson S., 2000) is the weight of the patients when they are moved or lifted, the frequency of handling and movement of the patients and the level of postural difficulty required by a task, particularly when these are of long duration (p.19).

MATERIALS AND METHODS

A systematic literature review was conducted during the month of June 2021, in order to develop a critical-reflective analysis of the content of the scientific literature published in the last five to eight years on the subject of musculoskeletal disorders in intensive care unit nursing staff.

1. Prevalence of MSDs (result).
2. Exposure to psychosocial risk factors.
3. Study population: nursing staff.

The study is descriptive-cross-sectional, developed for the elaboration of this research, described as follows:

According to Tamayo the descriptive study “comprises the description, records, analysis and interpretation of the actual nature and composition or processes of the phenomena”. (Tamayo, M., 2006)

The cross-sectional study according to (Hernández, R, Fernández, C. and Baptista, P., 2016) where data are collected at a single moment, in a single time, its purpose is to describe variables and their interrelation incidence at a given time, and the design. (p.91)

The search for the fifteen (15) research articles of the last eight (8) years in renowned scientific journals can be mentioned: Scielo, Redalyc, among others, which admit scientific research with reliability for the acquisition of their results.

- Inclusion - Exclusion Criteria

- **The inclusion criteria for these documents were the following:**
 - a. Thirty-four research articles and academic papers.
 - b. Perception of musculoskeletal alterations, after obtaining the articles in the Hinari, Elsevier, Scopus, Pubmed, Ebsco databases, the studies that met the inclusion criteria were selected.
 - c. A search was carried out using the same strategies in the following bibliographic databases. Web of Science, MEDLINE (Pubmed), NIOSTHIC and CINAHL.
 - d. A general search was performed in Google Scholar.
 - e. Total number of articles reviewed, eight articles.
 - f. Questionnaire of 24 questions.
 - g. Sample of nursing staff: 73 subjects.
 - h. Questionnaires were used.
 - i. Data were obtained from 17 female workers, who ranged in age from 25 to 32 years.
 - j. Eighty-six intensive care nursing assistants.

- k. Questionnaire to intensive care nursing professionals.
- l. Thirty-six participants, Nordic questionnaire.
- m. Sample of 46 auxiliaries from District 18D04 health district of Tungurahua, Ecuador.
- n. Analysis of a total of 20 scientific articles.
- o. This study was made up of 45 nurses.

• **The exclusion criteria for these papers were as follows:**

- a. Non-nursing studies.
- b. Studies older than eight (eight) years.

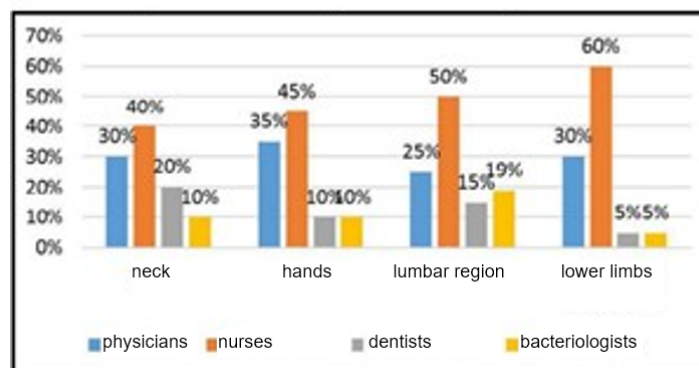
- **Extraction and analysis of data for documentary research.**

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RESULTS

- a. In relation to the improvement of the psychosocial environment has a high impact on the decrease and prevention of musculoskeletal disorders. Currently nursing assistants face daily inadequate conditions in their work area and represent challenges in their daily routine, assistance and care, which may result in Musculoskeletal Disorders.
- b. It was evidenced that the main symptom of musculoskeletal origin is pain, initially presented in the neck and back, the female gender was more vulnerable and especially the atareo group corresponding to 41 to 50 years of age, whose main cause is repetitive movements.

Figure 1. Prevalence according to anatomical area and profession



- c. Sixty-four studies were reviewed and quality criteria were applied, accepting those with medium and high quality (n=47). In a second screening, those that did not meet the inclusion criteria were eliminated, and 36 studies were included in the meta-analysis.
- d. Musculoskeletal disorders present a prevalence of more than 80%, the most affected areas being the lumbar region, neck and shoulders. Their most common causes are: manual handling of loads, repetitive movements and forced postures; there is a statistically significant association with psychological stress. They have physical and psychosocial consequences.
- e. The average age was 36 years, 89% were women, with high levels of education and an average work seniority of 4-5 years. The highest prevalence of musculoskeletal discomfort and/or pain was in the lower back region, followed by the neck and shoulder. The presence of psychosocial risk factors was mainly in the domains: reward 99%, leadership and social relations 89%, commuting home-work-home 94.4% and time away from work 75.4%.

**Prevalence of musculoskeletal discomfort in intensive care nurses.
 Nordic Questionnaire**

| Anatomic region | No | | Yes | | Yes, right | | Yes, left | | Yes, both | |
|------------------|----|--------|-----|--------|------------|--------|-----------|-------|-----------|--------|
| Neck, (%) | 34 | (46.6) | 39 | (53.4) | | | | | | |
| Shoulder, (%) | 45 | (61.6) | 27 | (38.3) | 12 | (16.4) | 5 | (6.8) | 11 | (15.1) |
| Elbow, (%) | 66 | (90.4) | 7 | (9.6) | 3 | (4.1) | 4 | (5.5) | - | - |
| Wrist/hands, (%) | 46 | (63.0) | 27 | (37) | 11 | (15.1) | 5 | (6.8) | 11 | 15.1 |
| Upper back, (%) | 47 | (64.4) | 26 | (35.6) | | | | | | |
| Lower back, (%) | 17 | (23.3) | 56 | (76.7) | | | | | | |
| Hip, (%) | 54 | (74.0) | 19 | (26.0) | | | | | 19 | 26.0 |
| Knees, (%) | 50 | (68.5) | 23 | (31.5) | | | | | | |
| Ankles/Feet, (%) | 47 | (64.4) | 26 | (35.6) | | | | | | |

Source: Own elaboration

- f. It was shown that the handling of patient loads, repetitive movements, forced postures and the adoption of awkward positions are related to the presence of musculoskeletal injuries. A total of 16.7% of the articles reviewed attributed the psychosocial risk factor and female sex as influencing the occurrence of these injuries.
- g. It was found that the nursing assistants in the intensive care unit presented a high prevalence of musculoskeletal symptomatology (79%), the most affected parts were the lower back (24.5%) and the upper back (17.5%). Most of the assistants

had received medical incapacity for this cause (65%).

- h. Of the nursing staff working in the institution, 73.9% are auxiliary nurses, 84.7% are women, the average age is 30 years, 42.3% have been working in the clinic for less than a year; they work on average between 41 and 60 hours (58.6%). Of the staff, 49.5% reported muscular pain in the last 12 months, with the back (37.8%) and neck (16.2%) being the most affected parts of the body.

Table 1. Duration of musculoskeletal discomfort in the last 12 months in the nursing staff of a clinic on the Atlantic Coast

| Presencia de molestias musculoesqueléticas | | n | % | |
|---|-----|-------|-------|------|
| Yes | | 55 | 49,5 | |
| No | | 56 | 50,5 | |
| Total | | 111 | 100,0 | |
| Body region with musculoskeletal discomfort | | | | |
| Body region | NO | % | Yes | % |
| Neck | 93 | 83,8 | 18 | 16,2 |
| Right shoulder | 109 | 98,2 | 2 | 1,8 |
| Left shoulder | 109 | 98,2 | 2 | 1,8 |
| Back | 69 | 62,2 | 42 | 37,8 |
| Right elbow-forearm | 111 | 100,0 | 0 | 0,0 |
| Left elbow-forearm | 108 | 97,3 | 3 | 2,7 |
| Right hand-wrist | 105 | 94,6 | 6 | 5,4 |
| Left hand-wrist | 110 | 99,1 | 1 | 0,9 |
| Duration of discomfort | | | | |

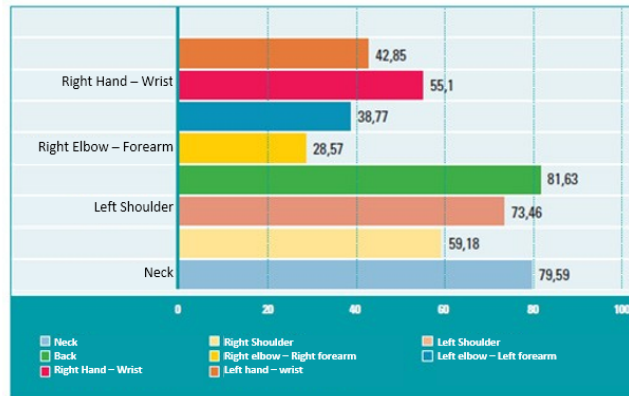
- i. 100% of workers have presented musculoskeletal discomfort. The prevalence of neck MSDs was 94.1%, 64.7% in shoulders, 88.2% in the dorsal-lumbar area, 18.8% in the elbow or forearm and 18.8% in the wrist or hands. Inferential analysis based on age, occupational category, current position and ergonomic variables did not show a significant statistical relationship between the variables.

| POSITION | TASK | REBA SOCRE | RISK LEVEL | ACTION LEVEL | INTERVENTION AND SUBSEQUENT ANALYSIS |
|-------------------------------------|--------------------|------------|------------|--------------|--------------------------------------|
| NURSE Central Zone | Assistance work | 9 | HIGH | 3 | ACTION IS NEEDED AS SOON AS POSSIBLE |
| NURSE Neonatal Crib Zone | Assistance work | 6 | MEDIUM | 2 | ACTION IS NEEDED |
| NURSE Isolation Zone | Assistance work | 4 | MEDIUM | 2 | ACTION IS NEEDED |
| NURSE Neonatal Incubator Zone | Assistance work | 4 | MEDIUM | 2 | ACTION IS NEEDED |

- j. It was found that the nursing assistants in the intensive care unit presented a high prevalence of osteo-muscular symptomatology (79%), the most affected parts were the lower back (24.5%), and the upper back (17.5%). Most of the assistants have

received medical incapacity for this cause (65%).

- k. The results obtained confirm this: more than half of those surveyed, 57.4%, say they have suffered discomfort and/or pain in the last 3 months. The areas most affected are the back, neck and left shoulder. The same situation occurs when we refer to the existence of discomfort and/or pain in the last 7 days; in this case, the most affected areas continue to be the neck, back and left shoulder, in that order.



Graph 1. Discomfort in the last 3 months

- l. In short, it was concluded that, there are ergonomic risks in nurses that are manifested in the arm, upper back and lower back before and after the intervention, and to prevent them, it would be to use equipment and lifting devices and ergonomic controls, education policies, while, among the self-care strategies, interpersonal relationships, positive attitude, emotional hygiene and working conditions are enunciated.

Table No. 2. Difficulties and obstacles for the ICU Nurse

| | Quantity | Percentage |
|---|----------|------------|
| Lack of attendance | 2 | 10% |
| Schedules | 1 | 5% |
| Lack of attention | 2 | 10% |
| Stress | 3 | 15% |
| Lower back, neck, hip pains | 3 | 15% |
| Lack of attendance, type of workday, work schedules | 2 | 10% |
| Internal problems with staff and patient safety | 2 | 10% |
| Exhaustion | 1 | 5% |
| Risk Factors | 2 | 10% |
| Poor posture | 2 | 10% |
| | 20 | 100% |

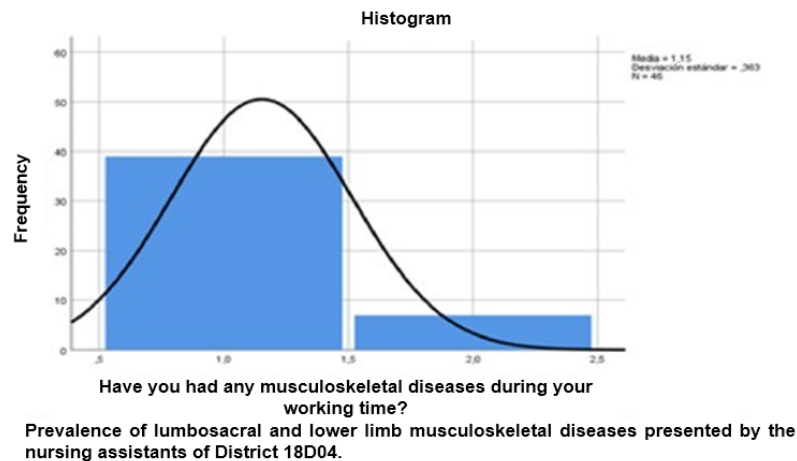
- m. In general, the workers who were evaluated were between 31 and 40 years of age. With respect to gender distribution, 77.7% were women and 22.2% were men. With a seniority in the work area of most workers from 1 to 5 years.

Table 2. Location of symptomatology in the last 12 months

| BODY AREA | Feminine n | Masculine n | Total n (%) |
|------------------|------------|-------------|-------------|
| Neck | 12 | 2 | 14 (38.8%) |
| Shoulder | 2 | 1 | 3 (8.3%) |
| Dorsal or lumbar | 18 | 4 | 22 (61.1%) |
| Elbow or forearm | 1 | 0 | 1 (2.7%) |
| Wrist and Hand | 8 | 2 | 10 (27.7%) |

Daysi Coral. 2020

- n. Eighty-five percent presented lumbosacral and lower limb diseases during working time, 39% had a temporary absence from work between 1-3 days. It was identified that weight bearing is performed by 37 % and prolonged walking by 33 %. Sixty-seven percent had between 11 and 40 years of work and the rest had less than 10 years in the sector. Fifty-four percent suffered from lower limb diseases and 46% from lumbosacral diseases.



- o. The 42.22% (19/45) perceived a high workload, 40.00% (18/45) medium and 17.78% (8/45) low; in the physical workload dimension, 53.33% presented a medium level and in mental workload, the perception was high with 46.67%. On the other hand, 57.78% (26/45) did not present musculoskeletal disorders, while 42.22% (19/45) did, likewise in the case of location, 13.3% was in the lumbar area and in intensity the majority was light with 17.80%.

Table 8. Level of workload according to level of musculoskeletal disorders.

| | | Musculoskeletal disorders | | | | | |
|----------|--------|---------------------------|-------|-------|-------|-------|--------|
| | | Does not show | | Shows | | Total | % |
| Workload | Low | 8 | 17.78 | 0 | 0.00 | 8 | 17.78 |
| | Medium | 8 | 17.78 | 10 | 22.22 | 18 | 40.00 |
| | High | 10 | 22.22 | 9 | 20.00 | 19 | 42.22 |
| | Total | 26 | 57.78 | 19 | 42.22 | 45 | 100.00 |

Source: Own elaboration survey.

DISCUSSION

- a. It should be added that the analyzed by (Silva et al. 2018) who conducted a study to 110 professionals, with a predominant sample of 90% women, which on average had an age of 39.37 years +/-, the hourly load they handled was 8.6 hours per week with an average working time of 12 to 9 years, where it was compared with the sectors in which they worked, for example: outpatient, milk bank, pediatrics, obstetric center, maternity, surgery etc., identified that the majority presented at least one discomfort or very high musculoskeletal discomfort, 56.38%, mentioned feeling discomfort in the lumbar and thoracic area, on the other hand, 51.06% in the cervical region and 26.59% in the ankle and foot.
- b. This review led to the conclusion that there are evidently risk factors related to musculoskeletal injuries in health staff, finding a higher prevalence in the lumbar region and extremities, which are related to working conditions, such as repetitive movements, physical load, environmental and personal conditions that lead to absenteeism, decreased work performance, permanent physical problems, job relocations and even inability to work.
- c. The results of this systematic review and subsequent meta-analysis show that occupational exposure to psychosocial factors in the work of nursing staff has an effective association with the presence of musculoskeletal pain and discomfort. One of the strengths of this review is having taken into account the publication of articles in languages other than English (used in most of the publications), such as French, Italian, Portuguese and Spanish, as well as noting the body areas most affected according to the studies analyzed.

- d. In relation to the most prevalent MSDs, it is concluded that the most affected areas, in order of prevalence, are the lumbar region, neck and shoulders. Although in this review it is not possible to reach an agreement on whether it is a priority to act on low back pain or neck pain due to the fact that two of the articles reviewed focus only on the first type of pain, relegating the others. The consequences of these prevalences did not translate into an increase in the need to change jobs.
- e. The psychosocial risk factors were analyzed in relation to the development of MSDs, the domains leadership-social relations, reward and home-work-home displacement presented the highest level of risk, debatable results in relation to other studies. Zambrano showed that the high levels of stress in the nursing staff working in intensive care are mostly caused by conflict with superiors, work overload and contact with pain and death.
- f. Some studies highlight the important relationship between the handling of loads, such as lifting or mobilizing patients, and the appearance of musculoskeletal injuries. We must remember that intensive care nurses perform physical loads during their working day (16-18, 20, 22, 24-25). This physical load, when it exceeds the capacity of the individual performing it, leads to a state of muscular fatigue, which manifests itself as an unpleasant feeling of tiredness and discomfort, accompanied by a decrease in performance, which subsequently conditions the development of musculoskeletal injuries.
- g. The body segments most frequently involved were: lower back (24.5%), upper back (17.5%) and knees (13.5%). The study also found that the great majority of the assistants had received medical incapacity for this cause (65%), it also found that a very low percentage of assistants had reported the symptomatology to the occupational risk administrator (18%), and 9% had already been relocated for this cause.
- h. Female sex predominated among the participants in this study (84.7% of the nursing staff). The average age, weight and height were 30 years, 63.4 kg and 160 cm respectively. The part of the body most affected by discomfort was the back with 37.8%, neck with 16.2% and right hand-wrist with 5.4%.

- i. The results show a prevalence of MSDs in the pediatric ICU nursing staff of 100%, since all the workers who participated in the study reported musculoskeletal discomfort. To make the study more interesting, the prevalence of musculoskeletal discomfort experienced by the worker in each of the 5 areas of the body was estimated in such a way that the prevalence of MSDs in the neck is 94.1%, the prevalence of MSDs in the shoulders is 64.7%, in the dorsal lumbar area 88.2%, in the elbow or forearm 18.8% and in the wrist or hands 18.8%.
- j. This study found that nursing assistants who perform their work activities in the intensive care unit present a high prevalence of musculoskeletal symptomatology (79%) as a result of activities such as bathing, mobilizing and transferring patients, where they are confronted with inadequate and prolonged postures, lifting and mobilizing loads. The body segments most frequently involved were: lower back (24.5%), upper back (17.5%) and knees (13.5%). The analysis also found that the great majority of the assistants had received medical incapacity for this cause (65%), a very low percentage of assistants had reported the symptomatology to the labor risk administrator (18%), and 9% had already been relocated for this cause.
- k. Nurses often perform heavy physical work activities, such as lifting loads, working in awkward postures, transferring patients, operating dangerous equipment, among others. The nursing profession is second only to industrial work in terms of physical workload. Because of this, low back pain is the most frequently occurring work-related MSD in this profession, with a 12-month prevalence of between 30% and 70%.
- l. Organizational factors were expressed as a barrier to self-care, affecting health care activity. As a protective factor, the treatment of patients was mentioned, based on the satisfaction generated by the helping relationship in situations of severity and suffering. The assessment of the quality of work life was not as desired and was deficient. The most affecting factors refer to the type of workday and work schedules (rotating shifts, nights, holidays, on-call).
- m. The results of this research show that within the activities carried out by the health staff, forced postures have a significant association with musculoskeletal discomfort, coinciding with the findings of Santana's study, carried out in a health center in Ecuador.

- n. Equivalent results were obtained in the research developed by Quispe, where he indicates that 75% of the sample studied presented low back pain, the level of pain was from mild to moderate in 98%, and it is shown that there is a link between the ergonomic risk of forced postures associated with the upper extremities and low back pain.
- o. In the results it was observed that 42.22% (19/45) perceive a high workload, 40.00% (18/45) medium and 17.78% (8/45) low; likewise it was observed that a greater proportion of the participants do not present musculoskeletal disorders. But of the group that does present them, the majority is in the lumbar area and of a slight intensity.

Ethical aspects:

- In the development of this article, all authors involved present the senior author under the consent of the other authors.
- All authors were responsibly engaged in the development of the article.
- The submitted article is original content, it has not been published in any journal.
- References to other authors are made in some articles in an APA manner.
- This article was submitted for evaluation by the advisor responsible for the subject.
- If the authors have not complied with the above points, the submission to the platform must be suspended and disapproved by the academic institution.

CONCLUSIONS

- a. By identifying that most of the healthcare staff working in the different health centers are women, where most of the injuries occur in the lumbar area, although there is also incidence in shoulders, knees, neck and dorsal area of the back; and the psychosocial risk factors favor and increase musculoskeletal disorders and the lack of knowledge on the part of employers, the lack of surveillance and control mechanisms by the government, favor the appearance of MSDs in the working population of the organizations.
- b. It is important to have mandatory training in the different clinical areas, and thus achieve an awareness of the risks to which health staff are exposed due to poor body mechanics and lack of knowledge about the mobilization of patients that can lead to musculoskeletal problems; as demonstrated in the indicators of this type of injury, causing total or permanent incapacity for work activities as health staff.

- c. Occupational exposure to psychosocial factors is associated with discomfort and/or pain in different body areas. Therefore, improving the psychosocial environment has an impact on the reduction and prevention of musculoskeletal disorders.
- d. A national strategy is needed to promote strategies for the prevention and control of musculoskeletal disorders in nursing, starting with conducting more scientific research on these diseases and reflecting the real situation.
- e. The psychosocial risk factors that presented a high risk among the nursing staff in the intra-work factors were the domains of rewards and leadership and social relations. In the extra-occupational factors were the domains commuting and time away from work. In the case of family relationships, they are good among the study population.
- f. Where of the total articles reviewed, eight articles, representing 66.6% (n=08/12) mentioned that handling loads such as lifting, changing position to patients, repetitive movements, forced postures and adopting awkward positions represent tasks that involve a great association with musculoskeletal injuries.
- g. The high work demands in intensive care units generate the appearance of musculoskeletal disorders in nursing assistants.
- h. Nearly half of the participants handle weights greater than those allowed and perform forced and antigravitational postures, exposing themselves to developing symptomatology or a musculoskeletal disorder, and the back is the most affected area of the body.
- i. The results of the study show that there is a high prevalence of MSDs in the nursing staff of the pediatric ICU of the HCUV, since 100% of the workers who participated presented MSDs. The neck and the dorsal or lumbar area are the most affected with a prevalence of 94.1% and 88.2% respectively, followed by MSDs in the shoulders with a prevalence in our study of 64.7% and by MSDs in the elbow or forearm and in the wrist or hands with a prevalence of 18.8%.
- j. The high work demands in intensive care units generate the appearance of musculoskeletal disorders in nursing assistants.

- k. The existence of this type of disorders is confirmed in a significant percentage of auxiliary nursing professionals in this center, their location in specific areas of the upper limbs and their consequences on occupational health in general. Likewise, certain task, organizational and psychosocial factors directly related to MSDs are identified, which can undeniably be influenced, thus opening up multiple possibilities for intervention.
- l. The role of the nurse in the intensive care unit is crucial, demonstrating that it is she who should be in charge of prioritizing health, giving spiritual encouragement, health support, replenishing the patient, following healthy lifestyles, caring for the physical and psychological well-being, and supporting patients in the prevention of diseases.
- m. The timely intervention with emphasis on preventive measures, in this population can cause important changes in the development of each of the tasks performed in the hospital, creating welfare and an appropriate working environment.
- n. There is an 85% prevalence of lumbosacral and lower limb osteomyoarticular disease in District 18D04 nursing assistants. The prevalence of these diseases is related to age and to having suffered them in the last twelve months. Lumbosacral and lower limb osteomyoarticular disease in nursing assistants has caused absenteeism. There was no statistically significant relationship between the suffering of osteomyoarticular disease and seniority in the sector, working hours and the activities most frequently performed.
- o. There is a significant relationship between physical workload and musculoskeletal disorders among the nursing staff working in the Emergency Department of the Hospital Nacional Arzobispo Loayza, 2020. According to Spearman's Rho statistic ($p=0.040$; $r_s=0.306$).

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