Identification of cumulative post-traumatic disorders in port workers for clinical reasoning

Identificação de transtornos traumáticos cumulativos em portuários para o raciocínio clínico

Marlise Capa Verde de Almeida[1]
Marta Regina Cezar-Vaz[1]
Clarice Alves Bonow[2]
Mara Regina Santos da Silva[1]
Edison Luis Devos Barlem[1]

Corresponding author
Marlise Capa Verde de Almeida
Rua General Osório, unnumbered, 96201-900, Health *Campus*, Rio Grande,
Rio Grande do Sul, Brazil.
marlisealmeida@msn.com

Abstract

Objective: To associate cumulative post-traumatic disorders self-reported by port workers with their socio-environmental constraints.

Methods: Cross-sectional study conducted with 232 port workers (136 onshore and 96 on board) with a mean age of 48.7 years. The cumulative post-traumatic disorders were self-reported, and their intensity was measured by a grade from one to four. Spearman's correlation coefficient was used to associate the intensity of disorders with characterization variables, and Pearson's chi-square test was used to associate groups of workers with the disorders.

Results: Both categories of port workers pointed out lumboischialgia (36.8% onshore and 28.1% on board) and tendinitis (27.9% onshore and 31.3% on board). There was a statistical correlation between age and work time with the intensity of the illnesses.

Conclusion: The self-reporting of illnesses pointed out low back pain and tendon disorders that inferred causality to the self-reported diseases, whose practice should integrate the processing of the nursing clinical reasoning.

Resumo

Objetivo: Relacionar os transtornos traumáticos cumulativos autorreferidos por trabalhadores portuários e seus condicionantes socioambientais.

Métodos: Estudo transversal com 232 portuários (136 em terra e 96 a bordo) com média de idade de 48,7 anos. Os transtornos traumáticos cumulativos foram autorreferidos; a intensidade foi medida pela atribuição de uma nota de 1 a 4. Foi realizada análise do coeficiente de *Spearman* para relacionar intensidade dos transtornos e variáveis de caracterização, e teste qui quadrado de Pearson foi usado para relacionar grupos de trabalhadores aos transtornos.

Resultados: Ambas as categorias de portuários destacaram lombocitalgias (36,8% em terra e 28,1% a bordo) e tendinite (27,9% em terra e 31,3% a bordo de navio). Houve correlação estatística entre a idade e tempo de trabalho com a intensidade dos adoecimentos.

Conclusão: A autorreferência de adoecimentos ressaltou doenças lombares e tendinosas que inferiram causalidade às doenças autorreferidas, cuja clínica deve integrar o processamento do raciocínio clínico da enfermagem.

Introduction

The process of illness associated with work requires a continuous and systemic performance from nurses, to operate elements conditioning to the workers' health, to eliminate or control them. Therefore, clinical reasoning is used, characterized by the cognitive process of thinking on health information, organizing ideas and exploring experiences that provide planning of care. It provides the assimilation and analysis of health evidence, differentiating them according to their use, effectiveness and application for the assisted individuals, which occurs at work from the workers' interaction in their occupational environment.[1,2]

Regarding musculoskeletal diseases, nursing clinical reasoning has been promoted based on the analysis of the socio-environmental and sociodemographic characteristics, and the workers' self-reporting, so that the identification and recognition of diseases and environment in which they develop, can contribute to their recovery. Furthermore, it should be possible to control emotional and physical responses, to modify health behaviors, at the same time producing professional skills for the control of these diseases and strengthening of occupational clinical reasoning.[3,4]

It is understood that the muscular health of port workers is conditioned by the cargo handling operations in the organized ports, whose activities of foremanship, stowage, cargo checking, cargo repair, group work and vessel surveillance constitute mixed work processes, integrating manual, automated and computerized activities. These characteristics propitiate the muscular pathological triggering, as already identified in studies, and the most prevalent diseases, according to medical diagnosis, are tendinitis and arthrosis.[5-7]

Therefore, the processing of nursing clinical reasoning can be incited from the anatomic and physiological characteristics of these diseases, as well as the self-perception of illness by workers, and the personal constraints related to work, which can be involved, thus triggering both specific and regulatory and clinical interventions that mitigate the illness. In this respect, a specific process of clinical reasoning is implemented, which might contribute to deepen the relationship among health, environment, work and disease of port workers, mediating the communication of occupational risks for the healthy maintenance of the port work process and other occupational realities.[8,9] Furthermore, the objective of this study was to associate the cumulative post-traumatic disorders self-reported by port workers with the socio-environmental constraints of their work.

Methods

A quantitative cross-sectional study was conducted with port workers of the *Porto do Rio Grande*, a port in the state of *Rio Grande do Sul*, in the south region of Brazil. Data were collected from January to October of 2014. The workers' selection was based on a single inclusion criterion namely, developing port work activities. Data collection occurred by means of interviews, with the use of a semi-structured questionnaire, validated by specialists on workers' health and used in previous studies conducted by the research group who integrate this study, the Laboratory of Studies on Socio-environmental Processes and Public Health Production (*Laboratório de Estudos de Processos Socioambientais e Produção Coletiva de Saúde* – LAMSA). This tool addressed several variables of characterization of the participants, such as: age, education level, marital status and income, as well as work characteristics, such as time, category and working hours.[7] Knowledge on health conditions, resources, work tools and technologies, health surveillance services and strategies of socio-environmental health prevention and promotion[7] were also addressed.

The cumulative post-traumatic disorders were identified based on the group of diseases of a previous survey of musculoskeletal diseases of the occupational healthcare medical service

of the workmanship management agency of *Rio Grande*, in the state of *Rio Grande do Sul*, during 2000 and 2009. These workers registered in the medical service were questioned and reported diagnoses of: lumboischialgia, arthrosis, arthritis, tendinitis, epicondylitis, bursitis, synovitis and tenosynovitis, and trigger finger. Then, the workers were questioned if they considered the disorders mentioned as associated with work and, by means of a psychometric scale, they classified the disorders' intensity as slight (score 1), moderate (score 2), serious (score 3) or complete (score 4).

A pilot study was conducted to avoid biases, applying the questionnaire to 13 temporary dock workers, selected according to their willingness to answer the tool. Furthermore, the interviewers received training and a guidance handbook for questionnaire standardization. In the year of data collection, there were a total of 579 port workers eligible to participate in the study. Of those, a non-random sampling, stratified and calculated with the StatCalc of the Epi-Info 3.5.2 software, led to the selection of 232 port workers, who were subdivided in workers who performed on board, that is, in the piers and warehouses (foremanship workers, n=136) and those who worked on board of vessels (dock workers, repair technicians, group workers, gate clerks and vessel wards, n=96). The level of confidence used was 95%.

Quantitative data were digitized and organized in the Statistical Package for the Social Sciences 21 software (SPSS); descriptive and inferential statistics were applied using Spearman's correlation coefficient, that enabled to analyze the correlation between the two groups of workers, and the variables of personal and work characterization, besides the use of Pearson's chi-square test, that verified the relationship of significance between the groups of workers and the self-reported disorders.

The manuscript extracted from the thesis entitled "*Adoecimento osteomuscular de trabalhadores portuários avulsos e o processamento do raciocínio clínico da enfermagem*", advised by Professor and Doctor Marta Regina Cezar-Vaz and defended on

May 27, 2015, to the Graduate Program in Nursing of the *Universidade Federal do Rio Grande*.

The study was registered at the Research Ethics Committee of the Federal University of Rio Grande under protocol number 118/2013.

Results

Of the 232 workers interviewed, 58.6% (n=136) worked onshore and 41.4% (n=96) worked on board the vessels. The mean age was 48.7 years (standard deviation – SD=7.64) and the mean port work time was 24.2 years (SD=8.2), with mean working hours of 7.2 hours (SD=1.9). Regarding the working shifts, 76.7% of the individuals (n=178) worked both in day and night shifts, according to the range of the working schedules. Regarding skin color, 56% (n=130) of the workers were considered white, 60.8% (n-141) were married, 37.1% (n=86) had high school and 28.9% (n=67) had incomplete elementary school.

Regarding the diseases self-reported by the port workers, the ones who work onshore reported more frequently the occurrence of all types of diseases investigated. For both categories, the most reported were lumboischialgia (36.8% of onshore workers and 28.1% of on board workers), and tendinitis (27.9% of onshore workers and 31.3% of on board workers). In order to verify associations between professional categories and musculoskeletal diseases, the chi-square test was applied, whose p value, as well as the frequency of diseases are presented in table 1.

Table 1. Frequency of musculoskeletal diseases self-reported by the port workers

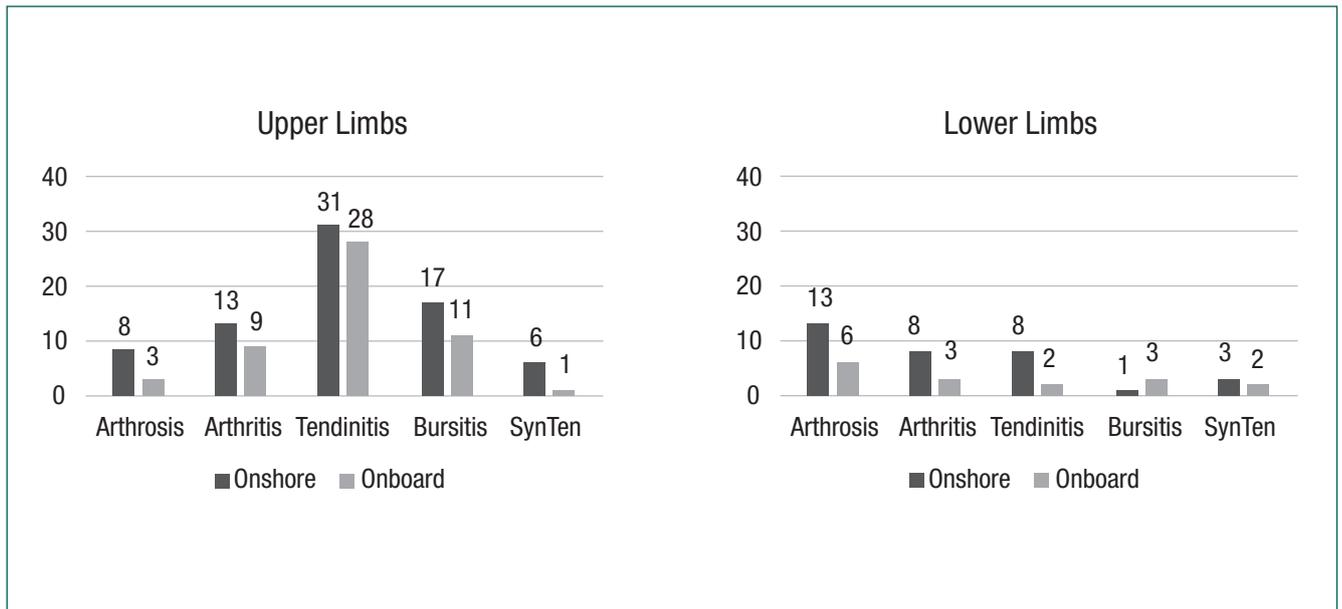| Disease	On board n(%)	Onshore n(%)	p-value
Arthritis	19(8.2)	11(4.7)	0.574
Arthrosis	22(9.5)	10(4.3)	0.210
Bursitis	22(9.5)	16(6.9)	0.921
Trigger finger	10(4.3)	5(2.2)	0.513
Epicondylitis	11(4.7)	10(4.3)	0.543
Lumboischialgia	50(21.6)	27(11.6)	0.169
Synovitis and Tenosynovitis	6(2.6)	3(1.3)	0.617
Tendinitis	38(16.4)	30(12.9)	0.586

Figure 1. Frequency of disorders according to location and professional category affected - Note: SynTen - Synovitis and Tenosynovitis

When questioned on the intensity of the muscular diseases, 41.3% (n=33) of the workers on board and 57.7% (n=45) of the workers onshore considered them moderate. The identification of the causal nexus of work with the diseases investigated was recognized by 76% (n-73) of the workers on board and 79% (n=108) of the workers onshore.

Between the two categories of workers, illnesses affected more upper limbs than lower limbs. Differently from other illnesses located in lower limbs, bursitis was more reported by workers on board than onshore (Figure 1).

When analyzing correlation possibilities between the intensity of musculoskeletal illnesses and variables of personal (age) and work (time and work hours) characterization, Spearman's correlation coefficient was conducted. Significant correlations were found between intensity of illnesses and age, that is, the higher the age, the higher the perception of intensity (p=0.130; p<0.048); there was also a positive correlation between intensity and length of work in the port, indicating that the higher the working time, the higher the perception of illness intensity (p=0.158; p<0.016). Regarding working hours, there was not a significant correlation (p=0.203; p<0.955).

Discussion

The limitations of the study are associated with its cross-sectional design, which does not allow the establishment of causal links, however, a study of this nature contributes to track and clarify relevant aspects for future intervention studies, for example. These characteristics strengthen other specific limitations, such as the presentation of a collection instrument, since the workers' low level of education might have interfered in the understanding and recognition of compromise by the questioned illnesses. The issue of masculinity, culturally attributed to the port worker is also included, which may mask the diseases' presence and intensity.

The identification of illnesses provides subsidies so that nursing, from its clinical reasoning, problematize work constraints that produce illness and make work activities painful and difficult to be developed, considering from that, measures that can reduce the effects of the diseases. The results of the study showed that, among the port workers studied, the most self-reported illnesses were lumboischialgia and tendinitis, which developed predominantly in upper limbs. Lumboischialgia refers to lumbar pain, which radiates to the lower limbs, and it may reach the toes. It is a specific type of low back pain

difficult to be diagnosed. It is associated with the presence of nerve crush such as intervertebral disk displacement, stenosis of medullary canal, and others. When associated with intervertebral disk displacement, this illness worsens the physical effort, like in the Valsalva maneuver, when sneezing and coughing.[10]

In the development of the port work, lumboischialgia may be associated with constraints that submit workers for a long period of time to contractures or immobilization of the region of the head, neck and shoulders. Examples of this are the port operations with cranes and winches that require concentration for handling and positioning of large structures, keeping firmly the body posture exposed to the vibration of machinery. Other activities also involve chronic stress, excessive efforts, lifting and abduction of arms above the shoulder height, for example, when handling bulk cargo and loose cargo, performed daily by workers.

Besides the constraints of work environment, it is important to relate the personal constraints. Port workers present a high mean of age, which causes dehydration of the intervertebral disks, leading to degeneration, instability and pain in the lumbar region.[10,11] It is also worth noting the worker's compromise by systemic conditions, such as obesity, which may contribute to the increase of lumbar lordosis, favoring the occurrence of mechanical low back pain,[12,13] which is an etiology condition different from lumboischialgia. Therefore, these conditions require clinical reasoning to be characterized in an accurate physical examination and a complete neurological evaluation, that comprise different clinical techniques, such as palpation, in which it is possible to identify the hypertonia in paravertebral muscles, as well as to identify mechanical, compressive, root or spinal nerve compromise with the lumbar spine, from the Lasegue's maneuver,[10] detecting the possibility of lomboischialgia. However, the identification of daily risk activities, such as carrying weight and poor body posture, as well as the existence of relevant personal constraints, may help detecting mechanical low back pain.

Tendinitis is characterized by inflammation of the tissue of the tendons, with or without degeneration of their fibers.[14] It is a disease with a high incidence in Brazil, and is considered one of the main causes of removing workers from their daily activities. The nexus with work comes from epidemiological findings, occupational history data and ergonomic analysis of work.[14] The disease might affect any part of the body, but, if the muscles involved have a synovial covering or sheath, the process is called tenosynovitis. The location of tendinitis among the port workers was more frequent in upper limbs, as identified in coal miners, in whom the disease manifested by means of lateral epicondylitis, De Quervain's syndrome and ulnar neuropathy,[15] and also among production workers, by means of tendinosis that manifested in workers continuously exposed to activities that require flexion and extension of arms and wrists.[16]

Port workers perform operations with these types of positions, like in the use of machinery, such as wheel loaders, backhoe loaders, winches, stackers, vehicles and in manual work with brooms, dustpans, ropes and cables, in manual tumbling and sliding of loads, and others. They are also exposed in vessels' surveillance work, signaling of operations, mooring and anchoring, and handling containers, since when they are lifted by winches and cranes and are diverted because of the wind, the workers try to move them, putting them in the right position.

These workers' occupational activities can also justify the significant frequency of reported arthrosis, characterized by progressive biochemical and anatomical changes in the joints, compromising structure and function. This disease is multifactorial and is both associated with age and work elements, being identified among dock workers, in the vertebral column, due to the weight carrying performed during port operations.[17] The joint disease was also associated with activities with the lifting of arms and standing work, which cause overload to the hip and knee joints among professors, making the blood supply difficult and causing pain and illness.[18]

Another significant factor in this study was the correlation between age and work time with the intensity of the self-reported illnesses. It is inferred that workers with higher age present longer exposure time to socio-environmental constraints, generating a higher chance of developing illnesses, and consequently, a higher perception of their intensity. Longer work time has the same effect, influencing in the understanding of the occupational environment and consequent exposure.

The results presented help nursing to use clinical reasoning, to identify why activities produce illnesses and why they are so difficult to be developed, considering measures that may reduce the effect of diseases. No matter how the results obtained were based on medical diagnoses, the processing of the nursing clinical reasoning for the workers' health go beyond this context, and it can use both biological data and personal and work socio-environmental elements, making it possible to check the existing interactions between the health and occupational illness processes.

Therefore, it is possible to organize the workers' experience as a protective factor for their health, since they will have means for the identification and knowledge about diseases caused by work, allowing them to clearly understand the intensity of these diseases, thus preventing them, by means of self-care strategies and collective guidance (among colleagues). To perceive how the body falls ill is a measure that can be strengthened by the communication of occupational risks, herein presented by personal (age) and organizational (type of work, time and working hours) elements, which are associated with the producing of illness, thus providing nursing clinical reasoning for the intervention in health. Self-management strategies may also be organized, allowing the management of the work environment and its tools, to prevent that occupational activities produce or intensify diseases.[19] In addition, nursing staff can use evaluation tools in health, such as electromyography, as a way to consider physiological and biomechanical responses, identifying the muscular activity, ex-hausted muscles, stress and the individuals' musculoskeletal strain.[20]

Besides these measures, using clinical reasoning, the nursing staff may complement the ergonomic evaluations where work is developed,[21] considering both internal and external areas of the ports, such as unions, where workers are called for work, and where they have a more appropriate place for their organization and rest, before and between work activities. With a more comprehensive look, reasoning collaborates to the ergonomic process, to promote an environmental and functional exploration of work, thus favoring the workers' adaptation and prevention of muscular diseases.

Conclusion

Lumboischialgia and tendinitis were the most frequent diseases among port workers, whose intensity showed a significant correlation with personal and work socio-environmental constraints, thus influencing in the design of nursing clinical reasoning, that in this context, should consider the chronicity of illnesses, organizing long-term preventive measures, and consequently, providing the implementation of nursing socio-environmental care to workers.

Collaborations

Almeida MCV and Cezar-Vaz MR declare that they contributed to the conception, project, analysis and interpretation of data, writing of the article, relevant critical review of its intellectual content and to the final approval of the version to be published. Bonow CA, Silva MRS and Barlem ELD contributed to the writing of the article, relevant critical review of its intellectual content and the final approval of the version to be published.

References

1. Banning M. Clinical reasoning and its application to nursing: Concepts and research studies. Nurse Educ Pract. 2008; 8(3):177-83.

2. Simmons B. Clinical reasoning: concept analysis. J Adv Nurs. 2010; 66(5):1151-8.

3. Cezar-Vaz MR, Cardoso LS, Bonow CA, Sant'Anna CF, Sena J. Conhecimento clínico do enfermeiro na atenção primária à saúde: aplicação de uma matriz filosófica de análise. Texto Contexto Enferm. 2010; 19(1):17-24.

4. Schoormans D, Mulder BJ, Van Melle JP, Pieper PG, Van Dijk AP, Sieswerda GT, et al. Illness perceptions of adults with congenital heart disease and their predictive value for quality of life two years later. Eur J Cardiovasc Nurs. 2014; 13(1):86-94.

5. Almeida MC, Cezar-Vaz, MR, Rocha LP, Cardoso LS. Dock worker: profile of occupational diseases diagnosed in an occupational health service. Acta Paul Enferm. 2012; 25(2):270-6.

6. Almeida MC, Cezar-vaz MR, Soares JF, Silva MR. The prevalence of musculoskeletal diseases among casual dock workers. Rev Lat Am Enfermagem. 2012; 20(2):243-50.

7. Cezar-Vaz MR, Soares JF, Almeida MC, Cardoso LS, Bonow CA. Self-referred illnesses related to work in self-employed port workers. Cienc Cuid Saude. 2010; 9(4):774-81.

8. Cezar-Vaz MR, de Almeida MC, Bonow CA, Rocha LP, Borges AM, Piexak DR. Casual dock work: profile of diseases and injuries and perception of influence on health. Int J Environ Res Public Health. 2014; 11(2):2077-91.

9. Bonow CA, Cezar-Vaz MR, Silva LR, Rocha LP, Turik C. Health disorders related to learning the welding trade: assessment of approaches to risk communication. Rev Lat Am Enfermagem. 2014; 22(1):43-50.

10. Barbosa MH, Silveira TB, Cussi RA, Bonato FZ. [Lombalgia: fatores de melhora e piora entre os clientes atendidos no ambulatório de ortopedia]. Saúde Coletiva. 2011; 8(47):18-23. Portuguese.

11. Organização Mundial da Saúde (OMS). Classificação Estatística Internacional de Doenças e Problemas Relacionados à Saúde (CID-10). 10a rev. São Paulo: OMS; 2008 [cited 2015 Aug 31]. Available from: http://www.datasus.gov.br/cid10/V2008/cid10.htm.

12. Oliveira JG, Salgueiro MM, Alfieri FM. [Low back Pain and Lifestyle]. UNOPAR Cient Ciênc Biol Saúde. 2014; 16(4):341-4. Portuguese.

13. Borges TP, Kurebayashi LF, Silva MJ. [Occupational low back pain in nursing workers: massage versus pain]. Rev Esc Enferm USP. 2014; 48(4):699-75. Portuguese.

14. Brasil. Ministério da Saúde do Brasil. Organização Pan-Americana da Saúde no Brasil. Doenças relacionadas ao trabalho: manual de procedimentos para os serviços de saúde. Normas e Manuais Técnicos. Brasília, DF: Ministério da Saúde; 2001. [cited 2015 Jun 30]. Available from: http://dtr2004.saude.gov.br/susdeaz/instrumento/arquivo/16_Doencas_Trabalho.pdf.

15. Özdolap S, Emre U, Karamercan A, Sarikaya S, Köktürk F. Upper limb tendinitis and entrapment neuropathy in coal miners. Am J Ind Med. 2013; 56(5):569-75.

16. Harris-Adamson C, You D, Eisen EA, Goldberg R, Rempel D. The impact of posture on wrist tendinosis among blue-collar workers: the San Francisco study. Hum Factors. 2014; 56(1):143-50.

17. Garcia Júnior AC. Segurança e Saúde no Trabalho Portuário - Manual Técnico da NR 29. São Paulo: Fundacentro; 2014.

18. Ribeiro IQ, Araújo TM, Carvalho FM, Porto LA, Rei EJ. [Occupational factors associated to musculoskeletal pain among teachers]. Rev Baiana Saúde Pública. 2011; 35(1): 42-64. Portuguese.

19. Walker J. Shoulder pain: pathogenesis, diagnosis and management. Nurs Stand. 2014; 28(22):51-8.

20. Oliveira GS, Cezar-Vaz MR, Rocha LP, Severo LO, Bonow CA. [Electromyography in clinical occupational health: integrative review]. Rev Enferm UFPE On Line. 2013; 7(4):1216-24. Portuguese.

21. Silva LA, Secco IA, Dalri RC, Araújo SA, Romano CC, Silveira SE. [Ergonomics and occupational health nursing: prevention of health disorders]. Rev Enferm UERJ. 2011; 19(2):317-23. Portuguese.