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REFLECTION ARTICLE

ECOSYSTEMIC ELEMENTS OF THE HEALTH OF DOCKWORKERS AND THE WORK PROCESS

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ABSTRACT
This theoretical reflection's aim was to present the interrelationship of ecosystemic elements of port work in the production of risks to the health of workers. Serge Frontier's theoretical framework was used to identify these elements, to which theory derivation was then applied. It enabled understanding the port as a complex, organized, hierarchical and diversified ecosystem, through the relationships established among workers based on the multi-functionality expressed in their practices and knowledge tools. These characteristics subject these workers to environmental exposure that poses risks to health at the individual and collective levels. Awareness of this context is instrumental for nurses to produce ecological/ecosystemic behaviors focused on the identification of environmental risks, thus, contributes to the preservation and maintenance of the health of dockworkers.

Keywords: Nursing. Work organization. Work.

INTRODUCTION

Port structures are located in areas with large extensions of water, naturally and artificially protected from sea waves and currents, enabling anchorage and shelter for vessels and facilitating the movement of passengers and cargo[1]. The city of Rio Grande has had such a structure since the 19th century and involves, as one of its driving forces, casual dockworkers whose work has a peculiar productive process that comprises structural aspects, such as the intermediation of a labor-management agency (LMA), the casual and multi-function nature of the work, and an intense workload[1].

In addition to these aspects, there are also environmental risks related to the process' structural nature involving handling cargo, the roles performed by the workers, the number of workers involved in the productive activities, and the influence of the physical space in which the work is performed (i.e. inside holds, containers, dock port).

This dynamics of labor present aspects relevant for an ecosystemic understanding of the health-work-disease continuum, which is achieved in this paper based on the theoretical conception of Serge Frontier[2], which led to the derivation of the ecosystems theory. This theory is based on the interactions among living elements and the physical environment in which they are organized. Hence, a port is considered a complete ecosystem, formed by a structure of strong and weak interactions between living and non-living elements in the internal environment, in inter-relationship with the external physical/chemical environment, the lacustrine-lagoonal setting[2].

These elements compose a self-organized system[2], evidenced by the **organization, hierarchy,** and **diversity** of its elements,

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characteristics that are necessary for the maintenance and survival of the systems involved, considering that, in addition to the inter-agents, the elements of the port work process complement each other, resulting in a stable productive process.

Acknowledging that the coexistence of these elements integrates the daily life of a significant part of the world population[1] working in this type of job, which has similar ecosystemic characteristics even while occurring in different countries, we consider the nursing field to have the potential to control factors that potentially affect the health of these workers, mediating, based on knowledge of the work environment, the communication of risks posed to health and the creation of an ecological/ecosystemic behavior to a healthy maintenance of the health-work-disease continuum.

Therefore, this reflection's **aim** is to present the inter-relationship of ecosystemic elements of the port work process in the production of risks to the health of workers.

MATERIAL AND METHODS

This theoretical reflection is based on an ecosystemic perspective that was originally expressed in a graduate paper for the course "Nursing/health work and the socio-environmental context", from the first semester of the doctoral program at the Federal University of Rio Grande, Nursing Graduate Program (FURG, RS). This course comprised the reading of an extensive bibliography highlighting the studies of Frontier[2] and Lausten[3], discussed together with literature addressing the dynamics, risks and characteristics of dock work[1,4-12]. The theory of theoretical derivation was applied to the literature involved, through which we derived analogies concerning knowledge of a given phenomenon – the theory of ecosystems – for the study and production of knowledge in another sphere, the health of dockworkers[3].

Additionally, we chose this topic due to integration with the Laboratory of Studies of Socio-environmental Processes and Collective Production of Health (LAMSA), which, since 2006, has researched occupational health in this context, investing in scientific production that seeks to identify the nexus among the socio-environmental constraints, risk and disease. Among its philosophical frameworks, this group works with the ecological concept of health, conceived here in the analysis of the categories **organization, hierarchy** and **diversity**, presented by Frontier[2], which are understood as being necessary to the maintenance of the functions of diverse environments, including that of labor.

Therefore, the bibliography allowed concepts to be examined that are capable of sustaining a potential model of an ecosystemic approach, which considers the ecosystem in interaction among internal systems, composed of living beings and non-living elements, and of these with the chemical-physical external environment. Each system has a specific delimitation that presents self-organization that associates structures and functions, the purpose of the work and autonomy, consequently producing stability[2], in a relationship of dependence with the environment[2,3].

Therefore, this discussion is intended to deepen knowledge concerning the production of risks in connection with environmental issues that involve the system of which casual dockworkers are a part.

ECOSYSTEMIC RELATIONSHIPS THAT INVOLVE THE WORK PROCESS OF CASUAL DOCKWORKERS

The readings and discussions enabled the identification of external and internal elements that compose the port ecosystem and involve the health of dockworkers. The following figure illustrates the interdependent relationships established among living and non-living elements of the internal and external environments of the port ecosystem.

Considering the structural characteristics of port work, we understand the port to be a complex ecosystem, composed of external and internal elements. The first are those that constitute the area around the port region, that is, the Rio Grande coastal ecosystem. The city of Rio Grande has had a port structure since 1737 and has the status of the last Brazilian seaport in the South Atlantic, integrating Brazil with the countries of Southern Latin America. Therefore,

its importance is not only geographic, but also economic[7].

In exchange with the environment described, the port establishes interactions among internal living and non-living elements at the same site[2], and humans are among the living beings of this ecosystem – casual dockworkers as part of the site's work dynamics. These workers are subdivided into six functional categories that formalize the **organization** of the work process: quayside workers, longshoremen, tally clerks, cargo repairmen, ships' watchmen, and block workers responsible for different productive functions.

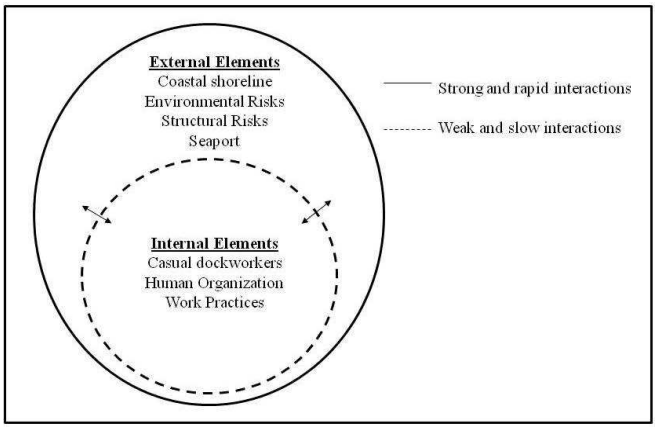

Figure 1 - Representation of the inter-relationship of living and non-living elements of the internal and external environments of the port ecosystem – adaptation of the scheme of an interactions system conceived by Frontier's ecological view[2].

Quayside workers and longshoremen, for instance, are involved in more manual activities, such as moving goods, receiving and checking cargo, internal transportation, opening containers for checking, handling, storing and delivering, loading and unloading vessels. The only differentiation between functions is the place of work, that is, the physical environment in which work relationships take place: if the work is performed on board a vessel, it is the responsibility of longshoremen; if ashore, the work is the responsibility of quayside workers[1].

Workers responsible for checking cargo perform less physical activities such as determining volumes, taking notes of the goods' characteristics, origin or destination, assessing the condition of goods, and weighing them. Cargo repairmen repair and restore packaging of goods, re-pack, label, and stamp cargo. The role of these workers is becoming less important due to the current way goods are packaged, i.e., in round lots, which facilitates transport and expedites handling through motorized equipment[1].

Watching vessels includes inspecting the entry and exit of people and goods on board, supervising ramps, holds, decks, and other places in the vessel. And finally, the activities of one block of workers consist of cleaning and maintaining vessels and their tanks, making general repairs. These last two activities do not require directly handling or transporting cargo but, because these workers perform actions that are necessary to achieve the product of port work and because their service is provided on the same site as that of other dockworkers, they receive equivalent legal treatment[1].

This subdivision is what confers the organizational nature on the work of casual dockworkers, which imposes requirements for productivity and agility in the handling of cargo. We observe, however, that there is a **hierarchical** structure in port work that emerges from this functional subdivision. Workers can perform activities correlated to that for which they already are qualified as long as they have the necessary knowledge and experience. Such a principle is called multi-functionality, which is encouraged in order to adapt casual dockworkers to the modern processes of cargo handling and to increase productivity[1].

Nonetheless, hierarchy is observed because, even though all workers legally may operate according to this principle, those who most

frequently do are quayside workers and longshoremen.

From the perspective of risk to health, greater occupational exposure is observed among these workers, so that the characteristic of **diversity** is established in the port work process.

The characteristic under study is presented in two forms: in the workers' functional tasks and in harmful occupational exposure. First, according to the LMA, casual dockworkers are organized for group work organization into what are called "*ternos*", work teams established based on the work force necessary to handle cargo onboard vessels[1]. This organization reinforces the survival, maintenance, adaptation and reproduction of this system[2], but it may, however, be considered unsatisfactory due to the insufficient number of workers included in the *ternos*[5] to perform specific activities. We also highlight there is a commitment to productivity in this field of work. The organization into *ternos* requires that, together with a period of eleven hours of rest between workdays[1], workers operate in turns, which are established according to their availability as they volunteer for the schedule.

Hence, an interdependent relationship, composed of strong and rapid interactions, is established among "casual dockworkers, work management, and work practices". Another interdependent relationship, one that is weak and slow, is established between these parts and the external physical environment[2], composed of the coastal shoreline, which together with the port's physical structure, poses environmental risks to health. This interaction is weak but constant. There is environmental exposure to the habitat's characteristics, to the work in the context of the ocean and weather conditions such as cold, heat, and moisture, which is discussed in the next item.

PORT WORK: A FIELD FOR THE ECOSYSTEMIC WORK OF NURSES IN OCCUPATIONAL HEALTH

The relationship of casual dockworkers with port work dynamics leads to harmful occupational exposure related to the port's complex ecosystem and to environmental risks, due to the nature of the ecosystem under study[2].

The human organization of the work process converges in the performance of different functions among workers, which also corresponds to different labor forces and occupational hazards. For example, the work of longshoremen is performed inside the holds of ships, where the sounds produced by the work process are amplified. The quayside workers, in turn, perform manual activities on land, such as unloading bulk cargo through the use of shovels and brooms, which increases physical strain and the risk of developing respiratory diseases[6]. The work of clerks and watchmen is to supervise and, in this case, these workers remain upright for long periods of time[1].

This is how exposure to the system's non-living elements is understood, as it occurs in the exposure to physical hazards given the handling of automated machines, essentially in the performance of quayside workers and longshoremen. This activity implies greater life expectancy associated with less manual work, however, it poses health risks related, among other things, to exposure to vibrations[8].

There is also chemical exposure due to the handling of toxic cargo such as fuel, gas, grains, and foodstuffs. Again, the workers most intensely exposed are quayside workers and longshoremen; beyond this, there is exposure to environmental pollution inherent to the port region, in which emissions from vessels and vehicles in the docks interact and affect all the workers.

Biological risks are also observed in relation to the potential contact of workers with microorganisms originating from vessels from different places in the world, which dock daily in the port and constitute agents uncommon to the Rio Grande environment. These have the potential to cause health problems. Given the preceding discussion, even casual dockworkers not handling cargo are exposed. Watchmen and the generalized block of workers come in contact with the crews of foreign vessels even before these are inspected by competent and responsible agencies.

Among other risks, casual dockworkers are exposed to noise, to the fall of suspended objects, and to the weather, which act as a complement to a morbidity profile, also identified through the prevalence of

musculoskeletal disorders and cardiac diseases, such as hypertension[4, 9,10,11,12], which reinforces the influence of the port ecosystem on the quality of life and productivity of workers.

Knowledge of the aspects previously mentioned leads to the discussion of the ecosystem under study, focusing on human health, and is important to supporting the practice of nurses[11]. Consideration and discussion of the environmental, occupational, socio-economic, and cultural aspects serve as tools that can be used to minimize occupational exposure to these risks. Accordingly, this reflection is intended to strengthen the possibilities of the ecosystemic practice of nursing in the face of the environmental assessment it enables, through the analysis of risk situations and establishing what the effects of such situation are on individuals, families, and community, as well as on the improvement of professional science and health production through ecological/ecosystemic behaviors[3]. For the proper implementation of the assessment proposed here, we emphasize the importance of clinical nursing integrated with perceiving the exposed workers, because they are the ones most knowledgeable of the context addressed here[11,12]. Hence, it enables the communication of personal and environmental risks, which facilitates the development of joint strategies to minimize such risks, preventing harm to the workers involved.

These strategies can be considered nursing interventions with a focus on the occupational environment, designed to control risks and contact with harmful substances. Nurses in this context are also mediators of health research programs to identify, early on, diseases and injuries that may be work-related. Based on these actions, nurses create for themselves and for workers, ecological/ecosystemic behavior used in the expression of their work with a view to preserve and protect the health of workers.

FINAL CONSIDERATIONS

This reflection presented the interdependent relationship between two important ecosystems: the port and the coastal shoreline in the city of Rio Grande, RS, Brazil. The productive dynamics of casual dockworkers correspond to a complex interaction characterized by organization, hierarchy, and diversity, which influences the occurrence of health risks based on the relationship between living and non-living elements of the ecosystems involved.

The ecological/ecosystemic approach to nursing care is understood as a strategy of communication for the prevention of environmental risks, understanding that the observance of interactions established between the environment and workers, in this case, dockworkers, contributes to ecological/ecosystemic behavior used in the health work and production. It is so because it incorporates the environmental relationships of the professionals into the recipients/beneficiaries of ecosystemic health, to identify occupational risks and act upon them to increase professional interventions from a macro/ecosystemic perspective of occupational health, which was represented here by this population.

ELEMENTOS ECOSSISTÊMICOS DA SAÚDE DO TRABALHADOR PORTUÁRIO E SEU PROCESSO DE TRABALHO

RESUMO

Trata-se de um artigo de reflexão teórica cujo objetivo foi apresentar a inter-relação de elementos ecossistêmicos do processo de trabalho portuário na produção de riscos à saúde do trabalhador. Para a identificação desses elementos, utilizou-se o referencial teórico de Serge Frontier, ao qual se aplicou a teoria da derivação. Foi possível compreender o porto como um ecossistema complexo, organizado, hierarquizado e diversificado, por meio da relação estabelecida entre os trabalhadores, a partir da multifuncionalidade expressa em suas práticas e instrumentos de saber. Tais características submetem-nos à exposição ambiental geradora de riscos à saúde, em nível individual e coletivo. O conhecimento dessa realidade de trabalho instrumentaliza a Enfermagem para a produção de comportamentos ecológicos/ecossistêmicos com enfoque na identificação dos riscos ambientais, contribuindo, assim, para a conservação e a manutenção da saúde do trabalhador portuário.

Palavras-chave: Enfermagem. Organização do Trabalho. Trabalho.

ELEMENTOS ECOSISTEMICOS DE LA SALUD DEL TRABAJADOR PORTUARIOS Y SU PROCESO DE TRABAJO

RESUMEN

Se trata de um artículo de reflexión teórica cuyo objetivo fue presentar La interrelación de elementos ecosistêmicos del proceso de trabajo portuário em la producción de riesgos a la salud del trabajador. Para la identificación de estos elementos se utilizo el referencial teórico de Serge Frontier, al cual se aplico la teoria de la derivación. Fue posible entender el Puerto como un ecosistema complejo, organizado, jerarquizado y diversificado, por medio de la relación establecida entre los trabajadores a partir de la multifuncionalidad expresa en prácticas e instrumentos de conocimiento. Tales características los someten a exposición ambiental generadora de riesgos a la salud en nivel individual y colectivo. El conocimiento de esta realidad de trabajo instrumentaliza la enfermería para la producción de comportamientos ecológicos/ecosistémicos con enfoque en la identificación de los riesgos ambientales, contribuyendo así para la conservación y manutención de la salud del trabajador portuario.

Palabras clave: Enfermería. Organización del trabajo. Trabajo.

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