

Occupational health nursing in civil construction: contributions based on Roy's adaptation theory

Enfermagem do trabalho na construção civil:
contribuições à luz da teoria da adaptação de Roy

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ABSTRACT Reflecting on the role of the nursing staff in civil construction has paramount importance, because it enables improving knowledge and making discoveries. Such reflection is further useful for managers and workers to jointly develop disease prevention and health promotion strategies. The aim of the present study is to describe a nurse's contributions to a civil construction company. It consists of an experience report according to Callista Roy's adaptation theory. The analyzed experience took place from August 2017 through March 2018. We describe the activities carried out by the nurse jointly with other healthcare workers. We believe that the present study evidences the significance of occupational health nursing actions, particularly within civil construction, as well as the relevance of providing theoretical scientific grounds to such actions to contribute to make working environments healthier for all the involved actors without neglecting the aspect of productivity.

Keywords | construction industry; occupational health; occupational health nursing.

RESUMO Refletir sobre a atuação da enfermagem em uma empresa da construção civil é de fundamental importância, visto que possibilitará aprimorar conhecimentos e revelar outros. Ainda, permitirá que os gestores em conjunto com os trabalhadores busquem estratégias para prevenção de doenças, promoção da saúde e prevenção de agravos. Dessa forma, esta pesquisa teve como objetivo descrever as contribuições da enfermagem em uma empresa da construção civil. Trata-se de um estudo de relato descritivo ancorado na Teoria da Adaptação de Callista Roy. Tal relato foi vivenciado no período de agosto de 2017 a março de 2018, o qual descreve atividades cotidianas desenvolvidas pela enfermagem com os trabalhadores e profissionais da área médica. Acredita-se que este estudo contribuirá para desvelar a importância das atividades desenvolvidas pela enfermagem do trabalho, especificamente na construção civil, bem como a relevância de apoiá-las em um referencial teórico científico; e, assim, aumentar a qualidade de vida no trabalho, buscando cada vez mais um ambiente laboral saudável para todos os envolvidos sem perder de vista a produção.

Palavras-chave | indústria da construção; saúde do trabalhador; enfermagem do trabalho.

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INTRODUCTION

Civil construction provides some of the poorest working conditions, with the highest rates of work accidents and leading to considerable government spending on insurance and compensation worldwide. It is further associated with high disability and mortality rates and psychological impacts for workers and their families¹. Investing in prevention and workplace safety and health is beneficial to organizations, workers, healthcare providers and society at large. Indeed, investing in preventive actions to make work environments as safe as possible is essential².

As part of their work, occupational health nurses (OHN) have resource to several methods and techniques for prevention of chemical, physical, biological and psychosocial hazards, preservation of the health of workers, treatment of injuries and occupational and non-occupational diseases and rehabilitation³. They actively intervene in the lives of workers to help them overcome problems, as well as in the stage of rehabilitation when needed. OHN are also charged of identifying hazards to which workers are exposed, as e.g. noise, dusts and improper ergonomic conditions, and to provide orientation to and refer those with social problems, such as use of legal or illegal drugs⁴.

Within this context, periodic lectures and educational campaigns might contribute to raise the workers' awareness on the negative effects of several avoidable conditions, including alcoholism, smoking, excessive exposure to sun, sexually transmitted infections, hypertension and diabetes, particularly in relation to their job, to thus successfully prevent occupational accidents and diseases.

OHN play a relevant role in health education. They collect statistical data on workers' morbidity and mortality, assess work-accident prevention programs, deliver outpatient care, participate in audits and provide consultancy on occupational health to ensure the safety and protection of workers³.

Their relevance notwithstanding, studies of OHN activities within civil construction are still scarce in Brazil. Therefore, the aim of the present study is to describe the contributions of the nursing staff at a civil construction company. For this purpose we had resource to Callista Roy's

adaptation model, which is based on the continuous and mutual interactions among human beings, and also with their environment, with particular focus on the adaptive system that is activated in response to situations that might arise in the workplace⁵.

METHODS

The present is a theoretical, descriptive and reflexive report of a 7-month experience with the daily tasks of a nurse as performed jointly with other healthcare workers. Nursing is both a science and an art, and the complexity of the care that is provided demands information much beyond that available in health regulatory standards (RS). We selected Callista Roy's adaptation model as theoretical framework because it seems to be useful to nursing professionals. We further surveyed the literature to obtain further grounds for our discussion. Since the present study did not involve research with human beings, ethical clearance was waived.

RESULTS AND DISCUSSION

GETTING ACQUAINTED WITH THE STUDY SETTING

The experience described here took place from August 2017 through March 2018 at a company located in a medium-sized town in northern Parana, Brazil. The company employed at that time 700 workers — 688 men and 12 women — two of whom were healthcare providers (one nurse and one physician). The employees were allocated to 19 different tasks/departments: earthworks, drainage, cement-treated base (CTB), paving, full-depth repairs, signaling, power station, topography, maintenance, lubrication, laboratory, administration, human resources, supplies, planning, control, measurements, health and safety, and six construction sites with the corresponding tents, toilets and cafeterias.

The occupational health unit was allocated two containers; one was used for storing files and the other for proper care delivery, which included a toilet and space for wound care and other simple procedures. In addition,

OHN performed daily educational actions with focus on occupational hazards aiming at the prevention of work-related accidents and diseases, with consequent improvement of the workers' quality of work life. It is worth reminding here that the odds of achieving control of any health problem are higher when they are timely detected and treated. Thus one may meet the goals of disease prevention and health promotion.

For this purpose, the nurse regularly implemented actions centered on ergonomics to contribute to the workers' safety and comfort, and also to raise their awareness on and monitor potentially harmful agents and their consequences. Such actions — which also involved the Internal Committee for Accident Prevention (ICAP) — included courses, lectures, Daily Safety Dialogues (DSD), distributing flyers and condoms and vaccination campaigns. As a result, the targeted workers improved their knowledge about the environmental hazards to which they were exposed.

Additional activities included follow-up of workers with chronic (diabetes, hypertension, obesity) and infectious (tuberculosis, leprosy, sexually transmitted infections) diseases and neoplasms, among others, with emphasis on orientation on the relevance of adhering to treatment and prevention.

Meetings were held every two weeks with the safety staff and the occupational physician to discuss the Environmental Hazard Prevention Program (EHPP) — aiming at achieving early detection of hazards and working conditions harmful to health, the Construction Industry Working Conditions and Environment Program — which focus was on safety and protective actions to be implemented at each stage of the project — and the Occupational Health Medical Control Program (OHMCP), which included pre-employment, periodic, return-to-work and job termination medical examinations.

The nurse developed her activities according to a fixed schedule. On Monday mornings she conducted DSD with the workers to provide them orientation on health promotion and disease and accident prevention. Meetings with managers took place on Tuesday mornings, when they jointly analyzed demands, profits, tasks, hazards and expected goals; absenteeism, turnover and work accident rates were discussed in the afternoon. The results of these meetings served as grounds for the

planning and development of health promotion actions. On Wednesdays, the nurse assisted the speech therapist with audiometry tests, reminded workers of their six-monthly or periodic medical examinations and actively looked for those who had missed appointments. As per the standard procedure, workers were communicated the appointment dates by the engineer-in-charge or the unit supervisor several days in advance. The nurse visited the construction sites on Thursday mornings, when she made observations of the employees' behavior and called the attention to improper ones. On Friday mornings, she and the physician ran campaigns included in OHMCP or as per need. The nurse's role in the inclusion of newly hired workers, including orientation on how to avoid work-related diseases and accidents, is particularly noteworthy.

The nurse's daily routine included: requesting laboratory tests (included in pre-employment, periodic, job change, return-to-work and job termination medical examinations) which due to high turnover rates were performed at an outsourced laboratory; feeding the results of tests to the company database; performing nursing consultations, as well as those required for Occupational Health Certificate issuance; and delivering medical certificates, results of laboratory tests and prescribed medications. The nurse also participated in the monthly training sessions provided by ICAP and the fire brigade.

At the time of the project (a highway duplication) onset, the nurse inspected the outsourced restaurant and cafeterias established at the construction sites and requested eventual improvements to avoid health problems related to the hygiene of food. She also reviewed the checklists included in the outsourced companies OHMCP (as e.g. the restaurant that provided the employees' meals) as required by RS 7. These checklists were returned with eventual indications of adjustments as per need. On these occasions, the nurse requested from the environmental technician the corresponding Chemicals Safety Information Forms to prepare for first-aid care in case of accidents.

We should observe that the nurse faced considerable challenges as a function of the goals set by the employers, which accomplishment often demanded much effort from the employees. In addition, there were some logistic

problems, as there was no ambulance or car available at the construction sites, but vehicles ought to be borrowed from other departments. The nurse further had to be continuously aware of the local health conditions to be able to provide optimal care to the workers. She also needed to have the technical-scientific knowledge required to raise the managers' awareness on the relevance of breaks and incentivize the workers to apply ergonomic notions safely and comfortably.

Educational actions were restricted to rainy days, when construction activities were interrupted. For this reason, some of the planned strategies could not be implemented during the dry season, and the deadlines set by the management were missed. For lack of exclusive consulting rooms, workers were seen in rooms full of files, which interfered with the work of both nurse and physician in consultations, as well as with the development and strengthening of health education actions. Therefore, care delivery strategies had to be thought over to avoid greater losses. As a fact, some workers missed some of the required vaccinations, which should have been updated at the time of hiring.

Many workers had left their families in other states in their search for a job and regretted not being able to work closer to home. Others stated they had no family or friends, but were utterly alone, and that they liked working in the construction industry because it afforded new experiences, adventure and opportunities to meet people with whom they could share happy moments. Some workers mentioned using drugs and having difficulty to adjust to the construction site lifestyle and the salary received, which did not suffice to meet their needs. All in all, the workers reported to be satisfied with the attention received from the investigator and that they missed having nurses to listen to them.

Access to health services was ensured through field visits, however, the workers did not always exhibit physical signs indicative of actual risk to their health. The nurse reinforced the need for proper use of the personal protective equipment provided by the employer, which was highly resistant and comfortable and ensured the due protection. Then, the medical records were filed according to identification numbers, and the nurse plotted a map of the construction sites to facilitate her mobility in case of accidents or other unpredictable events.

Absenteeism was higher among the women, probably due to excessive overtime work, shift changes, physical and emotional fatigue, exhaustion, moral harassment, discomfort in the workplace, anxiety, stress and tension. Absenteeism, high turnover rates and the quality of work life might interfere with the daily routine of workers, as well as with the development of health promotion actions.

Unfavorable working conditions might lead workers to seek means to compensate for their dissatisfaction, adopt resistant and defensive attitudes, become indifferent to work or choose to miss workdays. These behaviors disrupt the structure of organizations and impair the quality of services.

Considering the context of civil construction, which is characterized by high work accident rates as a function of extremely poor working conditions, we believe that the actions implemented and the orientation given by the OHN had positive impact on the company outcomes. No work accident requiring sick leave/sick pay or deaths occurred along the year until the completion of the project, but just a few minor accidents without significant consequences.

The health promotion and disease and risk prevention actions undertaken by the nurse followed Callista Roy's adaptation model assumptions, i.e. approaching the work environment as a complex that encompasses personal interactions and their relationship with the work process from the perspective of the conditions needed to achieve a healthy environment free from risks to the health of all the involved actors.

OCCUPATIONAL HEALTH NURSING ACTIVITIES

OHN have the skills needed to implement health promotion and occupational accident and disease prevention actions and to prepare workers for emergencies, thus improving their productivity and reducing the rates of sickness absenteeism³. The occupational health nursing profession began in Brazil in 1921, under the supervision of the North-American nurse Ethel Parsons, sponsored by the Rockefeller Foundation⁶.

The activities of North-American OHN mainly focus on safety. They inquire on the medical history and state of health of workers, provide care in case of accidents, feed information systems and manage environmental and occupational health services. They develop health promotion

and protection actions, assess limitations for work, provide orientation on necessary readjustments, evaluate the ability of workers to perform their job and keep records of their state of their health⁶.

We call the attention to the similarities between Brazilian and North-American OHN identified in a study⁶. In both countries, OHN perform administrative, educational and health promotion activities and nursing procedures, and sometimes they assume the role of occupational health service coordinators. Some of the most relevant tasks identified in that study include individualized orientation to workers based on their occupational health records, care delivery in case of work accidents, participation in the planning of benefits, interdisciplinary, professional and community committees, evaluation of the aims of educational programs, planning of programs and interventions, recruitment of occupational health personnel and ensuring compliance with manuals and management reports — all which activities are similar to those identified in the present study.

Differences are essentially due to demographic reasons. In the United States, the distribution of nurses across regions is proportional, while in Brazil most jobs are concentrated in the Southeast region. In Brazil, most nurses work at companies with more than 3,501 employees, while in the United States half of the nurses work at companies with 1,000-2,000 employees. In Brazil, nurses are mostly concerned with educational actions, while in the United States they tend to focus more on managerial aspects⁶.

The actions of OHN have considerable impact on potential risks or problems. They promote changes in the working environment, in addition to exhibiting environmental control and workplace safety competencies. OHN in Spain are intent in establishing close and holistic relationships with the workers under their care. They seek to identify and protect particularly vulnerable workers, provide information about preventive and organizational measures to avoid occupational hazards, apply specific nursing techniques to achieve accurate evaluations of the state health of workers, formulate emergency plans, report severe accidents to health authorities, advice government agencies on adequate occupational health management and design protocols targeting violence at work⁷.

A qualitative exploratory study conducted with workplace health and safety experts — eight of whom were

OHN — found that the nurses had good relationship with the other staff members, characterized by dialogue, respect, partnership and collaboration. Nevertheless, the nurses found that their support and leadership position and the physical distance between the health and safety experts — allocated to different areas — interfered with their interpersonal relationships at work. Another negative point was conflict with the physicians when the latter attempted to impose themselves on the nurses — who mentioned that the physicians charged them with administrative tasks which were their responsibility. The nurses participated in the preparation of legal documents, such as OHMCP, but not of EHPP. They also participated in DSD, lectures, campaigns, training sessions and design of posters and folders⁸.

Nurses in Brazil tend to follow a continuous educational cycle, even when unaware of it. Thus they put the principles and guidelines which underlay the Unified Health System (Sistema Único de Saúde–SUS) and embody the right to health into actual practice⁹. OHN's efforts should aim at reducing the exposure of workers to hazards to thus prevent diseases and other health problems. This is to say, they should focus on health promotion, disease prevention and educational actions to incentivize healthy habits and behaviors, and thus help workers meet productivity demands¹⁰. In this way the production needs of organizations can be satisfied without dismissing the safety, physical and mental well-being of their employees.

In regard to the activities developed by nurse discussed in the present study, we noticed that educational actions targeting workers with hypertension or diabetes were missing. As a function of such want of orientation — including changes in dietary habits and relevance of physical activity to improve their quality of life — most workers did not adhere to prescribed treatments, while their activity contributed to worsen their state of health, which was attended by inefficient adjustment responses.

The scope of safety actions and measures, detection and minimization of occupational hazards and orientation provided by OHN is not restricted to the organization as such, since workers also act as multipliers of the information received within their families and communities¹¹. Assessment of risks is one the main preventive actions and

thus crucial to avoid occupational risks and reduce the rates of work accidents and occupational diseases. An international study identified the two most frequent hazards in civil construction, namely, work involving machinery or hand-held tools, followed by lifting or moving people or heavy loads¹².

Civil construction workers usually lack appropriate knowledge about their working conditions and required protective measures, whence the relevance of OHN. OHN promote improvements in the lifestyle of workers and help prevent future health problems. Given that nurses contribute much to improve the working conditions and promote balance in the state of health of workers civil, construction companies should invest more in health-care personnel¹³.

ROY'S ADAPTATION THEORY: POSSIBLE SCIENTIFIC GROUNDS FOR OCCUPATIONAL HEALTH NURSING

Civil construction workers are susceptible to develop occupational diseases, such as repetitive strain injury, work-related musculoskeletal disorders, dermatitis, noise-induced hearing loss, lead poisoning and pneumoconiosis, among others. Occupational hazards associated with the incidence of these conditions include: use of motor vehicles; non-ergonomic postures, e.g. when lifting heavy loads, exposure to biological, chemical and physical agents and inhaled dusts of materials such as bricklayers line, rubber, silica and asbestos, stress related to job insecurity and high turnover rates, work at heights, handling machinery, equipment and sharps, and electrical installation work¹⁴.

According to Roy, the environment encompasses the conditions, circumstances and influences with positive or negative impact on the behavior and development of people¹⁵. In turn, the human being is conceived of as an adaptive system with inputs and outputs regulated by feedback. Inputs are stimuli, which are categorized as focal (internal or external stimuli immediately confronted by the individual, i.e. the immediate and visible cause of a given problem), contextual (stimuli with indirect positive or negative influence on the current situation and involving causal factors) or residual (internal or external factors with uncertain influence on adaptive responses; they involve the individual's previous experience of

disease, and past experiences which influence their current condition). Outputs comprise responses and control and coping strategies. Feedback operates on the basis of regulator and cognator processing subsystems^{16,17}. The regulator subsystem is related to internal stimuli and gives rise to automatic and unconscious responses involving chemical, neural and endocrine reactions. The cognator subsystem decodes internal and external stimuli, and consequently leads to conscious and deliberate responses which involve cognitive and intellectual aspects¹⁶.

According to Callista Roy's theory, health is the result of a process of adaptation to several stimuli — stress, disease, unhappiness⁷ — for human beings to become integrated and whole and able to accomplish the goals of survival, growth, reproduction and mastery. From this perspective, nurses may modify focal and contextual stimuli to elicit adaptive responses according to four modes: physiological, self-concept, role function and interdependence¹⁶.

The physiological mode is related to the regulator subsystem and comprises physical responses to environmental stimuli to meet five basic needs (oxygenation, nutrition, elimination, activity and rest, and protection) involving four physiological processes (senses, fluid and electrolytes, neurologic and endocrine function). The self-concept mode concerns physical integrity and psychological and spiritual aspects. It deals with the individual's values and expectations, including body image, self-consciousness, self-ideal, moral and ethical beliefs, and spirituality. The role function mode involves the social dimension and aspects related to accomplishments and interactions with other people¹⁶. The interdependence mode is associated with interpersonal relationships, support systems and satisfaction of affective needs — love, respect and affirmation^{16,18,19}. These adaptive modes therefore correspond to human behaviors that represent adaptive or inefficient responses to health-disease situations. They allow establishing an adaptive typology, i.e. indicators of positive or difficult adaptation. Within this context, to adapt means to be in balance with oneself and with others and to recover one's physical, mental and social well-being¹⁶.

As concerns occupational health nursing, Roy's adaptation model enables a detailed analysis of environmental

and the health conditions of workers, developing strategies for care delivery and grounds for the planning, execution and evaluation of the effectiveness of interventions, and assessing adaptive responses elicited in workers. Thus it contributes to improve the quality of work life, facilitates the adaptive process, improves outcomes and eliminates negative situations in the workplace¹⁵.

As was mentioned above, while no work accident requiring sick leave or sick pay occurred during the period of observation, there were eight accidents which caused slight damage to the health of the involved workers. In three cases, the company physician indicated task restrictions and the other five returned to their usual work. One might infer that the actions developed by the nurse jointly with other healthcare workers contributed to this outcome.

The aims of health educational actions are to promote the production and application of knowledge to enhance human development and help healthcare workers acquire knowledge continuously¹⁷. Thus they favor the development of adaptive responses among OHN, inasmuch as, from Roy's theory perspective, educational actions represent contextual stimuli which influence adaptation to the demands of the profession.

Coping is one further significant component of Roy's theory. Coping is the term used to designate a process of confrontation that involves mechanisms to interact with a transforming environment and leads to adaptation. Coping might be innate (a genetic characteristic of human beings, an instinctive mechanism that favors the interactions with and the adaptation to a transforming environment) or acquired (a skill developed out of lived experiences able to influence adaptive responses and specific stimuli)¹⁹.

Through the planning and implementation of actions designed according to Roy's adaptation theory, we succeeded in identifying problems exhibited by the analyzed population of workers and their causes, as well as the interventions carried out by the nurse jointly with a multiprofessional staff. Nurses are expected to make significantly contributions to the maintenance of the health of workers so they might perform their job with freedom, pleasure and maximum safety, i.e. maximize their quality of life both at and outside work²⁰.

Studies performed in West Africa point to the complexity of civil construction, particularly in regard to workplace

health and safety²¹. We believe that the present study is essential to incentivize the application of theories to orient the practice of OHN.

FINAL CONSIDERATIONS

The present study describes the everyday routine of OHN and reasserts the relevance of prevention, protection and health promotion for civil construction workers along the period the nurse carried out her activities jointly with other healthcare workers. No work accidents requiring sick leave/sick pay occurred during the period of observation, but just eight accidents with slight impact on the health of the involved workers — three were indicated job restrictions by the company physician, and the other five returned to their usual work since they had minor injuries and were able to perform their tasks without any harm to themselves.

Roy's adaptation theory provides scientific grounds to nursing actions by enabling reflection on contextual stimuli, characterized as occupational hazards, fit to transform the working environment, and thus prevent occupational accidents and diseases, favor adaptive responses, improve the quality of life and interpersonal relationships of workers, and reduce the rates of absenteeism.

The present experience report contributes to reassert the relevance of nursing actions in civil construction, which were analyzed here within a definite theoretical framework, and consequently received scientific grounds. In other words, the selected theory played a relevant role in our survey of the actual conditions of workers and the adequacy of their actions.

Finally, although the aims of the present study were successfully accomplished, it has some limitations. We described the work performed by one single nurse at one single civil construction company. Therefore, we suggest additional studies on this subject with resource to theoretical frameworks in the planning of all included actions. Future studies are also needed, because the implementation and development of qualified healthcare provision and management still require sounder theoretical grounds.

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