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PHYSICAL INTEGRITY OF NURSING STAFF AND PATIENTS IN PSYCHIATRIC ENVIRONMENTS: DEFINITION OF REQUIREMENTS FOR THE DESIGN OF TRANSFER EQUIPMENT

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Abstract:

It is important to determine the design requirements that will guide the product development process. Thus, the objective of the article was to define the design requirements for the development of a transfer equipment for patients with reduced mobility and mental disorders, focusing mainly on the physical overload of the nursing team and consequently the patient's integrity. For this, a deep bibliographic review was carried out, which was systematized considering aspects related to product, user and context, resulting in the definition of the basic requirements that must be present in a transfer system. Among the requirements, low cost, comfortable and safe to the patient and the nursing team, prevent injuries to patients, inadequate postures and decrease of the strength exerted by the nursing team, possibility to use the product with the patient sitting and lying down .

Keywords: Physical Integrity, Nursing Team, Psychiatric Environments, Ergonomics, Transference Equipment.

1. INTRODUCTION

Back pain represents the most common form of work-related musculoskeletal disorders (WMSDs), resulting in substantial costs to society (MARRAS, 2000). Low back pain can affect up to 65% of the population per year and up to 84% over a lifetime (WALKER, 2000), with a prevalence of approximately 11.9% in the world population (HOY, 2012), placing an overload on health services. (HART, DEYO and CHERKIN, 1995).

WMSDs, particularly pain and injuries in the lower back, represent a risk to nursing staff. These professionals are subject to developing these disorders, as they are exposed to inappropriate ergonomic and environmental factors in many activities that require effort (MIRANDA and STANCATO, 2008), such as transporting patients (RADOVANOVIC, 2002).

In this context, patient mobilization is frequent and involves carrying out a complex task with motor demands that often overloads the musculoskeletal system. The annual incidence of lumbar spine pain among nurses who mobilize patients is 40-50% (HIGNETT, 2003) and the lifetime prevalence is 35-80% (EDLICH et al, 2004). In this sense, according to HSA (2010) the highest prevalence and incidence rate of back pain in nursing workers is developed during the lifting and transfer of patients.

In this context, it appears that the prevention of low back pain is based on training nursing workers in patient movement techniques, reducing excessive patient movement (KJELLBERG et al, 2000) and also on the use of equipment to assist in these transfers. Furthermore, the correct and trained execution of the movement brings comfort, safety and quality of life to the patient. On the other hand, for professionals working in transfers, the use of these products can reduce costs, injury risks, improve job satisfaction and increase productivity.

However, it appears that there are products on the market, of high and low complexity, that can assist in the transfer of patients, but they present problems such as high cost or are not comfortable for the patient or nursing team.

In view of the above, there is a need to use low-cost equipment to assist in the transfer of patients, which at the same time reduces the burden on the lumbar spine of the nursing team and provides comfort and safety for the

patient. Therefore, this article aimed to define the design requirements for the development of equipment for transferring patients with reduced mobility, based on the user, product and context.

Thus, this research is characterized as applied in nature, with a qualitative, descriptive and exploratory approach and took place at the Institute of Psychiatry of Santa Catarina (IPq-SC) in 2015. The Institute is the only public hospital in the State which provides Psychiatry care, maintained by the Santa Catarina State Department of Health and contracted with the Ministry of Health. It serves mainly a low-income population, coming from the municipalities of Greater Florianópolis and the interior of the State, as there is no network of outpatient care.

This study was carried out in two stages. Stage 1, theoretical, through bibliographical research in books, scientific articles, theses and dissertations in the CAPES Periodicals (Coordination for the Improvement of Higher Education Personnel) databases, data collection was carried out. In stage 2, IPq-SC was visited and the process of developing the transfer product began through the Guidance Guide for Project Development (GODP) (MERINO, 2014) to generate information blocks (product, user and context) to determine design requirements.

2. METHODOLOGY

THEORETICAL REFERENCE

The use of ergonomics and its systemic and integrated approach to work situations in hospitals or other healthcare units makes a decisive contribution to healthcare organizations and, consequently, to everyone involved, including hospital administrations, operational managers, and, naturally, health professionals, patients and their companions (SERRANHEIRA, UVA and SOUSA, 2010).

Among these health professionals, the nursing team stands out, which is made up of nursing technicians, nursing assistants and nurses (STOLARSKI, TESTON and KOLHS, 2009) who carry out various activities in the hospital environment, some of which can generate risk of WMSDs, such as patient transfers (RADOVANOVIC, 2002).

In this sense, according to White, Duncan and Baumle (2012), transfer is described as moving the patient from the bed to the stretcher or to a conventional, wheelchair or toilet chair. The factors that make it difficult for nursing professionals to move patients are the size and weight of the individuals, the propensity to fall or lose balance and the lack of cooperation from patients (NIOSH, 2006). Therefore, carrying out the transfer requires prior planning to avoid injuries to the patient and members of the nursing team, such as falls; displacement of tubes, drains or catheters; and damage to the skin (WHITE, DUNCAN and BAUMLE, 2012).

In this context, it appears that the use of equipment for patient transfer significantly reduces the compressive forces on the spine (ZHUANG et al., 1999). This occurs because there is a reduction in the force required to perform the movement and improves posture when handling the patient. Furthermore, these transfer equipment promote greater safety, facilitate patient independence and eliminate or minimize risk factors for injuries to caregivers and patients (WORKSAFE, 2006).

In this sense, Ergonomics can contribute to patient and nursing team safety through the conception/design of equipment that can be used to move patients.

Furthermore, these products must take into account the characteristics, capabilities and limitations of the patient and healthcare professionals (SERRANHEIRA, UVA and SOUSA, 2010). For the redesign of this equipment requires methodologies to collect requirements in the design project (LOOZE et al., 1994).

DEFINING THE REQUIREMENTS

GODP aims to organize and offer a sequence of actions that enable design to be developed consciously, taking into account the greatest number of aspects and responding in a more assertive and consistent way to the objectives established for design practice (MERINO, 2014). The GODP is divided into eight stages, separated into three moments: Inspiration (-1/0/1), Ideation (2/3) and Implementation (4/5/6). This study covered stages -1, 0, 1 and 2.

The opportunities stage corresponds to stage -1, where potential market opportunities and related sectors are verified, depending on the product to be evaluated. The opportunity was given after a visit to IPq-SC with the aim of developing equipment for transferring patients between bed and wheelchair and vice versa. Currently, this task is performed manually and this device would reduce biomechanical overload and prevent injuries to the lumbar spine of the nursing team.

In the prospecting stage, which corresponds to stage 0 of Inspiration, it comprises the definition of the project's central problem, consisting of a preliminary immersion of the market level, to get closer to the

problem. At this stage, patent searches were carried out for products that were in some way related to patient transfer. The search was carried out online through the National Institute of Industrial Property and Google Patents. In addition, research was carried out on the musculoskeletal system to gain greater understanding of the issues surrounding the development of a transfer system.

In stage 1, referring to data collection, where project definitions were developed based on the user's needs and expectations, which include issues of usability, ergonomics, anthropometry and biomechanics, as well as compliance with legislation that deals with technical standards for product development. This data was collected mainly in books, theses, articles and research websites, such as the CAPES journal database and Google itself.

In stage 2, organizing and analyzing the data collected in the previous phase, analytical techniques were used to define project requirements and strategies. At this point in the project, diachronic and synchronic analyzes were carried out, in addition to the information blocks divided into product, context and user. Furthermore, at this stage the design requirements of the patient transfer system were defined.

In the synchronic analysis stage, similar products were researched and different devices were found, from the simplest such as transfer boards, to the most complex and mechanized such as transfer winches. In addition to these, boards were found on the floor with non-slip areas such as the Mobility Board, devices with lever principles such as Lady Shifting and equipment controlled by remote control, such as the Rifton Tram. Many of these products found on the market are efficient and meet the needs of the nursing team and the patient, but at a high cost. On the other hand, lower-cost products still harm the health of the nursing team.

\The data collected allowed us to generate three blocks of information centered on the user, the context and the product

which made it possible to develop the project requirements. The product block aims to identify the main functions and information of a transfer equipment. Thus, it was possible to find the functions of the transfer system,

such as assisting the nursing team in moving the patient, reducing effort and the risk of health problems for workers and finally generating more comfort, safety and stability for the patient. Safety information was also obtained, such as seat belts, adaptable size, foot and knee support and back and hand support. In addition, research was carried out on possible materials to be used, such as stainless and welded steel, aluminum, belts and ties, wheels and non-slip materials. Other information was also added about the size of the equipment to avoid patient embarrassment and the possibility of it being a simple and safe product.

The context block aims to collect data about the nursing team and their problems within the context of the transfer. Thus, important items about the transfer were identified, according to Alexandre and Rogante (2000), such as positioning the chair close to the bed; lock the chair and bed; sit the patient on the edge of the bed; hold him by the waist or armpits, helping him to get up; sit him in the chair. Furthermore, the routes that the patient could take after transferring to the chair were determined, as shown in figure 1.

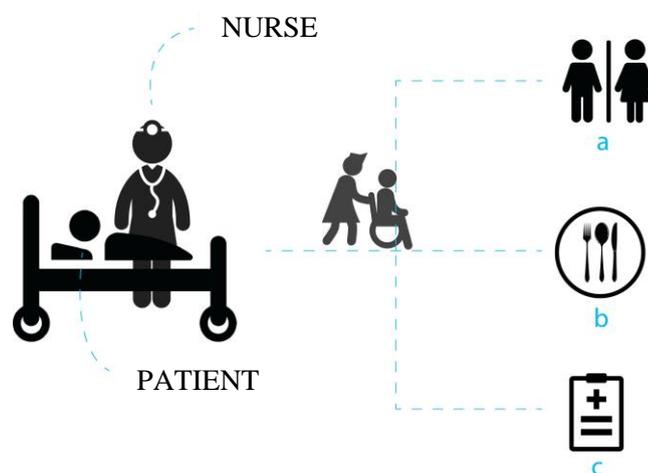


Figure 1 - possible patient paths after transferring from bed to wheelchair.
a: bathroom b: meal c: physiotherapy/occupational therapy.

In the user block, the objective was to collect data on the difficulties and needs of the nursing team and patients in the context of transfer. It was determined that the direct user of the transfer equipment was the nursing team and the main health problems of these professionals and the needs to assist in the movement of patients were identified, since the movement and transport of sick people are considered the most painful and dangerous for health workers (ALEXANDRE and ROGANTE, 2000). The indirect user, elderly people and bedridden patients with movement difficulties, the research showed that the main health problems of the elderly are memory loss, rheumatoid arthritis, osteoporosis, diabetes, dementia, stroke, Parkinson's disease, falls, heart attack, hypertension (SILVA et al, 2007). On the other hand, bedridden people mainly present pressure ulcers (SILVA and GARCIA, 1998), blood circulation problems and care must be taken regarding hygiene (washing hands, clean bed linen), balanced diet, daily exercise, provision of air space and avoid immobilizing the patient in bed for a prolonged period of time (CONCEIÇÃO, 2010). In this way, based on the blocks of information, product, user and context, the design requirements for the patient transfer equipment were generated, which are presented in figure 2.



Figure 2 - Project requirements

3. CONCLUSIONS

Thus, based on the results of this research, it was possible to define the project requirements that will guide the development of equipment for transferring patients with reduced mobility. Research is currently ongoing and in the next stage the device will be developed based on the

product, user and context requirements.

In this sense, the research method used was suitable for defining project requirements and will allow the development of low-cost transfer equipment, which promotes patient comfort and safety, while reducing musculoskeletal overload on the nursing team's spine. from IPq-SC.

Therefore, it is believed that the use of design with the help of the principles of ergonomics and usability allows the development of quality and low-cost products that can prevent the emergence of WMSDs, improve the quality of life and increase the productivity of the nursing team, while which could also increase autonomy and improve patients' quality of life.

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