ANALYSIS OF WORK LOADS DUE TO THE PRAXIS OF NURSING AIMING THE HEMODYNAMIC SERVICE

ANÁLISE DAS CARGAS DE TRABALHO DECORRENTES DA PRÁXIS DA ENFERMAGEM EM SERVIÇO DE HEMODINÂMICA

ANÁLISIS DE CARGAS DE TRABAJO POR LA PRAXIS DE ENFERMERÍA EN SERVICIO HEMODINÁMICO

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ABSTRACT

Objective: to analyze the workloads resulting from the practice of hemodynamics nursing services in Santa Catarina, Brazil, especially physical loading by exposure to ionizing radiation. We used the methodology of psychodynamics work. Method: we used the methodology of the psychodynamics of work that developed in different stages: demand and pre-survey, the survey itself, research material, the method of interpretation and validation. The research material was extracted from observations and group interviews. In total, we held 36 meetings. The research project was approved by the Ethics in Research, CAAE. 0020.0.145.145-08. Results showed that there are many loads that arise with the workers of Nursing hemodynamics services, and that the physical burden of ionizing radiation somehow establishes relation to other workloads. Conclusion: therefore, there is interrelation between workloads in the praxis of hemodynamics nursing services. Descriptors: Occupational Health; Ionizing Radiation; Occupational Risks.

RESUMO

Objetivo: analisar as cargas de trabalho decorrentes da práxis da Enfermagem em serviços de hemodinâmica de Santa Catarina, Brasil, sobretudo a carga física pela exposição à radiação ionizante. Utilizou-se a Metodologia da Psicodinâmica do Trabalho. Método: utilizou-se a Metodologia da Psicodinâmica do Trabalho que se desenvolveu em diferentes etapas: a demanda e a pré-pesquisa, a pesquisa propriamente dita, o material da pesquisa, o método de interpretação e a validação. O material da pesquisa foi extraído das observações e das entrevistas coletivas. Ao todo foram realizados 36 encontros. A pesquisa teve o projeto aprovado pelo Comitê de Ética em Pesquisa, CAAE n. 0020.0.145.145-08. Resultados: mostraram que são muitas as cargas que se manifestam junto aos trabalhadores de Enfermagem em serviços de hemodinâmica, e que a carga física de radiação ionizante de algum modo estabelece relação com as demais cargas de trabalho. Conclusão: há, portanto, interrelação entre as cargas de trabalho na práxis da Enfermagem em serviços de hemodinâmica. Descritores: Saúde do Trabalhador; Radiação Ionizante; Riscos Ocupacionais.

RESUMEN

Objetivo: analizar las cargas de trabajo derivadas de la práctica de servicios de hemodinámica de enfermería de Santa Catarina, Brasil, especialmente carga física por la exposición a la radiación ionizante. Se utilizó la metodología de la psicodinámica del trabajo. Método: se utilizó la metodología de la psicodinámica del trabajo que se desarrolla en diferentes etapas: la demanda y antes de la encuesta, la propia encuesta, material de investigación, el método de interpretación y validación. El material de investigación se extrajo a partir de observaciones y entrevistas grupales. Se celebraron en total 36 reuniones. El proyecto de investigación fue aprobado por el Comité de Ética en Investigación, CAAE. 0020.0.145.145-08. Los resultados mostraron que hay muchas cargas que se presentan con los trabajadores de los servicios de hemodinámica de enfermería, y que la carga física de la radiación ionizante de alguna manera establece relación con otras cargas de trabajo. Conclusión: Por lo tanto, existe interrelación entre las cargas de trabajo en la praxis de la hemodinámica servicios de enfermería. Descriptores: Salud Ocupacional; La Radiación Ionizante; Riesgos Laborales.
INTRODUCTION

The capitalist mode of production, by imposing the logic of the process of recovery in the labor process, caused changes in which loads have a greater dimension. Thus, workloads are always the result of the technical characteristics of the organization and division of work.\textsuperscript{1,2} Also in this sense, the term workload has been used in health care worker to replace the word risk very common in ergonomics and occupational health. In relation to this substitution, it should be clarified that the occupational medicine uses the risk category to mean elements present in the center of the work that can cause damage to the body of the worker, defining risk as harmful agents that can cause isolates disease.\textsuperscript{1,2}

In turn, the worker health, which directs social medicine, unlike occupational medicine, examines the health-disease process recognizing the knowledge of social worker as an important process, seeking to understand the biopsychic nexus of community workers through an integration of the elements present in the work process.\textsuperscript{1,3}

We use the term workload here to designate those to which workers are exposed, based on the references of the social determinants of health-disease process and also theoretical contributions of psychodynamic work.\textsuperscript{1,3} In this direction, the reference of the social determination of work classify workloads according to external and internal materiality that take over the worker’s body. The loads include materiality internal physiological and psychological loads, and between the external loads are physical, chemical, mechanical and biological.\textsuperscript{1}

Among the charges we highlight the physical burden of ionizing radiation, because nowadays Nursing has been increasingly requested to assist users subjected to diagnostic and treatment services that employ ionizing radiation, such as the services of hemodynamics under investigation of this study.\textsuperscript{4,6}

OBJECTIVE

- To analyze the workloads resulting from the practice of hemodynamics nursing services of Santa Catarina, Brazil, especially physical loading by exposure to ionizing radiation.

METHOD

This paper was written from the thesis << Nursing work in hemodynamics and wear of workers from exposure to ionizing radiation >>, Post Graduate Program in Nursing, Federal University of Santa Catarina - UFSC. Florianópolis, Santa Catarina, Brazil, 2010.

We used the Psychodynamic Methodology of Work\textsuperscript{2,3}, which according to its epistemological nature, emphasizes the qualitative aspects. Such a method includes: demand and pre-research, research, research material, the method of interpretation and validation. The demand and pre-study constitutes the first stage of the research and follow some criteria established by Dejours\textsuperscript{3} to develop the method. We must answer: Who demanded the research? What demand? And to whom such demand was addressed?

Given these criteria, the research was demanded by nursing workers of seven hemodynamics services of the State of Santa Catarina, Brazil from questions about working conditions, including workload by exposure to ionizing radiation.

Thus, the search started from the data previously identified and addressed in the application and pre-search, that is to say data from hemodynamic services that demanded research. So, after treating and refining the demanded data, the research was directed to a hemodynamics service, based in a private philanthropic hospital accredited to provide assistance in the area of interventional cardiology in Florianópolis, Santa Catarina, Brazil.

The research material was extracted from the observations of the work process and press conferences. In total 36 meetings were held in the period from March to November 2009, totaling approximately 54 hours of observations.

The meetings were held in the morning and evening, usually at the scheduled times for exams, lasting one to two hours. At each meeting, there was an average of four to five of the seven workers in the sample of field research.

Data validation is given in two stages. The first in the course of the observations and the second with the inclusion of other hemodynamic service workers who did not participate in the field research.

The interpretation was subjective and started at the validation of data, i.e., interpretation equipment consisted of a commented observation.\textsuperscript{3}

Thus, the analysis took into account the experience of the researcher who performed research material in the light of the theoretical corpus proposed in this study, being conducted by the speeches of the subjective experiences of workers. Recorded
data of observations and interviews were transcribed using the Panasonic Voice Editing Software version 2.0. This feature, together with the other information, and reduced the time of transcription also facilitated the organization and systematization of the information composing commented reports.

The study was submitted to the Ethics Committee in Research of the Institute of Cardiology of Santa Carina (ICSC) by CAAE. 0020.0.145.145-08, receiving assent to its publication under Protocol No. 101/2008.

RESULTS AND DISCUSSION

From the interpretation, data validation and confrontation with literature data were systematized in Figures by type of cargo, and also by reports of subjective experiences of workers and also by commented observations. In this way, we prepared this chapter, along with discussion of the data.

Thus, among the charges raised in order of importance, we include the psychic load shown in Figure 1.

Figure 1. List of psychic charges evidenced in the work process of nursing services in hemodynamics, Florianópolis / SC, Brazil, 2010.

<table>
<thead>
<tr>
<th>Psychic Charges</th>
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<tbody>
<tr>
<td>1) Awareness of the dangers of working with ionizing radiation.</td>
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<td>2) Fear of not knowing how radiation can affect their health.</td>
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<tr>
<td>3) Lack of knowledge of the proper operation of hemodynamic and information technology.</td>
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<td>4) Lack of physical principles of radiation production.</td>
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<td>5) Physical and mental tiredness.</td>
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<td>6) Stress due to the use of sophisticated technology without proper technical skills.</td>
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<td>7) Constant stress during the exams.</td>
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<td>8) Emergency situations, due to the possibility of dealing with the unexpected.</td>
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<tr>
<td>9) Rhythm and accuracy in handling the Contrast injector pump</td>
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<tr>
<td>10) Responsibility attributed to those who have more time to work on hemodynamics.</td>
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</table>

Among the ten validated items about the mental burden, “the consciousness of dangerousness” is a term used in the theory of social determination\(^2\). Such a burden to these authors generated a prolonged state of tension due to the concern of workers with the risk of occupational accidents themselves.

Awareness of danger here refers to the dangers that workers attach to work with ionizing radiation. Accordingly, we perceive fear through ignorance of how radiation can affect their health, though in most cases these workers do not recognize or deny the possibility of being with some signs and symptoms related to the effects of exposure to this workload.

Generally they attribute some signs and symptoms such as hair loss and decreased hematocrit to family heritage, bringing examples of their fathers, brothers, always discarding the possibility that his condition is related to radiation exposure.\(^3\)

In this sense, fear is one of the dimensions of the experience of workers almost always overlooked by studies in psychopathology work.\(^3\) Occupational exposures of some professions lead workers to fear.\(^5\) Still, the fear relating to the risk may be substantially expanded by the ignorance of the limits of these risks or the ignorance of effective prevention methods.

Following this path, we include the lack of physical principles of the production of radiation during procedures and the importance of the use of radiological protection measures to reduce occupational exposure to this physical load.\(^4\)\(^6\)

Another important psychic pressure was constant tension workers assigned to care relating to the monitoring of hemodynamic parameters, the signs and symptoms experienced by users during the accomplishment of procedures and also the physician’s request, which is constant. Thus, at the end of the procedures the employee presents physical and mental fatigue.

It also helps to increase the physical and mental fatigue, lack of knowledge about how the hemodynamics equipment works and information technology. In this sense, there is the expansion of hemodynamics services, since the products and equipment used are increasingly sophisticated, and are generally available in English, making it difficult to understand some of the beeps emitted by such equipment, among other demands.\(^7\)

This also demonstrates the need for nursing staff to qualify and organize themselves to be able to follow this evolution.\(^6\)\(^7\) The stress due to the use of these technologies indispensable in the process of work was also identified as psychic charge. In relation to stress, nursing professionals are subject to stress just like other workers, however, they face an additional emotional demand due to the nature of the profession when dealing with life and death.\(^8\)\(^9\)

Psychic load is also important and contributes to increasing stress, these are emergency situations experienced by these workers daily. We witnessed some complications while we watched the workers.
process, which demanded agility, constant attention and knowledge to deal with such situations, besides the sophisticated technology present in this work process. Allied to this, other activity identified was the pace and precision in handling the Contrast injector pump, in which the worker must also be agile and know how the equipment works.

The permanence time of the workers in controlled area, ie, exposed to ionizing radiation is a constant, and the worker is exposed, often unnecessarily, especially when adverse conditions occur, such as to meet users in clinical complications during interventional procedures, among other situations. However, well-targeted workers can minimize this exposure. 4,9-10

Another load to be added here is the responsibility given to those who have more experience in hemodynamics service. This ends up causing greater burden a particular worker, to define the work teams at every turn, consists of two nursing workers, among other professionals that make up this team. We realize that this responsibility concerns the worker, as identified in this report:

[…] I have experience of other hemodynamics, so it's pretty easy to me, but when the other fellow does not have much knowledge, everything gets a bit crazy and I also have to take over the affairs, but today was an exception, because the other colleague is absent [...]. (Collective workers ad hoc)

To clarify this speech, it is worth remembering that such service does not have the technical reserve in the personal figure as provided by COREN in Resolution No. 293/2004 as regards the Technical Safety Index (STI). 11

Among the physiological loads identified in Figure 2, we emphasize the forced and awkward positions, arising from the use of lead garments for being too heavy and somewhat malleable, hindering mobility, preventing movement and Crouching worker to have to provide care that requires speed, how to meet emergencies during the exams. The speech below shows such a situation.

When I'm using these garments I find it difficult walking properly, especially when using the circular type apron. This, besides being heavier, it also hinders the movement, but we have to get used to it, because we have to wear it. (Collective workers ad hoc)

<table>
<thead>
<tr>
<th>Physiological Loads</th>
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<tr>
<td>1) Uncomfortable and forced position due to the use of vestments lead.</td>
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<td>2) Immobilization by the difficulty of moving due to the use of vestments lead.</td>
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<tr>
<td>3) Forced positions by the amount of time using the garment.</td>
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<tr>
<td>4) Static and dynamic physical effort</td>
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<tr>
<td>5) Rate of tax work and division of labor is not always fair.</td>
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<tr>
<td>6) Repetitive cleaning activities, disinfection and preparation of surgical instruments.</td>
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<tr>
<td>7) Moving around in the room wearing tight clothes lead, hindering the movement of the worker.</td>
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<tr>
<td>8) Pressure exerted at the location of withdrawal of the introducer around 20 minutes each procedure.</td>
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Figure 2. Relationship of physiological loads evidenced in the work process of nursing services in hemodynamics, Florianópolis / SC Brazil, 2010.

The use of lead dressings is also a physiological load, "they mean an increase in energy expenditure and body use that involves a static or dynamic effort”. 1,11,12 Even in that direction, “the physical exertion is caloric intake [...] redistribution of blood, spent and tissue hypertrophy, “ie 1,11,12 a heavy physical exertion “as is the case of the use of these garments, or "uncomfortable position can only exist through the body “of the worker .

These loads cause wear manifested by back pain, lower limbs, hips and physical fatigue. The latter is usually referred to in the end of the shift. In summary, the heavy lifting in an awkward position means not just the sum of the effects of these wear the musculoskeletal system and the caloric expenditure from each of them, as well as an increase of both. 1

Another physiological load was identified in the work rate imposed and the time that these workers remain standing, about 20-35 minutes using these heavy garments, and also configure hardship and considerable physical and mental. Repetitive activities in cleaning, disinfection and preparation of surgical instruments also stand as physiological load. They are performed in the preparation room of the materials that is next to the examination room. There were no reports of fatigue as cleaning, disinfection and preparation of instruments, although this activity is performed standing, it does not require the use of vestments lead.

Mechanical loads, shown in Figure 3, is related to physical space, allowing mainly accidents. Thus, we highlight the physical structure of the room and the distribution of furniture and equipment. This distribution and also the presence of cabinets for consumables and other equipment, hampering the mobility of workers, especially when they are in the garments of lead and also when they need to
act quickly. With that the worker ends up adopting postures to crouch or stand up to avoid hitting any connected equipment or even the side table prepared with sterilized materials. Thus, just a simple activity requiring physical effort of workers and also contributing to the discomfort and pain, especially in the spine, as evidenced by the following report:

"[…] I feel a lot of back pain and discomfort, but it is bearable depending on the duration of the examination […]. (Collective workers ad hoc)"

These data corroborate findings, showing that workers relate part of their complaints to working conditions and equipment, they end up favoring the adoption of awkward postures.

### Mechanical and Biological Loads

1. Physical structure of the room very tight due to the distribution of furniture and equipment.
2. Possibility of accidents with piercing or slashing material.
3. Handling of surgical instruments soiled with biological material.
4. Possibility of contact with biological material at the puncture site.
5. Possibility of blood spatter during withdrawal of the guide wire and catheter placement.
6. Exposure to body fluids.

#### Figure 3. Relationship of mechanical and biological loads evidenced in the work process of nursing services in hemodynamics, Florianópolis / SC Brazil, 2010.

The use of coats of lead was also identified as mechanical load, due to the possibility of falls, as revealed in the following report.

"[…] We get so used these clothes that we got to run with them. Sometimes we unbalance, to fall down, as has happened with a colleague, but we cannot do anything because we have to wear them […]. (Collective workers ad hoc)"

However the use of these garments is also configured as physiology cargo. Among the mechanical loads we also identified the possibility of accidents with piercing or slashing material in handling and also due to the manifestations of workloads. The number of accidents involving these materials in nursing workers are common due to the manipulation of needles and sharp objects, presenting risks to physical and mental health.\(^\text{14}\)

In this sense the existence of an impact in the lives of nursing professionals in the biological, psychological and social fields, resulting in greater psychic tiredness immediately to the accident with biological material, being mainly voiced by fear of contamination by HIV and fear of an accident with contaminated materials.\(^\text{14}\)

Biological loads shown in Figure 3 refer mainly to the activities of manipulation of surgical instruments soiled with biological material, which besides generating mechanical load by the possibility of the employee suffering an accident, bioburden is also intense. This load also presents the possibility of blood spatter during withdrawal of the guide wire and catheter placement at the time of examination, and yet workers do not wear glasses for this kind of protection.

The withdrawal of the introducer was also identified as important biological load, the possibility of direct contact with the biological material when the pressure on the puncture site until the bleeding stops. However, like other loads, this is also configured as physiological load, mainly due to the time, around 20 minutes, the worker remains exerting finger pressure at the site of removal of the introducer.

Importantly, we frequently observe these procedures, workers wore gloves to nursing procedures. In exposure to body fluids we also identified manifestations of this burden, although with less intensity.

Regarding chemical loads, we observed contact with chemicals that are part of the everyday activities of workers cleaning the terminal and concurrent examination room, the cleaning and disinfecting materials, the preparation and administration of parenteral solutions and medications in use of compressed air to dry the possibility of intravascular catheters with the possibility of splashing these products in the eyes, and in the preparation and control of the means of radiological contrast to be administered by injection pump.
As regards the loads physical include thermal discomfort generated by refrigerated environment. In winter the worker suffers from the cold, and in summer, with the heat. Allied to these conditions, the use of vestments lead also contributes to increasing complaints of worker with thermal discomfort because the radiation protection equipment, and heavy also contribute to increase the heat.

Exposure to ionizing radiation procedures performed in the exam room sets important physical load on the one hand the possibility of developing diseases arising from such exposure, and on the other to configure psychic charge in relation to the lack of such charge may affect your health and their families. It should be noted that diseases resulting from this activity, commonly manifest around 10-15 years after this exposure.15-16

Finally, the discussion of the data indicates an interrelationship between workloads present in the work process of hemodynamics services, as signs the theoretical framework of social determination1, first because this benchmark is considered workloads are considered the elements found in the work process that dynamically interact with each other and the body of the worker, those generating adaptation processes that result in wear, understood as the capacity loss potential and / or actual bodily and psychic. In this regard it is noteworthy that a survey to analyze the mental burden of nursing in university hospitals has highlighted that in addition to being "assigned to certain working conditions, they were boosted by potentiating and most other loads."17-14

CONCLUSION

The analysis of workloads arising from the practice of nursing in the hemodynamic allowed us to establish a relationship with exposure to physical load of ionizing radiation present in this work process, hence one cannot deny the presence of ionizing radiation in the process of working nursing in this service. Thus, for example, the psychic load is mainly due to lack of knowledge of the production of radiation and its health effects, manifesting fear, just as the constant stress due to the use of a work tool that emits ionizing radiation.

This instrument, ie the equipment ends up generating hemodynamic manifestation of physiological loads, because the worker in the work process has no choice but to use the vestments of lead to protect themselves from this physical load. And to withstand heat, weight and discomfort caused by the use of such garments, the worker ends up adopting forced positions and also troublesome, as long as it remains in the garments. This situation also occurs due to the tax rate and the division and organization of this work.

Likewise the mechanical loads also manifest with such conditions, as the difficulty that workers are moving around freely in the room using the garments, not only these issues, but also throughout the course of the work, that leads to the use of the body as defensive strategies in situations of pain and discomfort, which contributes to increased wear manifested by pain in the skeletal muscles.

The possibility of an accident with drilling and cutting materials occurs in this context, more specifically, because to assist the doctor in procedures, nursing workers handling needles and yarn guide amid the biological material present there. Coupled with the attention he needs to have that moment, there is also all the sophisticated technology that demands knowledge. Moreover, at this moment he is vested not only with sterile clothes, but also with the garments of lead. And there are so many possible situations that carelessness can take it up to an accident involving this bioburden. Thus, the intensity of the load causes the worker to reduce the perception of the risks present in the work process.

And finally, chemical loads, the most relevant in this case, the manipulation of radiographic contrast used in the procedure. The activity also involves the mental burden, especially in the rhythm and precision in the
speed with which the worker must master the technology infusion pump contrast, activity that happens during the exam. One should remember that at that time the employee is vested with the garments of lead, also involving physiological loads.

This finding, the interrelation of workloads generate wear on psychobiological worker proves that the studies in the area of occupational health have shown, namely that the workloads interact with each other and with the body of the worker, and from the process work.

In this sense, what was proved by analyzing workloads arising from the practice of nursing services hemodynamics of Santa Catarina, Brazil, especially physical loading by exposure to ionizing radiation, in which the initial look was to the load due to the physical ionizing radiation, but other fillers have been identified with the same degree of complexity, indicating that they interact with each other.

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