

THE USE OF INDIVIDUAL PROTECTION EQUIPMENT AMONG THE NURSING STAFF OF A PUBLIC HOSPITAL*

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ABSTRACT: The objective was to identify the use of personal protection equipment by nursing workers during procedures which expose them to biological fluids. It was observational, descriptive and transversal research, with a quantitative approach, undertaken in a public hospital in the state of Paraná, in January – May 2014, using nonparticipant and intentional observation of 201 procedures through the use of a checklist. It was ascertained that, in the Surgical Center, procedure gloves (97%) obtained the greatest adherence, but that closed shoes and eye protection were not used on any occasion. In the Central Sterile Services Department, no worker used the procedure gloves, either rubber or heat-resistant, although the surgical mask (44.4%) had the greatest adherence in the cleaning room. In the Intensive Care Units and Emergency Room, the procedure gloves were used (100%), although adherence to the eye protection was low (0.86%). The nursing staff did not use all the equipment stipulated by legislation during their activities.

DESCRIPTORS: Occupational Health; Occupational Risks; Accident Prevention; Protective Devices; Nursing, team.

A UTILIZAÇÃO DE EQUIPAMENTOS DE PROTEÇÃO INDIVIDUAL ENTRE TRABALHADORES DE ENFERMAGEM DE UM HOSPITAL PÚBLICO

RESUMO: O objetivo foi identificar a utilização dos equipamentos de proteção individual pelos trabalhadores de enfermagem, durante procedimentos que os exponham aos fluidos biológicos. Pesquisa observacional, descritiva, transversal com abordagem quantitativa, desenvolvida em um hospital público do estado do Paraná, no período de janeiro a maio de 2014, utilizando-se da observação não-participante e intencional de 201 procedimentos por meio de um checklist. Verificou-se no Centro Cirúrgico que as luvas de procedimentos (97%) obtiveram maior adesão, entretanto sapatos fechados e óculos não foram utilizados nenhuma vez. Na Central de Material e Esterilização nenhum trabalhador utilizou as luvas de procedimentos, borracha e térmicas, entretanto a máscara comum (44,4%) teve maior aderência na sala de limpeza. Nas Unidades de Terapia Intensiva e Pronto Socorro as luvas de procedimento foram utilizadas (100%), porém a adesão aos óculos foi baixa (0,86%). Os trabalhadores de enfermagem não utilizaram todos os equipamentos preconizados pela legislação durante suas atividades.

DESCRIPTORES: Saúde do trabalhador; Riscos ocupacionais; Prevenção de acidentes; Equipamentos de proteção; Equipe de enfermagem.

LA UTILIZACIÓN DE EQUIPOS DE PROTECCIÓN INDIVIDUAL ENTRE TRABAJADORES DE ENFERMERÍA DE UN HOSPITAL PÚBLICO

RESUMEN: El objetivo de la investigación fue identificar la utilización de los equipos de protección individual por los trabajadores de enfermería, durante procedimientos que los expongan a los fluidos biológicos. Investigación observacional, descriptiva, transversal con abordaje cuantitativo, desarrollada en un hospital público del estado de Paraná, en el periodo de enero a mayo de 2014, utilizándose observación no participante e intencional de 201 procedimientos por medio de un checklist. Se verificó en el Centro Quirúrgico que los guantes de procedimientos (97%) tuvieron mayor adhesión, sin embargo zapatos cerrados y gafas no fueron utilizados ninguna vez. En la Central de Material y Esterilización, ningún trabajador utilizó guantes de procedimientos, pero la máscara común (44,4%) tuvo mayor adherencia en el salón de limpieza. En las Unidades de Terapia Intensiva y Emergencia, los guantes de procedimiento fueron utilizados (100%), pero la adhesión a las gafas fue baja (0,86%). Los trabajadores de enfermería no utilizaron todos los equipos preconizados por la legislación durante sus actividades.

DESCRIPTORES: Salud del trabajador; Riesgos ocupacionales; Prevención de accidentes; Equipos de protección; Equipo de enfermería.

*Article extracted from the End-of-Course Paper for the Undergraduate Course in Nursing titled "Use of Individual Protection Equipment among Nursing Staff: an evaluation". Londrina State University, 2014.

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Received: 04/03/2015

Finalized: 20/05/2015

INTRODUCTION

The worker in the health area is exposed to occupational risk factors on a daily basis: chemical, physical, biological, ergonomic and psychosocial risk factors⁽¹⁾. These risks can lead the worker to early withdrawal from her activities and the partial or total loss of her ability to exercise her profession⁽²⁾.

One of the efficacious ways of minimizing the risks to which the workers are exposed in exercising their work activities consists of the correct use of Individual Protection Equipment (IPE).

IPE are described in the Regulatory Standard - 6 (NR-6) as being any device or product for individual use, used by the worker and aimed at the protection from risks which can threaten her safety and health. The employer is obliged to provide the workers with equipment which is appropriate to the type of risk to which they are exposed, in a perfect state of maintenance and functioning and free of charge. The worker must use the IPE according to the risk and purpose, appropriately, and take responsibility for keeping and maintaining them, as well as communicating to the employer any change which makes them inappropriate for use⁽³⁾.

With the purpose of establishing the basic guidelines for the implementation of actions protecting the health and safety of workers in health institutions, Regulatory Standard - 32 (NR-32) was created. This standard aims to specify criteria which must be followed in order to reduce the potential risks, thus improving the quality of service and care provided with greater safety for the health worker⁽⁴⁾.

Activities are undertaken in the health institutions which expose the workers to biological fluids, such as possible contact with bodily secretions and even the occurrence of accidents with sharps. This exposure is considered most common among the nursing staff, and the most serious type, due to the risk of developing lethal diseases in that more than 20 types of pathogen can be transmitted⁽⁵⁾, including Human Immunodeficiency Virus (HIV), Hepatitis B (HBV) and Hepatitis C (HCV)⁽²⁾.

Studies⁽⁶⁻⁸⁾ have shown poor adherence to the use of IPE during the undertaking of procedures which involve contact with body fluids, including

procedure gloves, sterile gloves, common masks and eye protection, among others, thus ignoring the prominent risk of biological exposure.

In the light of these considerations, the following research question is posed: Do the nursing staff in a public hospital use the necessary IPE during the nursing care? In order to respond to this question, there is, as the objective, to identify the use of IPE by the nursing staff during the undertaking of procedures which expose them to biological fluids.

This study is of extreme importance, given that identifying the use of IPE by the nursing staff contributes such that reflections may be made with the aim of preventing risks and health problems, improving these workers' quality of life.

METHOD

This is an observational, descriptive, transversal study, with a quantitative approach, undertaken in a public hospital with high complexity attendance, in a city in the north of Paraná, which has approximately 903 health workers.

Data collection was undertaken in the period January – May 2014, through the technique of nonparticipant observation of the nursing staff during the nursing care. A pre—elaborated checklist was used, with the IPE necessary for each procedure undertaken in the previously-established departments, these being: the Surgical Center (SC), Central Sterile Services Department (CSSD), Intensive Care Units I and II (ICU I and II) and Emergency Room (ER). Five departments were selected intentionally, as the procedures to be observed occur frequently and in significant numbers.

The following procedures were observed using the checklist: in the SC, the removal of materials from the operating rooms, the throwing-away of body fluids from the aspiration bottles and the use of x-ray in orthopedic operations; in CSSD, the washing of materials in the cleaning room, packaging and sterilization; and in ER and ICU I and II, dressings for healing by secondary intention and endotracheal aspiration by open system.

The departments in which the observations were made have 248 nursing workers, with 201 procedures observed, undertaken by nursing

technicians and auxiliary nurses in the morning and afternoon periods.

The inclusion criteria were the procedures undertaken by the nurses, the auxiliary nurses, and the nursing technicians; the exclusion criteria were procedures undertaken by students and lecturers of nursing, other categories (physiotherapists and physicians) and of those undertaken with patients kept in isolation. In the data collection period, no nurse undertook the procedures observed, and for this reason they were not included in the study.

The data collected were transcribed by typing into the Microsoft Office Excel 2010® program and were analyzed through descriptive statistics (frequency and percentage) and in the form of tables. The project was approved by the Committee for Ethics in Research Involving Human Beings, of the hospital in which the study took place, under CAAE N. 19911813.3.0000.5231. All of the ethical precepts of research involving human beings were respected.

RESULTS

Based on the 201 procedures observed in the department selected, Table 1 shows the number of procedures and the simple relative frequency for each department, it being the case that the majority of procedures were observed in ICU I and II and in ER.

In SC, among the 51 (25.4%) procedures which were observed, 34 (66.7%) referred to the removal of material from the operating rooms, followed by the throwing-away of body fluids from the aspiration bottles 10 (19.6%) and by the

Table 1 - Number of procedures observed. Londrina-PR-Brazil, 2014

Department	Procedures	%
Surgical Center	51	25,4
Central Sterile Services Department	29	14,4
Intensive Care Unit I and II	61	30,3
Emergency Room	60	29,9
Total	201	100

use of x-ray in orthopedic operations, with seven (13.7%).

In CSSD, the total number of procedures observed was 29 (14.4%). Of these, nine (31%) were undertaken in the cleaning room (cleaning of materials), 14 (48.3%) in the packaging and six (20.7%) in sterilization.

In ICU I and II, among the 61 (30.3%) procedures observed, 59 (96.7%) corresponded to dressings by secondary intention, and two (3.3%) to endotracheal aspiration. In ER, of the 60 (29.9%) procedures observed, 56 (93.3%) were dressings by secondary intention and four (6.7%), endotracheal aspirations.

Table 2 shows the use of the IPE by the nursing staff, as well as the relative frequency, during the procedures observed in SC, CSSD, ICU I and II, and ER.

As can be seen from Table 2, of the 34 procedures observed in the SC, during the removal of material from operating rooms, the procedure gloves were used by the majority of the nursing staff (97%), and the closed shoes only in five (14.7%). In relation to the throwing-away of body fluids, four (40%) of the 10 procedures observed included the use of surgical masks. However, the rubber gloves, the eye protection and the closed shoes were not used once. The lead aprons, in SC, were used in three (42.9%) of the seven procedures undertaken using x-ray.

In CSSD, specifically, in the cleaning room, where the materials are washed, the use of the surgical mask was observed in four (44.4%) of the nine procedures. However, the rubber gloves, closed shoes and eye protection were not used on any occasion. In the area in which the materials were packaged, the surgical mask was used only once (7.1%) in the 14 procedures observed, and the procedure gloves were not used on any occasion. In the sterilization area, the heat-resistant gloves and the hearing protectors were not used on any occasion.

In relation to the 115 procedures involving dressings observed, the use of procedure gloves was observed in all the workers, although eye protection was used on only one occasion (0.86%). During the endotracheal aspiration, the eye protection was used on only two occasions (33.3%).

Table 2 – Use of Individual Protection Equipment by the nursing staff of the SC, CSSD, ICU I and II and ER Londrina-PR-Brazil, 2014

Procedure	Absolute frequency	IPE	Use of IPE	Relative frequency
Removal of materials	34	Procedure gloves	33	97%
		Closed shoes	5	14,7%
Throwing-away of body fluids	10	Surgical masks	4	40%
		Rubber gloves	0	-
		Eye protection	0	-
		Closed shoes	0	-
Use of x-ray	7	Lead apron	3	42,9%
Cleaning room	9	Rubber gloves	0	-
		Closed shoes	0	-
		Eye protection	0	-
		Surgical masks	4	44,40%
Packaging	14	Procedure gloves	0	-
		Surgical masks	1	7,10%
Sterilization	6	Heat-resistant gloves	0	-
		Hearing protectors	1	7,10%
Dressing	115	Procedure gloves	115	100%
		Eye protection	1	0,86%
Endotracheal aspiration	6	Eye protection	2	33,3%

Key: IPE: Individual Protection Equipment

DISCUSSION

In this study, it was possible to observe that during the 34 procedures of removal of material from the operating rooms, only five (14.7%) nursing staff used the closed shoes. However, the majority (97%) used procedure gloves in undertaking this task, this being different from another study undertaken with circulating staff in the operating room, which ascertained that the workers did not use the stipulated IPE, such as procedure gloves, during the removal of swabs with blood on⁽⁹⁾.

It is emphasized that what is required during the removal of materials from the operating rooms is the use of the following IPE: procedure gloves, due to the contact with biological fluids and humidity arising from the operations using water, as well as the use of the surgical mask and closed shoes with the use of overshoes⁽¹⁰⁾.

In relation to the ten procedures observed during the throwing-away of body fluids from the aspiration bottles used during the surgical procedures, use of the surgical mask had a low adherence among the workers (40%) and the

procedure gloves, eye protection and closed shoes were not used on any occasion in this study. The low adherence to the use of the IPE may be related to factors such as discomfort, inconvenience and inadequacy⁽¹¹⁾.

Concern is great in relation to the low adherence to the use of IPE during the throwing-away of body fluids, as, on most occasions, these bottles contain a significant quantity of fluid which can provoke splashes during their throwing-away and can be potentially configured as contaminating.

In relation to the use of x-ray in the operating rooms, all the workers exposed to ionizing radiation must protect themselves through the use of protective clothing or barriers with damping of not less than .25 mm lead equivalence⁽¹²⁾. According to the results of the present study, there was no significant adherence to the use of this IPE, as only three (42.9%) workers used it. In contrast, another study observed that 100% of the workers used this IPE due to the use of x-ray in catheterization laboratories⁽¹³⁾.

The low adherence to the use of garments with lead, in the present study, may be related to the

characteristics of this IPE⁽¹⁴⁾, that is, the presence of the lead causes this IPE to be heavy, causing discomfort and even back pain after its use⁽¹³⁾.

In CSSD, particularly in the cleaning room, the materials need to be clean, the following being necessary: the use of the surgical mask, long rubber gloves, an impermeable apron with long sleeves, hearing protectors (if necessary), eye protection and impermeable and anti-slip closed shoes. The eye protection and surgical mask can be substituted with the face shield. These IPEs protect the workers from the exposure to the biological fluids and to the humidity⁽¹⁵⁾. However, in this study, no worker used the closed shoes, the eye protection and the disposable apron in the cleaning room, revealing the low adherence.

It was also ascertained that the nursing staff do not use the rubber gloves for washing the materials in the cleaning room, preferring the procedure gloves, which provide less protection in relation to the risk of accidents with sharps and to humidity. In one study which evaluated the risks and the mechanisms of self-care of workers in the CSSD, the same stated that the rubber gloves remove the sensitivity and make handling the materials more difficult⁽¹⁶⁾.

In the 1990s, with the introduction of enzymatic cleaning agents in the efficient cleaning of the contaminated materials in the cleaning room, there was discussion of the need – or not – for the use of procedure gloves during the packaging of the items, given that the efficient cleaning of the contaminated materials can significantly reduce the microbial load⁽¹⁷⁾, leaving the materials safe for handling. However, a Brazilian resolution makes obligatory the use of procedure gloves, masks, and hearing protectors⁽¹⁵⁾ for this activity. In the present study, no nursing worker used the procedure gloves, and only one (7.1%) used the surgical mask.

During the sterilization, although the Brazilian resolution does not address the need for use of IPE in this area⁽¹⁵⁾, one must use heat-resistant gloves for the removal of the materials from the autoclave, as these avoid burns in the worker, as well as eye protection, a surgical mask, closed shoes and an impermeable apron⁽¹⁰⁾. However, in the present study, it was ascertained that the nursing workers did not make use of the heat-resistant gloves, just using pieces of cloth

to protect themselves, which were close to the equipment, exposing themselves to the risk of burns due to the high temperature of the materials and the autoclaves.

The hearing protectors must also be used in the sterilization, as the nursing workers are exposed to the noises of the sterilization equipment, and without the appropriate use of hearing protectors, the high sound frequencies can harm these workers' health.

In one study undertaken in order to ascertain the levels of noise in a sterilization department, it was observed that these levels were high, as the mean was 66 decibels⁽¹⁸⁾, it being the case that the acceptable levels of noise are from 34 to 45 decibels⁽¹⁹⁾. Although the levels of decibels to which the workers in the present study were exposed have not been ascertained, it is inferred that the use of this IPE is necessary; however, in the present study, no worker used it.

In relation to the use of IPE for undertaking dressings for healing by secondary intention, in which the cleaning of the wound is undertaken by the method of irrigation, the use of the following IPE is necessary: surgical mask, apron, eye protection and procedure gloves⁽²⁰⁾. It is emphasized that the dressings were undertaken using sterile tweezers, dispensing with the need to use sterile gloves.

In this study, the surgical mask (70.4%) and the procedure gloves (100%) had significant adherence during the undertaking of dressings with healing by secondary intention. However, the eye protection was used on only one occasion (0.86%) by the workers during the undertaking of the 115 dressings observed. This data is similar to the result of another study, which evidenced that less than half (45.1%) of the workers used eye protection for undertaking the dressing⁽²¹⁾.

In relation to the endotracheal aspirations using the open system, the following are necessary: the use of the surgical mask, eye protection against possible volatile particles, and sterile gloves for protecting the patient and the worker, as well as the disposable apron⁽²²⁾.

This study found that the surgical mask, sterile gloves and disposable aprons were used by all the nursing workers observed during the endotracheal aspirations. However, only two (33.3%) workers used the eye protection.

Complementing this, another study ascertained that of the 334 procedures observed of aspiration of the upper airways, only in 25 (7.8%) were all the IPE necessary used⁽⁷⁾.

One study observed the reasons for which the workers do not use the IPE during the procedures: a feeling of suffocation, inconvenience, discomfort, difficulty in use, heat and compulsoriness of use⁽¹¹⁾. This behavior of not using the IPE correctly directly and indirectly influences the workers' safety, placing them in a situation of risk⁽²³⁾.

The worker in the health area, including nursing, needs to be aware of the risks to which he or she is exposed. It is necessary, therefore, to undertake continuous education such that measures may be adopted, thus preventing the risks and improving the workers' quality of life.

Authors^(13,24-25) confirm that significant learning is necessary for the practices of standard precautions to be adopted efficaciously, thus promoting the prevention of accidents and occupational diseases, the adoption of preventive measures being essential for the improvement of the worker's health.

In a complementary manner, it is of fundamental importance that the nursing workers first understand what the occupational risks to which they are exposed are; and, thus, that they may be alert to these risks so as to avoid them and protect their health⁽²⁶⁾.

CONCLUSION

It can be asserted that the nursing workers investigated do not correctly use all of the IPE necessary for the procedures undertaken, which are stipulated by Brazilian legislation.

It was observed in the SC that the rubber gloves, the eye protection and the closed shoes were not used by any worker. However, there was significant adherence in the case of the procedure gloves. In CSSD, no worker used the necessary procedure gloves, rubber gloves, or heat-resistant gloves, or the closed shoes, eye protection and impermeable aprons, the surgical mask being the equipment which obtained the greatest adherence. In the ICUs and ER, adherence to eye protection was very low, in contrast with the procedure gloves, which were used by all the workers.

Although this study's objective was achieved, the study presented limitations, as it was a transversal study which does not allow the generalization of the findings researched. Thus, it is suggested that further studies should be undertaken, including the use of IPE and other procedures and departments which were not addressed in this study, as well as the effect of training in the health services.

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