

Healthcare-associated infection control and biosecurity measures for nurses in the emergency department of a National Essalud Hospital

[Medidas de bioseguridad y control de infecciones asociadas a la salud del personal de enfermería del servicio de urgencias de un Hospital Nacional, Essalud]

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Resumen

Las medidas de bioseguridad son indispensables en la labor del cuidado enfermero para asegurar la calidad e impacto de las intervenciones de los cuidados de enfermería en las áreas asistenciales. Objetivo: Determinar la relación de las medidas de bioseguridad y el control de infecciones asociadas a la atención de salud en su labor que realizan los enfermeros(as) en el servicio de emergencia de un Hospital Nacional, Essalud, 2019. La metodología fue de enfoque cuantitativo, correlacional, de corte trasversal, diseño no experimental, cuya población estuvo conformada por 152 enfermeras/os que laboran en el área de emergencia, para ello se aplicó 3 instrumentos: Escala de conocimientos de medidas de bioseguridad con 14 ítems con respuestas múltiples, Lista de chequeo de medidas de bioseguridad con 17 ítems y Lista de cotejo de lavado de manos con 11 ítems ambos instrumentos con escala dicotómica. Ambos instrumentos fueron evaluados por expertos y su confiabilidad fue 0.8. Los resultados obtenidos demuestran que existe correlación significativa positiva media, entre las variables medidas de bioseguridad y el control de infecciones asociadas a la atención de salud. Se concluye que el conocimiento de los enfermeros(as) sobre medidas de bioseguridad y las IAAS suscitan alto riesgo al personal de salud como a los pacientes. Por lo que es fundamental continuar con la capacitación, monitoreo, seguimiento y control para asegurar la calidad e impacto en los cuidados de enfermería en los servicios de emergencia.

Palabras clave: Bioseguridad, control de infecciones asociadas a la atención de salud, cuidado de enfermería

Abstract

Biosecurity measures are indispensable in the work of nursing care to ensure the quality and impact of nursing care interventions in the areas of care. Objective: To determine the relationship between biosecurity measures and healthcare-associated infection control in the work of nurses in the emergency department of a National Hospital, Essalud, 2019. The methodology was a quantitative, correlational, cross-sectional, non-experimental design, whose population consisted of 152 nurses working in the emergency area, for which 3 instruments were applied: Scale of knowledge of biosecurity measures with 14 items with multiple answers, Checklist of biosecurity measures with 17 items, and Handwashing checklist with 11 items, both instruments with a dichotomous scale. Both instruments were evaluated by experts and their reliability was 0.8. The results obtained show that there is a significant positive average correlation between the variables

measured of biosecurity and the control of infections associated to health care. It is concluded that nurses' knowledge of biosecurity measures and HAIs pose a high risk to health personnel and patients. Therefore, it is essential to continue training, monitoring, follow-up and control to ensure the quality and impact of nursing care in emergency services

Keywords: Biosecurity, Healthcare-associated infection control and nursing

1. Introduction

Health safety is a major activity in the area of health care, the World Health Organization (WHO, 2019), reports that the burden of infection associated with endemic health care around the world, occurs in 1 in 10 patients, who become infected while receiving the most common medical care. In addition, it is estimated that hundreds of millions of patients worldwide are affected each year, mostly in low- and middle-income countries. In addition, the environment and risk factors related to in-hospital infections, also known as nosocomial infections, are a public health problem worldwide because they are associated with increased mortality, morbidity, and costs both in the hospital and to patients, their families, and society (WHO,2020).

There is a multifactorial nature of intrahospital infections, especially in Intensive Care Units (ICU), Special Care Units (SCU), which are high-risk areas because they are two to five times larger than other hospital areas, since they are related to the practice of invasive methods: vascular accesses, urinary catheters, endotracheal tubes, among other procedures that significantly increase the risk of acquiring nosocomial infections (Castro and Simian, 2018).

Thus, biosafety measures are the set of procedures and actions taken by health professionals to reduce or eliminate possible risks of infection in the hospital both patients and health personnel. The care work of the nursing professional is immersed in the management of quality and patient safety of the execution of care based on health standards and norms to measure the effectiveness of procedures, indicators of results, efficiency of the process or processes and the use of resources, user satisfaction as well as that of the personnel providing care (WHO, 2019).

Historically, Nightingale's model addressed the need to improve hygienic and sanitary conditions and focused on providing patients with a safe environment with a suitable environment for patients to promote health, prevent illness, restore health and alleviate suffering. Therefore, biosecurity measures are precautionary measures that should be applied by all health personnel when handling items that have or have had contact with blood, body fluids, secretions, excretions or tissues of the patient; avoiding accidents due to exposure to these fluids and reducing the risk of transmission of microorganisms that cause infections in health areas, so it is important to apply the use of protective barriers, hand washing and proper waste management generated especially in the surgical center, in critical patient units (OPS, 2010).

The international background on biosafety is evidenced that in Spain Caballé M. (2018), showed that 88.9% of those surveyed knew about safety syringes and 67.8% had used them. 31% of the nurses who answered that they had suffered an accident with biological risk did not agree at all that the safety syringes reduce the probability of suffering an accidental puncture. The conclusion is that having suffered a biohazard accident at some point does not improve the assessment of bio-safety devices. The nurses of Mutua Universal present an average level of perception of biological risk. In Brazil, Llapa-Rodríguez E., da Silva Gilvan Gomes (2018), showed that out of 145 nurses 88.3%(128) mentioned that they received training on biosafety. Regarding hand hygiene with soap and water, 97.9%(142) reported doing so before/after patient contact and before/after removing sterile and/or procedural gloves. It is concluded that the majority

demonstrated knowledge of biosafety. However, this knowledge does not ensure compliance with the standards by the professionals.

In Peru, through the Ministry of Health (2014), efforts have been made to reduce the problems of the most common types of in-hospital infections (IHI) found at surgical sites and in the bloodstream, urinary tract, and lower respiratory tract. According to data reported by the Health Intelligence Office on Epidemiological Surveillance of the Guillermo Almenara Irigoyen National Hospital, in the year 2018, out of 205 cases studied in the Emergency Service in the Special Care Unit, 12.5% presented Health Care Associated Infections (HAI), with a greater increase than other services (OISVE, 2013).

Also, Cervantes E. and Becerra M. (2017), showed that 68% apply prevention measures in an inadequate way in each procedure and 32% apply them in an adequate way, it is also observed that 60% perform hand washing in an inadequate way, 72% do not use protective material such as: mask, gloves, disposable apron, disposable boots, cap, 62% in the application of antiseptics/disinfectants are not applying it in an adequate way and finally we have that 2% have an inadequate management in the disposal of waste. I work with an important contribution because it measures the percentage in the nursing staff in terms of prevention of nosocomial infections according to the use of biosecurity measures. On the other hand, Perochena L. and Abarca J. (2017), showed that 88.3% had an intermediate or neutral safety culture and efficient and expert professional performance, and only 4.7% had an advanced beginner's level. Nurses who had an intermediate culture were between competent (41.0%) and efficient (28.7%) and those who reached a high culture, the highest percentage of them (42.9%) were expert in their performance. Therefore, there is a statistically significant relationship between the variables, since the higher the safety culture, the better the performance of the nurses.

According to Somocurcio J. (2017), it was shown that 21% of the personnel evaluated obtained a result of 8 to 10 correct answers, 75% of 4 to 7, and 4% of 0 to 3. There are significant differences in the level of knowledge according to the variables of occupational group, age, time spent working in the hospital, sex by occupational group, sex by age, and having received labor induction. It is concluded that the knowledge of the professional personnel of the hospital about the measures of biosecurity is not ideal, which generates a situation of high biological risk for the professional and technical personnel as well as for the patients. It is possible to give training on biosecurity focused on the most vulnerable groups, in addition to improving its quality and impact. In Colombia, Díaz-Díaz A. and Vivas M. (2016), it was found that the results obtained that the study subjects are evaluated on biological risk and biosafety and in a smaller percentage the application of biosafety practices was evidenced. No statistically significant relationships were observed between knowledge on biological risk and biosafety and type of linkage and teaching seniority. It is concluded that teachers recognize the exposure to biological risk, but the low use of biosafety measures and recommended procedures to prevent accidents is a concern. Conclusions: It is expected that teachers in the health area have a high knowledge about biological risk and application of biosecurity norms, but this research showed the deficiencies.

Also, Tamariz F. (2016) It was determined that the level of knowledge of the health personnel is from medium (55%) to low (19%), which is an alarming figure, since the population to be studied works in the hospitalization areas. The level of practice of the health personnel is good (65%), but with the risk of deviating to a lower unfavorable level in the areas of hospitalization. It is concluded that the level of knowledge and practice of biosafety of health personnel presented a significant relationship between both variables (Fisher's exact test $p = .000$), which means that knowledge about biosafety is necessary for favorable practice, and thus decrease the risk of intrahospital infections.

Faced with this situation, a strategy is assumed to reduce and control intrahospital infections. International institutions have implemented biosecurity standards that aim to reduce the risk of transmission of infection microorganisms, linked to accidents, by exposure to blood, by body fluids, therefore, controlling hospital infections under the principles of biosecurity: Universality, use of barriers and means of disposal of materials. Likewise, all health personnel should take standard precautions routinely to prevent exposure of skin and mucous membranes in all situations that could lead to accidents (OPS, 2010).

It is important to specify that health professionals are continuously exposed to acquire any infectious disease, even more when working in areas such as Emergency, Intensive Care and hospitalization, which make health exposed continuously through contact with various pathogens and making them carriers for other patients, in addition, overcrowding and poorly ventilated environments also lead to various infectious diseases. For this reason, it is important to understand, analyze and apply our actions through hand washing, which would reduce the impact and risk to the health of the patient and health professionals within the emergency area, promoting within the institution a culture of safety and quality of services provided (Caballé, 2018; Llapa et al., 2018).

In relation to biosecurity measures. They are all those actions or measures that the nurse applies in relation to the prevention of any intrahospital infection invasion which was measured by means of a questionnaire according to the dimensions, whose results are Adequate and Inadequate. Likewise, biosecurity measures in the set of preventive measures that aim to protect the health and personal safety of health professionals and patients against the different risks produced by biological, physical, chemical and mechanical agents (Malagón and Galán, 1998). Finally, this research will fill the gaps in knowledge and information about the preventive interventions that nurses apply in their daily work area, such as biosecurity standards, which aim to reduce healthcare-associated infections. Taking into account that, a safe environment should be promoted in order to reduce hospital stay, decrease costs and prevent complications that may cause.

2. Methodology

The study has a quantitative, correlational, cross-sectional and experimental design approach (Hernandez et al., 2014; Levine and Mark, 2014). The population consisted of 152 nurses who work in the Emergency Department of the Hospital Nacional Guillermo Almenara Irigoyen in the Special Care Unit. Three instruments were applied: Scale of knowledge of biosecurity measures with 14 items with multiple answers, Checklist of biosecurity measures with 17 items, and Handwashing checklist with 11 items, both instruments with a dichotomous scale. These were evaluated by experts and their KR 20 reliability was 0.8, 0.75, and 0.9. For data analysis, the Statistical Package for the Social Sciences (SPSS); version 25 for Windows, was used, using descriptive and inferential statistics such as frequencies, proportions, and point estimates by 95% confidence intervals. This study was approved by the ethics committee of the Hospital Nacional Guillermo Almenara Irigoyen.

3. Results

Table N°1

Sociodemographic characteristics of the nurses working in the Emergency Service of the Hospital Nacional Guillermo Almenara Irigoyen.

Age	N°	%
20-30	6	4%
31-40	97	64%
41-50	43	28%
50 años o más	6	4%
Total	152	100%
Sex	N°	%
Single	61	40%
Married	67	44%
Divorced	24	16%
Total	152	100%
Time of service	N°	%
1-5 age	61	40%
6-10 age	61	40%
11-22 age	30	20%
Total	152	100%
Hep immunization ^B	N°	%
Vaccine	146	96%
Non-vaccinated	6	4%
Total	152	100%
Studies carried out	N°	%
Specialist	134	88%
Graduates	6	4%
Master's degree	12	8%
Total	152	100%
Workplace accident	N°	%
Once	55	36%
Twice	91	60%
None	6	4%
Total	152	100%

Table No. 2

Compliance with biosecurity measures - Infection control measures in nurses in the emergency department of a National Essalud Hospital.

Level of compliance	Biosecurity measures		Infection control measures	
	N°	%	N°	%
Adequate	123	81%	114	75%
Inadequate	29	19%	38	25%
total	152	100%	152	100%

There is evidence that nurses have a higher level of adequate knowledge in the use of handwashing by 81%, followed by handwashing technique by 75%. In relation to the level of inadequate knowledge we have that in 12% in the use of hand washing, followed by the technique of hand washing in 20%.

Table N° 3

Knowledge of biosecurity measures for nursing professionals, according to dimensions: physical barrier, protective and waste management. Guillermo Almenara Irigoren National Hospital

Biosecurity measures	Physical barriers		Protective barriers		Waste management	
	N°	%	N°	%	N°	%
Appropriate knowledge	91	60%	109	72%	121	80%
Inadequate knowledge	61	40%	43	28%	31	20%
Total	152	100%	152	100%	152	100%

Nurses were found to have a higher level of adequate waste management knowledge by 80%, followed by protective barrier by 72% and physical barrier by 60%. In relation to the level of inadequate knowledge we have that in 40% in physical barrier, 28% in protective barrier and 20% in waste management.

Table No. 4

Compliance with infection control measures according to physical and protective barriers and waste management. Guillermo Almenara Irigoren National Hospital

Infection control measures	Physical barriers		Protective barriers		Waste management	
	N°	%	N°	%	N°	%
Adequate	145	96%	128	84%	103	68%
Inadequate	7	4%	24	16%	49	32%
Total	152	100%	152	100%	152	100%

Nurses have a higher level of adequate knowledge of physical barriers at 96%, followed by protective barriers at 84% and waste management at 68%. In relation to the level of inadequate knowledge we have that in 32% of waste management, 16% in protective barrier and 4% in physical barrier.

Table N°5

Spearman's Rho correlation test between biosecurity and infection control measures taken by nurses in the Emergency Service of the Special Care Unit.

Correlaciones				
			Biosecurity measures	Healthcare-associated infection control (HAI)
Rho Spearman	de	Coeficiente de correlación	1,000	,527**
		Sig. (bilateral)		,000
		N	152	152
Rho Spearman	de	Coeficiente de correlación	,527**	1,000
		Sig. (bilateral)		,000
		N	152	152

** The correlation is significant at the 0.01 level (bilateral).

It is evident that the Rho Spearman correlation coefficient indicates that the measures of biosecurity and Health Care Associated Infection Control (HAI) are significant ($p\text{-value} < 0.01$) and it reaches a value of 0.527 which indicates a medium positive correlation.

4. Discussion y conclusions

Biosecurity is a highly relevant activity in the health field not only because of the economic costs involved but also because of the costs of living that can be caused by the lack of biosecurity measures. The role played by the nurse in this task has a determining role in the prevention of healthcare-associated infections. Nursing professionals, as members of the health care team, play a key role in this process by actively intervening in five strategic roles: research, assistance, education, epidemiology and administration. The aim of the study was to determine the relationship between biosafety measures and control of healthcare-associated infections assumed by nursing professionals in the Emergency Service of the Special Care Unit of the Hospital Nacional Guillermo Almenara Irigoyen ESSALUD 2019. The results showed that there is a weak inverse relationship between biosecurity measures and intrahospital infection control, which is statistically not significant since $p\text{-value} (0.7143) > 0.05$. These results differ with Tamariz F. who showed a significant relationship between both variables (Fisher's exact test $p = .000$), which means that knowledge about biosafety is necessary for favorable practice, and thus decrease the risk of in-hospital infections (Tamariz, 2016).

It follows that it is necessary to maintain continuous and sustained nursing intervention for the prevention and control of compliance with biosecurity measures. These measures require an enormous commitment of all the actors in health so that the suitable conditions in the labor scope can be given as it is the endowment of available material resources to execute actions and daily procedures direct and indirect to the patients. To monitor the incidences of hospital infections supervising the techniques of daily use.

In relation to identifying the level of knowledge about the biosecurity measures applied by the nursing professionals in the care of adults assisted in the Special Care Unit of the Guillermo

Almenara Irigoyen National Hospital in the dimensions of physical barrier, protective and waste management. The results obtained were that nurses have a higher level of adequate knowledge in waste management by 80%, followed by the protective barrier by 72% and the physical barrier by 60%. In relation to the level of inadequate knowledge we have that in 40% in physical barrier, 28% in protective barrier and 20% waste management. These results can be compared with the study by Cervantes E. and Becerra M. (2017), it was shown that 68% apply prevention measures in an inadequate manner in each procedure and 32% apply them adequately. It was also observed that 60% wash their hands in an inadequate manner, 72% do not use protective material such as: masks, gloves, disposable aprons, disposable boots, caps, 62% when applying antiseptics/disinfectants are not applying them in an adequate manner and finally we have that 2% have inadequate waste disposal management.

It follows that it is elementary to constantly know the level of knowledge that nursing professionals have to ensure that their actions have a support that allows on the prevention and practice of hygiene and safety measures when providing nursing care to patients.

As for identifying the control measures applied by nursing professionals in the care of adults attended to at the Special Care Unit of the Guillermo Almenara Irigoyen National Hospital in the dimensions of physical barrier, protective and waste management. The results showed that nurses had a higher level of adequate knowledge of physical barriers in 96%, followed by protective barriers in 84% and waste management in 68%. In relation to the level of inadequate knowledge we have that in 32% of waste management, 16% in protective barrier and 4% in physical barrier. These results can be compared with the study by Llapa-Rodríguez E., da Silva Gilvan Gomes (2018), who demonstrated that when the number of biosafety trainings increases, the levels of biosafety knowledge increases, however this does not ensure the compliance of the professionals with the norms.

It follows that the control of the activities and actions of nursing professionals are directly related to the knowledge acquired in the training provided to prevent HSIs. It is necessary to maintain this system of ongoing training because there is a high turnover of nursing personnel who could jeopardize adherence to the biosafety standards, thus jeopardizing the control and mitigation of HSIs in the health services.

By measuring the control of Healthcare-Associated Infections (HAI) according to the application of handwashing applied by nursing professionals in the care of adults attended to at the Special Care Unit of the Guillermo Almenara Irigoyen National Hospital in the dimension: Use and Technique of Handwashing. The results showed that nurses have a higher level of adequate knowledge in the use of hand washing in 88%, followed by the hand washing technique in 80%. In relation to the level of inadequate knowledge we have that in 12% in the use of hand washing, followed by the technique of hand washing in 20%. These results can be compared with Llapa-Rodríguez, E., da Silva Gilvan Gomes (2018), who showed that 88.3% of nurses complied with the biosecurity measures for hand hygiene with water and soap. After receiving training, 97.9% reported doing so before/after patient contact and before/after removing sterile and/or procedural gloves.

Finally, the control of biosecurity measures has a fundamental component in the compliance with the process of use and techniques of hand washing because it reaffirms the competencies and work commitment of the nurse (or) to fulfill his/her daily work applying procedures and activities related to the direct care of patients with knowledge, skills, and attitudes that assure the quality of life of the patients (Panimboza and Pardo, 2013; Huatuco, 2014; Castro, 2014).

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