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RESEARCH ARTICLE

KNOWLEDGE OF BIOSAFETY MEASURES IN SERVICE SUPPLIERS WHO PARTICIPATE IN SURGICAL CARE

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ABSTRACT

Health care personnel involved in the patient's surgical care are exposed to a high risk of contracting any infection during their work by not complying with established Biosecurity Measures. We emphasize the importance of complying with the Biosafety Measures to civilian personnel who participate in surgical procedures of the patient in the Naval Medical Center, evaluating the knowledge about the Biosafety Measures. The present study is observational, transverse and descriptive, where the survey "Questionnaire of knowledge on Biosafety Measures" was applied.

Keywords:

Civil Service Providers,
Biosecurity, Surgical Care.

INTRODUCTION

It is known as biosafety measures to the set of rules and procedures that guarantee the control of risk factors, the prevention of harmful impacts and the respect of the permissible limits, without threatening the health of people who work and / or manipulate elements. biological, biochemical techniques, genetic experimentation and their related processes and also ensure that the product of these investigations and / or processes do not threaten the health and welfare of the patient, health personnel, or against the environment (Gómez, 2015). The staff of the surgical area is constantly exposed to occupational hazards. It is important to point out that the medical staff provides care to the patient during the surgical intervention, for this reason they are exposed to a high risk of contracting any infection during their work, so it is important that they know the Universal and Standard precautions; hand washing, protective barriers; gloves, lenses, masks, hat, apron and solid waste management

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for patient care, thus preventing biological risks and thus comply with Biosecurity Measures (Rodríguez, 2013; Pacheco, 2016). The important element of biosecurity is strict compliance with good practices and appropriate procedures, the efficient use of materials and equipment, which constitute the first containment barrier. In order to avoid contamination by pathogens in the operating room, a series of Biosecurity Measures are carried out by medical personnel during the patient's intervention. Attention to biosecurity problems, together with the nursing workers who work in these units, is necessary to reduce the risk of infection and accidents at work (Ilapa-Rodríguez, 2018). A study conducted by A. Ruiz and Bertocchi S. in 2017, where the objective was to determine the level of knowledge of biosafety measures of the health personnel of the Hipólito Unanue National Hospital, found that there are significant differences in the level of knowledge according to the variables of occupational group, age, working time in the hospital, sex by occupational group, sex by age and having received labor induction. It was concluded that the professional staff of the hospital did not have the knowledge about biosecurity measures, which generates a situation of high biological risk both for them and for the patients (Bertocchi, 2017).

In 2014, an investigation was carried out to evaluate the knowledge on the handling of Infectious Biological Residues (RPBI) by the nursing staff in the emergency services and hospitalization of the General Hospital of Iguala, Guerrero, it was shown that only 39% of the personnel of Nursing knows the dispositions for the handling of this waste. However, there is an error in the rest of the personnel that represents a risk of nosocomial infectious disease transmission for the nursing staff and the general population (Galán, 2014). To date there is no study that has been conducted based on the knowledge of the Biosafety Measures of the personnel of surgical support service providers. The present study determined whether the civilian personnel participating in the surgical procedures possess the knowledge of the Biosafety Measures, highlighting the universal precautions, standard and its principles, as well as other aspects of importance for the same.

MATERIAL AND METHODS

The objective of this study was to assess compliance with Biosafety Measures by civil service providers who participate in patient surgical care at the Naval Medical Center. The study variables are the use of hand washing, protective barriers (gloves, protective glasses, masks, cap, apron) and solid waste management. All civil service provider personnel involved in patient surgical care were included in the six operating rooms of the Naval Medical Center during the March-November period. The total number of suppliers is 59 people, from the different commercial companies that in their totality are 24 who provide their services in the operating room service.

Inclusion criteria

- Suppliers of different companies that proportional attention in different patient's surgical process in the different surgery rooms in Naval Medical center.
- Suppliers of civil services that participate in surgery that they deliver your services like a complement to the medical team.

No inclusion criteria

The personnel that does not want to participate in the investigation of voluntary (need explain your reasons). Knowledge questionnaire about biosecurity is developed and validated By Bachelor Karin Villanueva Paravicino and modified by the writer Maritza Noelia Barrios Sanchez, et al. The reliability of instruments it was measured through reliability coefficient by Richard Kunderson, get at 0.78 overall of value, indicated like moderate reliability (Barrios Sanchez, 2017). This research was made respect the national and international ethnic's principles for the sciences health researches: Declaration of Helsinki, Nuremberg Code, Geneva Declaration and the General Health Law.

Statistical analysis

To items analysis was used descriptive statistics, measuring the frequency and both correct and incorrect response percentage, the summary measures of central tendency and the dispersion of total punctuations of the test. The distribution normality of total punctuations was analyzing with the Kolmogorov-Smirnov statistical. Cronbach alfa was applied to measure the reliability of the test and changes in reliability levels were evaluated, eliminating the elements suggested by the test. The associations were evaluated with Chi square or Fisher's test

(case by case) and the likelihood ratio of Chi square. The strength of association was measured using the odd ratio (OR) with 95% confidence intervals and a $p < 0.05$ to reject.

RESULTS

The questionnaire was applied to 59 civil service suppliers. With the rating system originally proposed by the questionnaire designers, whose maximum score is 20 points, the average obtained by the suppliers was 11.2 with a standard deviation of 2.2 points (range 4-16). According to the Kolmogorov-Smirnov statistical the distribution of the scores is normal with $Z=1.31$ ($p=0.06$). The highest internal consistency of the questionnaire with 13 selected items, reported a Cronbach's alpha coefficient of 0.469 [95% CI from 0.245 to 0.6488, $p = 0.0001$). The items selected as the most consistent are shown in Table 1. Considering the total of items according to their original design, the items with the highest percentage of incorrect answers (highlighted in gray) were: relative to the knowledge of the principles of biosafety measures (61% , item 2), on the agents for washing hands (62.7%, item 6), on the duration of hand washing (74.2%, item 8), on the use of a mask (78.0%, item 11) and on the handling of dangerous fluids (69.5%, item 13); whereas, item 20 that refers to the knowledge of the measures to be taken in the case of accidents at work, was only answered incorrectly by 5.1% of the suppliers, followed by item 17 on the knowledge of the diseases to which they are exposed, whose percentage of incorrect answers is only it was 15.3%. The percentage of incorrect answers of the rest of the items was above 20% (Table 1).

Item 2 (knowledge of biosecurity principles and measures) was significantly associated with items 5 and 9 (hand washing and use of gloves respectively), while association with item 14 (waste disposal) although it is knowledge important, from the statistical point of view, it was not significant (Table 2). 56.5% of those who correctly answered the principles of biosafety, paradoxically ignore the measures for handwashing, while 72.2% of those who answered incorrectly about knowledge of safety principles, responded correctly on the measures of hand washing, therefore the Odd Ratio (OR) was 0.29 (95% CI 0.09-0.88, $p = 0.02$), that is, paradoxically ignorance of the principles of biosafety is a protective factor against the lack of knowledge about the laundering of hands. A similar association was observed in relation to the use of gloves. Because 52.2% of those who answered correctly about the knowledge of biosafety principles, they did it incorrectly about the use of gloves, and 88.9% answered the opposite (they answered incorrectly and correctly respectively), the OR it was 0.40 [IC 95% 0.03-0.43, $p = 0.001$]. Finally, in relation to the elimination of wastes, those who do not know the principles of biosafety had 3.3 times more risk of ignoring the waste disposal measures [OR 3.3, IC 95% 0.8-13.4, $p = 0.07$]. The item about knowledge concerning agents for washing was strongly associated with the knowledge about the diseases to which they are exposed and with the knowledge of the measures before labor actions. As observed in the table 3, the highest percentage of those who answered incorrectly about the agents for washing, correctly answered about the knowledge of the diseases to which they are exposed, while those who responded correctly to the knowledge about the agents for washing up to 31.8% incorrectly responded to knowledge about the diseases to which they are exposed (OR = 0.12 [IC 95% 0.02-0.66, $p = 0.007$]); notice that something

Table 1. Frequencies and percentages of incorrect answers for items of the knowledge questionnaire on biosafety measures.

Items on the knowledge of:		Incorrect response frequency	(%)
1	Definition	21	35.6
2	Principles	36	61.0
3	Precautions	24	40.7
4	Barriers	24	40.7
5	Hand washing	23	39.0
6	Hand washing agents	37	62.7
7	Hand drying agents	34	57.6
8	Duration of hand washing	44	74.6
9	Use of gloves	16	27.1
10	Contact with fluids	27	45.8
11	Mask use	46	78.0
12	Use of aprons	25	42.4
13	Fluid manipulation	41	69.5
14	Waste disposal	15	25.4
15	Disposable material	14	23.7
16	Sharps disposal	26	44.1
17	Illnesses to which they are exposed	9	15.3
18	First action before a puncture	17	28.8
19	Accidents suffered	33	55.9
20	Measures against accidents at work	3	5.1

Table 2. Association of the item knowledge of principles of biosafety measures with the items washed hands, use of gloves and waste disposal.

Associated items	Principles		P	OR [IC 95%]
	Incorrect (n = 36)	Correct (n = 23)		
Response level				
Handwashing				
Incorrect	10 (27.8%)	13 (56.5%)	0.02	0.29 [0.09-0.88]
Correct	26 (72.2%)	10 (43.5%)		
Use of gloves				
Incorrect	4 (11.1%)	12 (52.2%)	0.001	0.40 [0.03-0.43]
Correct	32 (88.9%)	11 (47.8%)		
Waste disposal				
Incorrect	12 (33.3%)	3 (13.0%)	0.07	3.3 [0.8-13.4]
Correct	24 (66.7%)	20 (87.0%)		

Table 3. Association of item knowledge of the agents for washing with the items diseases to which they are exposed and measures against work accidents.

Associated items	Agents for washing		P	OR [IC95%]
	Incorrect (n = 37)	Correct (n = 22)		
Response level				
Diseases to which they are exposed				
Incorrect	2 (5.4%)	7 (31.8%)	0.007	0.12 [0.02-0.66]
Correct	35 (94.6%)	15 (68.2%)		
Measures against accidents at work				
Incorrect	0 (0.0%)	3 (13.6%)	0.01	Not evaluable
Correct	37 (100%)	19 (86.4%)		

Table 4. Association on knowledge of the duration of hand washing with knowledge on the agents for washing, use of gloves, use of masks, use of aprons and sharps waste

Associated items	Response level	Duration of washing		p	OR [IC 95%]
		Incorrect (n = 44)	Correct (n = 15)		
Handwashing agents	Incorrect	24 (54.5%)	13 (86.7%)	0.01	0.18 [0.03-0.91]
Use of gloves	Incorrect	9 (20.5%)	7 (46.7%)	0.05	0.40 [0.03-0.43]
Mask use	Incorrect	37 (84.1%)	9 (60.0%)	0.06	3.50 [0.9-13.00]
Use of aprons	Incorrect	15 (34.1%)	10 (66.7%)	0.02	0.25 [0.07-0.89]
Sharps disposal	Incorrect	16 (36.4%)	10 (66.7%)	0.04	0.28 [0.08-0.98]

similar happens with the knowledge associated with the measures about accidents at work with the particularity that 100% of those who answered incorrectly about the agents for washing responded correctly to the measures about work accidents. The associations of the item duration of the wash, in this case there were four significant items and one very close to the level of significance established to reject the null hypotheses. The greater knowledge of the duration of the washing is associated with the lack of knowledge of the agents for washing (OR = 0.18 [IC 95% 0.03-0.91, p = 0.01]), as well

as a greater lack of knowledge of the use of gloves (OR = 0.29 [0.08-1.0, p = 0.05]), greater ignorance of the use of apron (p = 0.02) and greater ignorance of what to do with sharps (p = 0.04); however, it was observed that, on the contrary, those who do not know the duration of the washing had a 3.5 times greater risk of not knowing at the same time the use of masks (p = 0.06) (Table 4). Knowledge about the use of the mask was also associated with knowledge about disposable materials. Those who answered correctly about the use of the mask, up to 46.2% of them answered incorrectly about the disposable

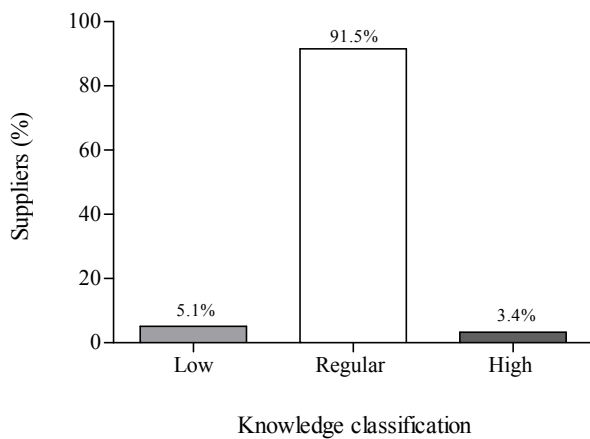


Figure 1. Levels of knowledge about biosafety measures from civil service providers to surgical services.

materials, and on the other hand those who responded incorrectly about the use of the mask, only 17.4% were mistaken in the knowledge of the material disposable being the OR 0.24 [IC95% 0.06-0.92, $p = 0.04$]. Finally, the knowledge about fluid handling was associated with the knowledge of hand drying agents, in the sense that those who answered incorrectly the knowledge of said agents had a 6.2 times higher risk of not knowing the measures for fluid handling [IC95% 1.8-21.5, $p = 0.002$], in fact of the 41 suppliers who answered erroneously about the handling of fluids, 70.7% also responded in the wrong way about hand drying agents, against 27.8% who responded incorrectly within the 18 suppliers who knew the measures for handling fluids. According to the established cut-off points, only 3.3% of the suppliers were classified with high knowledge and in the other end 5.1% were classified with low knowledge while the great majority (91.6%) was classified with regular knowledge (Figure 1).

DISCUSSION

Being the operating room area a critical service, for the exposure that has the staff that works, to suffer sharp accidents and acquired infections when they do not apply biosecurity measures, is the importance of knowledge about them. Rosalva Espinoza Aliaga in Lima - Peru of 2015 in her study of "Biosecurity of the Nursing Professional in the Operating Room Center", found that nurses have a good - high knowledge level (35%) about biosecurity, however, most have a regular knowledge - medium (25%) and bad - low, (15%). Making it comparative with our study the provider of civil services according to the cut points reported in the questionnaire, only 3.3% of the suppliers were classified with high knowledge and in the other end 5.1% were classified with low knowledge, while the large Most (91.6%) were classified with regular knowledge (Aliaga, 2015). Padilla Languré realized in Nogales, Sonora, 2016 the study on "Standards of Biosafety of Nursing Personnel in a Hospital Institution", where 45 nurses were studied.

In knowledge about biological risk it was found that 75% know the normativity regulations, 89% refer to the use of biosafety measures, 31% always use gloves in procedures, 9% use more face, 2% wear glasses, and 29% wear work clothes, 2% never retreads needles after use (Languré, 2016). Our study was 59 civilian providers that, knowledge of the principles of biosafety measures was significantly associated with the items of hand washing and the use of gloves while the association

with the waste disposal item, although it did not become statistically significant. The 56.5% of those who correctly answered the principles of biosafety paradoxically ignore the measures for hand washing and, on the contrary, 72.2% of those who answered incorrectly the knowledge of the principles of safety in turn answered correctly the knowledge of the measures of hand washing, therefore, ignorance of biosafety principles is a protective factor against ignorance of knowledge handwashing. Similar association it observed in relation to the use of gloves since 52.2% of those who answered correctly the knowledge of the principles answered incorrectly about the use of gloves and, on the contrary, 88.9% of those who answered incorrectly the principles gave correct answers to the use of gloves. This means that they do not know the existing biosecurity measures for their application in their work, which there are occupational risks for the personal of civil providers in the operating room service, by contact with biological agents. In the study by Lizbeth Rojas and collaborators, the population consisted of medical (26) and nursing (22) personal. An instrument was designed Ad Hoc that collected information on general data, occupational risks, knowledge on biosafety and application of biosafety measures. The data were analyzed applying descriptive statistics, establishing the relationship between the variables by means of the chi- squared test with a level of significance set at 0.05. The results showed that the predominant risk was biological (blood); the greater percentage of the population does not use the security barriers in an adequate way; the nursing staff showed a higher level of knowledge about biosafety compared to the medical group. It concluded that in the urban ambulatory type I, both the medical staff and the nursing staff have knowledge about general biosafety norms, but the application of them was low.

It is shown that the personal of civil service providers have a regular level (91.6%) of the biosafety measures, the greater knowledge of the duration of the washing is associated with the lack of knowledge of the agents for washing, as well as the use of gloves, use of pinafore dress, note that on the other hand, those who do not know the duration of the washing had a 3.5 times greater risk of not knowing the use of masks at the same time.

The 41 provider who answered incorrectly about the manipulation of fluids 70.7% also responded wrongly about hand drying agents against 27.8% who responded incorrectly among the 18 suppliers who knew the measures for handling fluids. In relation to the elimination of waste, those who do not know the principles of biosecurity had 3.3 times more risk of ignoring the waste disposal measures. This shows us that the personal of civilian suppliers does not have a high level of knowledge of Biosecurity measures, but has practice and mastery based on work experience, that is, they are empirical people. After analyzing the results of the study on the knowledge of the Biosafety measures by the civil providers that participate in the Operating Room of the Patient in the Naval Medical Center, during the period March to November of 2018, it has been concluded that it is to regular knowledge. Now, if the cut-off points are established with the statistical criterion applied to the distribution of the sample studied ($n = 59$) to form three class intervals, the lowest is the suppliers below the 25 th percentile, the regular between the 50 th percentiles 75 and the high ones that fell above the 75 th percentile; in this way, 12 (20.3%) would be classified below the 25th percentile, 29 would be between 50-75 and 18 above the 75% percentile.

Conclusion

We conclude that the H1 is eliminated because the suppliers do not have a high level of knowledge about biosecurity measures and we demonstrated in this work that civil suppliers do have an intermediate knowledge (91.6%) of these measures. This is due to practice and work experience, in brief, they are empiric. Likewise, civil suppliers do not have a high level of knowledge about biosecurity measures, as expected, this is a problem to the health of the citizens who participate in the surgical care of the patient at the Naval Medical Center. This lack of knowledge of civil suppliers in the biosecurity measures may be to lack of interest in the reviewing the literature or the lack of training through their company and the personnel of epidemiology department of Naval Center Medical.

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