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Safe administration of medications / Administración segura de medicamentos

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ABSTRACT

The research work carried out arises as a result of trying to understand what risks could be faced by nursing staff when administering different types of medications to users. Therefore, it was proposed in the work to address various objectives such as describing the academic training of the staff, knowledge of the safety standards formulated by the WHO (World Health Organization) with respect to safe medication, if the staff registered adequately handle adverse events, know the existence of service standards and action protocols. For this purpose, a study with a mixed approach (quantitative-qualitative), with a retrospective, descriptive and cross-sectional design was carried out. The population was made up of the service staff, who completed a questionnaire on safe administration of medications (validity by Aiken's V: 095045 and validity: 0,872). Their participation was anonymous and not mandatory, with all of them signing the respective informed consent and in accordance with ethics. The results show that 100 % of the nursing professionals surveyed, 78,9 %, consider that they have a very good safe administration of medications, 18,4 % good and only 2,6 % regular. None of the professionals presented poor or very poor medication administration. On the other hand, the nursing professionals surveyed have predominantly a very good safe administration in the dimensions of reviewing the prescription of dispensed medications (97,4 %), preparation of medications (78,9), patient identification (71,1 %), administration of medications (84,2 %) and reporting and registration (86,8 %). It was concluded that the nursing staff has high knowledge and experience in safe medication administration, strengthening the quality service. Recommending the implementation of established protocols in the future.

Keywords: Safe Medication Administration; Nursing Knowledge; Adverse Event Reporting.

RESUMEN

El trabajo de investigación realizado surge como consecuencia de intentar comprender cuales podían ser los riesgos afrontados por parte del personal de Enfermería, a la hora de administrar diferentes tipos de medicamentos a los usuarios. Por lo tanto, se propuso en el trabajo abordar diversos objetivos como ser describir la formación académica del personal, el conocimiento de las normas de seguridad que formula la OMS (Organización mundial de la Salud) con respecto a la medicación segura, si el personal realizo registro adecuado de eventos adversos, conocer la existencia de normas y protocolos de actuación del servicio. Se llevó para tal fin un estudio de enfoque mixto (cuantitativo-cualitativo), de diseño retrospectivo, descriptivo y corte transversal. La población estuvo constituida por la dotación del servicio, quienes completaron un cuestionario sobre administración segura de medicamentos (validez por V de Aiken:095045 y validez: 0,872) su participación fue anónima y no obligatoria, firmando todos ellos el consentimiento informado respectivo y conforme a la ética. Los resultados mostraron que el 100 % de los profesionales de enfermería encuestados, el 78,9 % considera que tiene una muy

buena administración segura de medicamentos, el 18,4 % buena y solo el 2,6 % regular. Ninguno de los profesionales presentó administración de medicamentos deficiente o muy deficiente. Por otro lado, los profesionales de enfermería encuestados tienen predominante una muy buena administración segura en las dimensiones de revisión de la prescripción de los medicamentos dispensados (97,4 %), preparación de medicamentos (78,9) identificación de paciente (71,1 %) administración de medicamentos (84,2 %) y reporte y registro (86,8 %).Se concluyó que el personal de enfermería presentó elevados conocimientos y experiencia en administración segura de medicamentos, fortaleciendo el servicio en calidad. Recomendando, a futuro, la implementación de los protocolos establecidos.

Palabras clave: Administración Segura de Medicamentos; Saber Enfermero; Reportes de Eventos Adversos.

INTRODUCTION

All healthcare providers have specific objectives regarding the quality they provide, based on the general purpose of reducing the potential risk to users. However, it has now been demonstrated in both developing and developed countries that many preventable harms are inflicted on patients, with serious human, moral, ethical, and economic repercussions, including those resulting from medication administration errors.

Patient safety is defined as the absence of preventable harm to patients and the reduction to an acceptable minimum of the risk of causing them unnecessary harm when caring for them. In the healthcare context, it consists of a set of organized activities that enable the establishment of processes, value systems, procedures, behaviors, technologies, and care environments that reduce risks consistently and sustainably, prevent the occurrence of avoidable harm, reduce the likelihood of causing harm, and mitigate its effects when it occurs.[1]

These data are obtained from the WHO:[1]

- About 1 in 10 patients is harmed when receiving health care, and each year, more than 3 million people die as a result. In low- and middle-income countries, 4 out of every 100 people die for this reason.
- More than half of this harm (i.e., in one in twenty patients) is preventable, and half is due to medications.
- According to some estimates, 4 out of 10 patients suffer harm during primary and outpatient care, 80 % of which (between 23,6 % and 85 %) could be prevented.
- It has been estimated that each year, patient harm reduces global economic growth by up to 0,7 %, and its indirect costs amount to several trillion US dollars.
- Investing in preventing this harm can generate significant economic savings and, more importantly, improve patient outcomes. For example, the benefits of such an investment have been observed when patients are involved in their own care: if this measure is implemented correctly, the frequency of harm is reduced by 15 %.

Most errors are not due to incorrect practices by a healthcare worker or group of workers, but are the result of systemic or procedural deficiencies that trigger such human errors.

To understand the causes of errors in medical care, we must stop looking for culprits and adopt a more systemic approach. In this way, it can be verified that errors result from

deficiencies in the system's structures and processes, and the degree of stress endured by workers in healthcare facilities, which are complex and constantly evolving environments, can be assessed.

Healthcare systems must take all necessary measures to prevent and reduce harm through organized activities such as the following:

- Ensure that management is committed to improving safety and create a work philosophy that prioritizes it.
- Promote safety in the workplace and the safety of clinical and surgical processes.
- Improve the skills of health and care workers and enhance communication and teamwork.
- Please take into account the opinions of patients and their families when formulating policies, conducting studies, and making joint decisions.
- Establish systems for reporting patient safety incidents in order to learn from them and continuously improve.

Investing in patient safety leads to better health outcomes, reduces costs related to patient harm, improves the efficiency of health systems, and builds public trust in them.

WHO launches Global Action for patient safety recognizing that patient safety is a global health priority and a fundamental part of strengthening health systems to achieve universal health coverage, the 72nd World Health Assembly adopted Resolution WHA72.6 on global action for patient safety in May 2019, establishing World Patient Safety Day.

The resolution emphasizes patient safety as a key strategic priority of WHO's work on universal health coverage, confirming the celebration of World Patient Safety Day every September 17 and calling for the development of a global action plan for patient safety.

At the national level, there is ANMAT (National Administration of Medicines, Food and Medical Technology), whose Department of Pharmacovigilance presented an annual report in 2017 with statistical data from the country, obtaining results of adverse events due to medication errors:

In 2017, the National Pharmacovigilance System (SNFVG) received and analyzed 12 306 initial notifications submitted through the online form for valid reports of Adverse Drug Reactions (ADRs). Through the same channel, 3662 follow-up reports were received; moreover, through semi-annual reports, which include cases dismissed (due to insufficient information) and those not related to drug administration, 4458. In other words, during 2017, 20 126 ADR notifications were received and processed, representing a notification rate of 509 reports per million inhabitants per year.[2]

Patient safety refers to healthcare standards that are subject to ongoing review to prevent and reduce risks, errors, and harm to patients in a healthcare system evolving due to technological and scientific advances and the implementation of increasingly complex practices. It is a complex process that takes into account various aspects.

Among these, the safe administration of medications is of great importance, as the nursing team working in critical care must not only handle the medication but also think critically throughout the process. This begins with the medical prescription, which is influenced by various factors, including preparation, administration, and the medication's potential effects on a person.

The high rate of incidents resulting from medication administration errors led the WHO to launch a global patient safety challenge called "medication without harm," which aims to ensure that healthcare institutions and professionals plan for safe practice and reduce the risks involved in medication administration.

The WHO proposes 10 rights: right patient, right drug, correct dose, right time, correct route of administration, prepare the medication yourself, administer the medication yourself, and record what you have done.

Safety culture is defined as the set of values and norms shared by individuals within an organization. It implies a shared mental model that positions safety as a common goal to be pursued.

Given that patient safety is grounded in ethical principles and that its natural extension is the responsibility of healthcare professionals to care for and protect patients, commitment to safety is a professional ethical responsibility.

Ethics, safety, and quality are closely linked concepts. The strongest motivators in quality and safety are ethical responsibility and the healthcare team's motivation to treat patients.

A medication error is defined as a preventable event caused by the inappropriate use of medications, mishandling by healthcare professionals, or by procedures or systems, thereby causing harm to the patient.

This includes everything from medical prescriptions, verbal guidance, labeling, packaging, and nomenclature of industrialized products, to dispensing, distribution, administration, education, monitoring, and use.

It is worth providing a brief explanation of adverse events to introduce the topic:

- A sentinel event is defined by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) as an unanticipated event resulting from healthcare that leads to the death of the patient or the permanent loss of a function or organ. It is unrelated to the natural course of the disease, or surgery in the wrong place, with the wrong procedure, or on the wrong patient. It is called a sentinel because its occurrence serves as an alarm, obliging the organisation to evaluate it immediately and respond to prevent new cases. AEs are situations directly related to service quality and therefore serve as negative indicators of this quality. The existence of a single case is already indicative of a problem. It should lead to an analysis of the causes to redesign the affected process and prevent it from happening again.[3]
- An adverse event is harm resulting from healthcare and not from the patient's baseline conditions.
- Near miss, a medical error that did not result in an adverse event because it was detected in time and was preventable.

According to PAHO[3], pharmacovigilance aims to balance the benefits and risks of drugs, which is why nursing must promptly identify them.

Nursing plays a key role in identifying, preparing, administering, and preventing adverse events associated with medication administration. As a last line of defense, it can also provide

information through reporting systems, thereby raising awareness among other professionals.[4]

Adverse event reporting is essential in an institution. To do this, healthcare personnel must adhere to it. This implies knowing what constitutes an adverse event so it can be reported accurately and in detail. Studies show that healthcare personnel who have the tools and knowledge to apply them deliver higher-quality care.

The International Classification for Patient Safety (ICPS), developed by the World Health Organization, classifies adverse events.

1. Type of incidents (13 subcategories).
2. Outcomes for patients (type of harm and impact).
3. Patient characteristics (demographic).
4. Incident characteristics (origin, discovery).
5. Contributing factors (patient-specific factors, external factors).
6. Organizational outcomes (6 outcomes).
7. Detection (healthcare personnel involved).
8. Mitigating factors (patient-related, healthcare personnel).
9. Improvement measures (related to the patient and the organization).
10. Risk reduction measures (patient, institution, organization).

The new WHO guidelines propose safe practices for medication administration; thus, members of the healthcare team should understand this activity to implement these practices. For this reason, it is essential to implement actions that promote learning in this discipline. It is therefore essential to establish the level of knowledge of nursing professionals regarding the rules that promote safe and effective medication administration in the critical care unit of a private institution in the city of Rosario, Santa Fe.

The reason for this project is that it is a daily practice affected by various factors. The inpatient area is an interdisciplinary setting, and medication administration is a process that begins with a medical prescription and ends with its delivery to the patient and its corresponding entry in the nursing chart. In this process, the role of nursing is fundamental, as it requires the application of theoretical and practical knowledge to ensure this task is carried out effectively and safely, thereby ensuring quality care.

What knowledge do nursing staff in a critical care area acquire about the safe and effective administration of medications?

Objective

To describe the level of knowledge of nurses in the process of safe and effective medication administration according to their level of training and experience.

METHOD

This is a mixed (quantitative-qualitative) study with an observational, retrospective, cross-sectional design.

The APA standards in their 7th edition have been used to establish the bibliographic references.

Variables:

1. Academic training and work experience:

- Highest level of education attained.
- Multiple Jobs.
- Length of service.

2. Level of knowledge of nurses
    - Knowledge of patient culture
    - Uses patient culture in practice.
    - Performs the 10 correct actions recommended by the WHO.

3. Adverse event reporting.
4. Existence of protocols.

Area of study

In 1995, a private institution was created in the city of Rosario, Santa Fe. Its main objective was and is to dedicate itself to the prevention and care of highly complex cardiovascular diseases; other related specialties and technologies dedicated to diagnosis, treatment, and comprehensive patient care were subsequently incorporated. Currently, it has more than 40, including: neurointervention, thoracic surgery, heart failure and transplant team, cardiology-arrhythmia, cardiopulmonary rehabilitation, and peripheral vascular surgery.

It currently has three operating rooms equipped with advanced technology for highly complex surgeries, and two hemodynamic rooms (for heart attack treatment and endovascular therapy).

The Critical Care Unit offers a total of 23 beds, divided into areas. The Cardiovascular Recovery Area has eight beds for highly complex surgeries, including heart transplants. The General Coronary Unit has ten beds for chronic patients who require comprehensive care, and the Individual Coronary Unit has five private rooms.

The general hospitalization sector comprises 10 shared rooms with 20 beds and 12 private rooms or apartments.

A cardiology emergency room operates 24 hours a day, 365 days a year, with three beds and emergency protocols in place.

Today, it is recognized as a historical monument. Attached to it is a 4-story building that houses outpatient clinics and advanced diagnostic imaging equipment (MRI, CT scanner, etc.).

Participants

Table 1. Distribution of nursing staff in the coronary care unit

Training	Nursing assistants Nursing	Professional nurses	Nursing graduates	Postgraduate degrees in Nursing
Shifts				
6 a.m. to 2 p.m.	-	1	5	-
14-22 hours	-	5	1	-
10 p.m. to 6 a.m.	-	4	1	-
Total	-	10	7	-

The sample selection criteria were incidental rather than probabilistic. The data were collected during 2023. The participants are 34 nurses from the institution's critical care areas.

Table 1 describes the nursing staff in the Coronary Critical Care Unit: 17 nurses in three 8-hour shifts, broken down by academic training, with the morning shift having five registered nurses and one professional nurse, the afternoon shift having one registered nurse and five professional nurses, and the night shift having four professional nurses and one registered nurse.

Table 2. Distribution of nursing staff in cardiovascular recovery

Education	Nursing assistants Nursing	Professional nurses	Nursing graduates	Postgraduate degrees in Nursing
Shifts				
6 a.m. to 2 p.m.	-	5	2	-
14-22 hours	-	4	2	-
10 p.m. to 6 a.m.	-	3	1	-
Totals	-	12	5	-

Table 2 shows the staffing levels for nursing in critical care cardiovascular recovery according to shifts and academic training, with five professional nurses and two nursing graduates on the morning shift (8 a.m. to 2 p.m.), four professional nurses and two graduates on the afternoon shift (2 p.m. to 10 p.m.), and three professional nurses and one nursing graduate on the night shift (10 p.m. to 6 a.m.) 3 professional nurses and one nursing graduate.

Instruments

To assess the knowledge of critical care nursing staff at an institution, an instrument specifically designed for this study was used, comprising four categories: sociodemographic data, institutional procedures, general procedures, medication administration procedures, and knowledge.

The second tool was a checklist that facilitated observation without any intervention, in two macro variables:

- Administrative scenarios.
- Medication administration.

Data analysis plan

To meet the objectives, the data were processed, loaded into forms created in Microsoft Excel, and then further processed.

The results are presented using descriptive analysis tools, such as simple frequencies and percentages.

Hypotheses are implicitly formulated in each specific objective.

Ethical considerations

To carry out the study, the project was submitted to the institution's Teaching and Research Committee, which granted its approval by notification. Participation in the study was voluntary; participants' anonymity was maintained; and the data presented were used exclusively for this research after participants signed the informed consent form.

RESULTS

The data analyzed were obtained from personal interviews with each critical care nurse and from the observation grid, and the results were processed for correct interpretation.

Table 3. Level of training and work experience

Level of training	61,76 % Professional nurse		38,24 % Bachelor's degree in nursing
Multiple jobs	73,53 % do not have dual employment		26,47 % have multiple jobs
Length of service	20,59 6-10 years	35,29 10-20 years	44,12 % More than 20 years

We analyzed the data obtained, where we can conclude that more than 60 % of the staff in the Critical Care Units in this institution are Professional Nurses and only 40 % are Licensed Nurses, from which we can gather that this institution does not have nursing assistants, but neither does it have nurses with postgraduate degrees.

This reality implies promoting staff education and training to continually update their skills, not only at the academic level but also through specific courses on medication safety.

Regarding moonlighting, only about 30 % have two jobs, which can lead to exhaustion, fatigue, and several factors that can cause errors in medication preparation and administration.

In terms of seniority, although there is some variety, a high percentage (35 %) have more than 20 years of service, 35 % have 10-20 years of service, and 6,10 % have the minimum. This indicates that the institution has a staff with significant expertise in daily practice, which is a strength from a service management perspective.

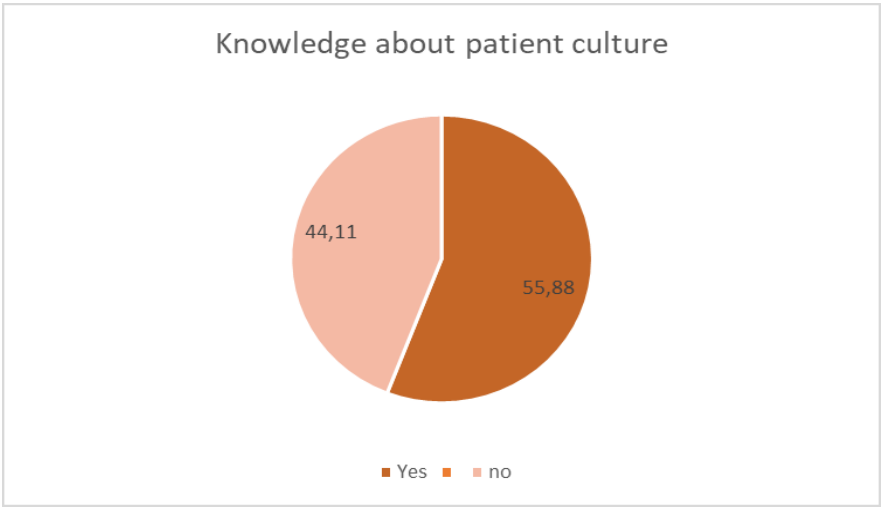

Figure 1. Percentage ratings of knowledge and culture of patient safety (n = 34)

Figure 1 indicates that 55 % are aware of patient safety culture, while 45 % are not familiar with the topic. This is a weakness, as one-third of nursing staff are unaware of the patient safety culture.

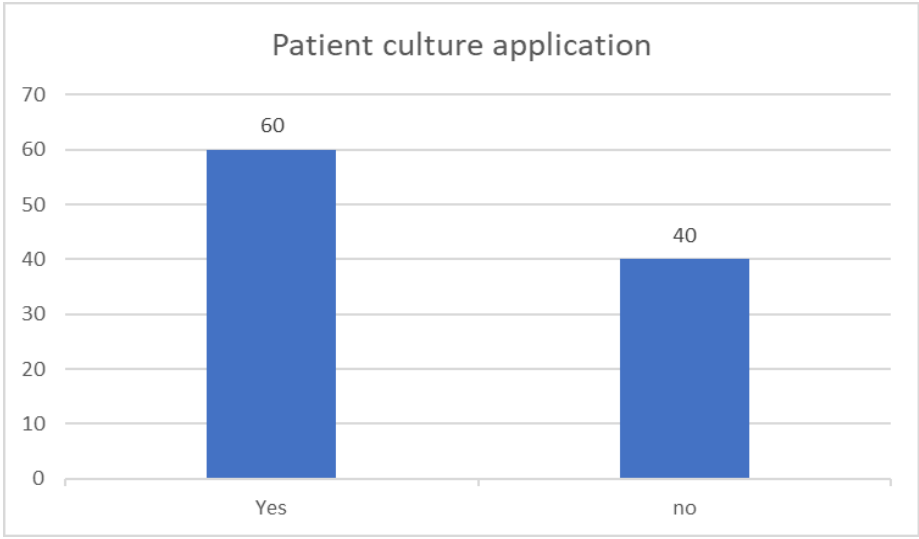

Figure 2. Assessment percentages regarding the practice of applying patient culture (n=34)

Figure 2 shows the percentages of nursing staff who apply patient culture, with 40 % not applying it. Compared to the previous graph, 44 % are unaware of the issue, but 40 % do not apply it.

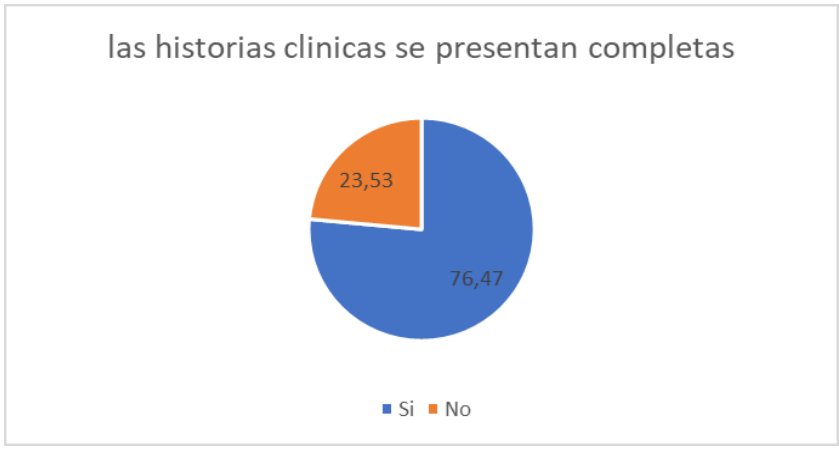

Figure 3. Percentages according to the degree of completeness of medical records (n = 34)

Regarding complete medical instructions, more than 20 % do not receive them for various reasons. Although this is not a high percentage, efforts should be made to reduce it in order to avoid errors in the preparation and administration of medication.

It is important to receive a complete medical record to understand the patient's actual condition and the treatments they have receive.

The institution does not have protocols for medication administration or guidelines for dilutions.

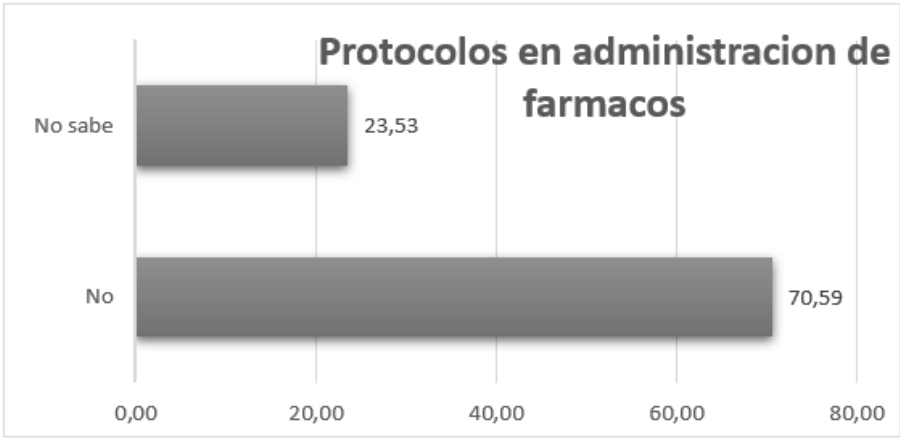

Figure 4. Indicates whether the institution has protocols for the administration of drugs

This deficit negatively impacts the knowledge levels of critical care staff, as 70,59 % say such protocols do not exist, and the remaining 25,53 % are unaware of their existence. This total or partial lack of knowledge prevents the correct work from being done to achieve safe medication for patients, which may encourage each worker or work shift to administer medication in their own way.

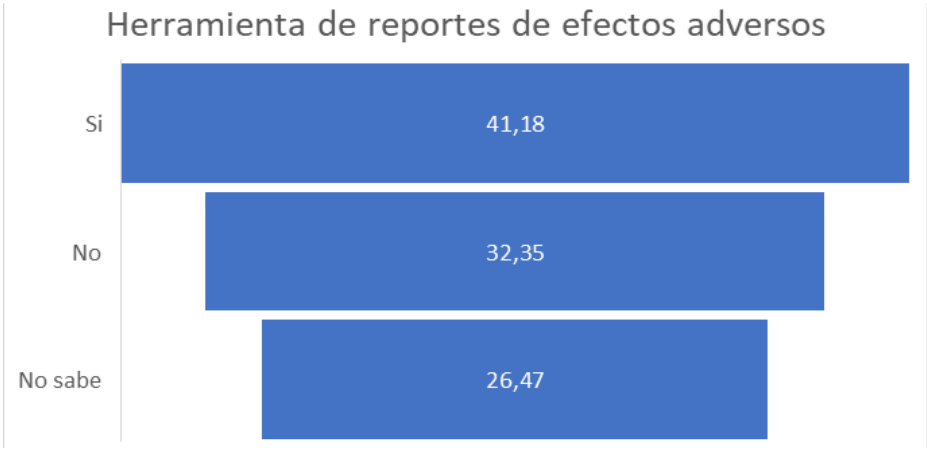

Figure 5. The institution has a tool for reporting adverse events

The institution has an online tool for reporting adverse events, which is anonymous and non-punitive (see annex). Any member of the nursing staff can access it and make the correct report for each patient. Forty-one percent of nurses are aware of this tool, 32,35 % are not aware of it or have not been informed about it, and 26,47 % do not know. This tool, which the institution has, lacks nursing knowledge to be used. New staff should be familiar with the tool upon joining.

All nurses were asked whether they apply pharmacovigilance, with 79,41 % saying yes and 17,65 % saying no. The reasons given were a lack of time and excessive workload. Therefore, although the percentage of those who do not apply pharmacovigilance is small, it is recommended that this percentage be increased to minimize the risks of both administration errors and adverse effects.

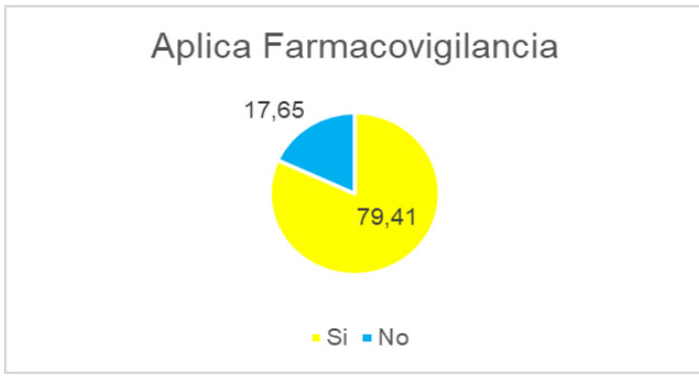

Figure 6. Critical care nursing staff apply pharmacovigilance

In relation to the data collected above and beyond the response obtained in this indicator, it will be important to interpret that the low level of those who do not apply pharmacovigilance may be higher due to the above variables, i.e., some of the staff are unaware of safe medication measures, the existence of protocols, and institutional tools for reporting adverse events that occur in the institution.

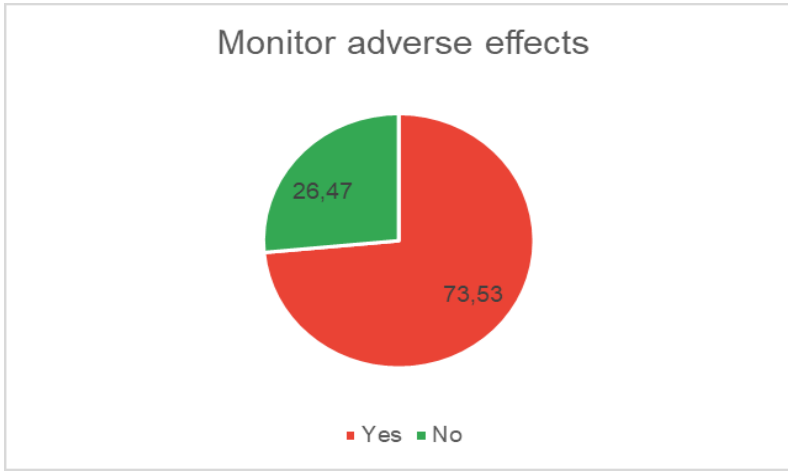

Figure 7. Nursing staff monitors adverse events after medication

The results shown in this graph confirm those of the previous table. These data were obtained from participant observation.

The monitoring of adverse effects corresponds to the subsequent administration of medications, to which a high percentage do not adhere, including factors of a multi-causal nature, as analyzed previously in the other graphs.

DISCUSSION

This study can be interpreted by addressing the general objective: to describe each nurse's knowledge and professional experience. The results show that this institution does not employ nursing assistants; only professional, licensed nurses are employed. As a weakness, it is noteworthy that a minimal percentage have completed postgraduate or master's degrees. The results show that almost 60 % are professional nurses and 40 % are registered nurses.[5,6]

A large part of the critical care staff has seniority: 44 % have more than 20 years of service, 35 % have 10-20 years, and only 20 % have less than 10 years. This reflects that the institution not only retains its staff but also provides continuity, demonstrating strong management, as the role in daily practice is sustained over time.[7]

Regarding multiple jobs, only about 27 % have two jobs, leaving 73 % with only one. Although this is a smaller percentage, fatigue and exhaustion can lead to errors in the safe administration of drugs.[8]

According to the WHO's medication standards, 55 % are aware of the standards, and 45 % are unaware of patient safety culture. This is a high percentage, which should be taken into account to reduce minor errors in drug administration. Regarding the application of patient safety culture, 76 % say they apply it, while the remaining 24 % cite excessive workload, lack of time, and other factors that should be reduced to achieve safe medication administration to the greatest extent possible, thereby raising quality and care standards.[9,10]

In pharmacovigilance, almost 18 % report not applying it, while 78 % do. Although this is a smaller percentage, its application is essential.

Regarding post-medication monitoring, 73 % say they conduct it, while the remaining 23 % do not, citing factors such as the end of their shift, lack of time, and unfamiliarity with adverse effects.[11]

If we consider and combine these four points, this institution has a permanent staff with seniority and, for the most part, with only one job. This strength can be used to minimize adverse effects as much as possible, increase knowledge of safe medication administration, and support staff training.[12]

The institution has a web tool for reporting adverse events. This tool is anonymous and non-punitive. The results show that 41 % are aware of this tool and say they have used it at some point, 32 % do not use it, and 26 % are unaware of it. This implies that the institution has a resource that, due to a lack of knowledge or misinformation, is not being used properly. Reporting could be improved to identify such cases and detect errors, thereby minimizing them.[13]

The institution lacks protocols for administering medications, including dilutions and dosages. 70 % of nursing staff confirm there are no protocols, while the remaining 30 % do not know. If we apply this to daily practice, there should be protocols in place to standardize criteria, as this deficit undermines nursing staff knowledge and can lead to errors in administration. Without protocols, each nurse does it their own way, according to the instructions received.[14]

CONCLUSIONS

The conclusion is developed in accordance with the dimensions proposed by Pedro Luis Castellanos to understand healthcare phenomena. We will begin with a general position, then move on to describe specific features, and finally arrive at the unique aspects of the problem.

Globally, according to the World Health Organization, the impact of adverse events related to unsafe medication administration is that around 1 in 10 patients is harmed when receiving healthcare, and each year, more than 3 million people die as a result. In low- and middle-income countries, 4 out of every 100 people die for this reason. It has been estimated that

each year, the harm caused to patients reduces global economic growth by up to 0,7 %, and its indirect costs amount to several trillion US dollars annually.

That is why a global initiative is being proposed in 2019, in which all countries adopt measures to prevent harm and avoid life-threatening errors, reduce patient hospital stays, and, as a consequence, reduce occupational harm to healthcare personnel, ranging from loss of licensure, imprisonment, or severe penalties that can lead to job loss.

In Argentina, regulations are issued by the Ministry of Health of the Nation, the Ministries of Health of the Provinces, and, at the municipal level, which regulate and penalize the mismanagement of medications in healthcare facilities. Provincial laws are in line with national laws.

Nicolas Law: Law on Health Quality and Safety

Purpose: the purpose of this law is to ensure the right to quality and safe healthcare, focused on individuals and communities, through the definition of a legal and institutional framework that promotes the transformation of cultural norms, the improvement of healthcare conditions, the protocolization and prioritization of care processes, the incorporation of appropriate technological tools, the reduction of preventable harm, and the care of the healthcare team's working environment.

Our country has a Department of Pharmacovigilance and a National Administration of Medicines, Food, and Medical Technology, which compiles national statistics on all patient safety reports. For this reason, healthcare and nursing staff must be aware and act ethically when administering medication.

The Ministry of Health has a website for reporting adverse events and provides access to national and international pharmacovigilance news.

Based on the objectives set out, it can be concluded that the institution does not have nursing assistants; only professional, licensed nurses are employed.

In terms of work experience, one strength is that those working in critical care have many years of experience, indicating no staff turnover and constant staffing levels, providing stability. Moonlighting exists, but at a low rate.

Regarding knowledge and application of patient culture, the results indicated that a low percentage of patients apply the 10 recommended practices by the WHO, which should be posted in every office as a reminder. Although there are multiple causes, efforts should be made to minimize them and ensure that all staff adhere to the 10 correct practices at all times during their shifts. It is suggested that training on this topic be reinforced. Our analysis shows that the institution offers ongoing training. However, it is essential to emphasize safe medication administration to ensure that all nursing staff share the same knowledge and use unified criteria.

Furthermore, the institution lacks protocols or guidelines for medication administration and dilution tables.

These should be developed in the future so that nursing staff and doctors have the same criteria.

It does have an online tool for reporting adverse events, but a percentage of the nursing staff is unaware of it. They should be informed of this so that they know about it and can use it reliably to improve patient quality and safety.

Regarding the application of pharmacovigilance, a low percentage conducts follow-up. This is due to sector or bed rotation. Management should work to ensure that nursing staff can apply pharmacovigilance, reinforce ward rounds, and ensure that information is complete, including patients' allergies and medical history, as well as potential reactions at the time of administration and after medication.

If these aspects were modified, the number of adverse events during medication administration could be reduced.

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None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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