Journal of Nursing
Revista de Enfermagem
UFPE On Line
ISSN: 1981-8963

ORIGINAL ARTICLE

ANALYSIS OF ESTABLISHED ANALGESIC DRUG ADMINISTRATION SCHEDULES IN INTENSIVE CARE

ANÁLISE DOS APRAZAMENTOS DE FÁRMACOS ANALGÉSICOS EM TERAPIA INTENSIVA

ANÁLISIS DE LOS PLAZOS ESTABLECIDOS DE FÁRMACOS ANALGÉSICOS EN TERAPIA INTENSIVA

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ABSTRACT

Objective: to analyze the availability of analgesic drugs performed by nurses in an intensive care unit. ***Method:*** this is a quantitative, descriptive, cross-sectional study using critical patient records in an intensive care unit. The sample was composed of 404 medical prescriptions. The data were collected by means of a semi-structured script. The Nursing appointments were analyzed according to the analgesic ladder of the World Health Organization, and the results are presented in the form of tables. ***Results:*** nonsteroidal anti-inflammatory drugs and opioids were found to occupy more than half of the medical prescriptions, accounting for 78%. It is observed that the most frequently repeated analgesic was tramadol associated with dipyrone, with 35%. It is noteworthy that only 0.7% of the prescriptions presented potentially interactive characteristics, being: tramadol and fluconazole and tramadol and prometazine. ***Conclusion:*** the study presented the importance of nursing care, associated to the field of Pharmacology, for good professional practice. It is pointed out that, despite the patients being polymedicated, the professionals seek not to administer analgesics along with other drugs, avoiding possible interactions. ***Descriptors:*** Analgesics; Intensive Care Units; Pain Management; Nursing; Incompatibility of Medications; Nursing Care.

RESUMO

Objetivo: analisar o aprazamento dos fármacos analgésicos realizados por enfermeiros em um centro de terapia intensiva. ***Método*:** trata-se de um estudo quantitativo, descritivo, transversal, utilizando prontuários de pacientes críticos em uma unidade de terapia intensiva. Compôs-se a amostra por 404 prescrições médicas. Coletaram-se os dados por meio de um roteiro semiestruturado. Analisaram-se os aprazamentos de Enfermagem de acordo com a escada analgésica da Organização Mundial da Saúde, e os resultados apresentam-se em tabelas. ***Resultados*:** verifica-se que os anti-inflamatórios não esteroidais e os opioides ocuparam mais de metade das prescrições médicas, representando 78%. Observa-se que o analgésico aprazado que mais se repetiu foi o tramadol associado à dipirona, com 35%. Ressalta-se que apenas 0,7% das prescrições apresentaram características potencialmente interativas, sendo elas: tramadol e fluconazol e tramadol e prometazina. ***Conclusão***: apresentou-se, no estudo, a importância do aprazamento na Enfermagem, associado ao domínio da Farmacologia, para uma boa prática profissional. Aponta-se que, apesar dos pacientes serem polimedicados, os profissionais buscam não administrar os analgésicos junto a outros fármacos, evitando possíveis interações. ***Descritores*:** Analgésicos; Unidades de Terapia Intensiva; Manejo da Dor; Enfermagem; Incompatibilidade de Medicamentos; Cuidados de Enfermagem.

RESUMEN

Objetivo: analizar los plazos establecidos de los fármacos analgésicos realizados por enfermeros en un centro de terapia intensiva. ***Método:*** se trata de un estudio cuantitativo, descriptivo, transversal, utilizando prontuarios de pacientes críticos en una unidad de terapia intensiva. Se compuso la muestra por 404 prescripciones médicas. Se recogieron los datos por medio de un itinerario semiestructurado. Se analizaron los plazos establecidos de enfermería de acuerdo con la escalera analgésica de la Organización Mundial de la Salud, y los resultados se presentan en forma de tablas. ***Resultados:*** se verifica que los antiinflamatorios no esteroideos y los opioides ocuparon más de la mitad de las prescripciones médicas, representando el 78%. Se observa que el analgésico complacido que más se repitió fue el tramadol asociado a la dipirona, con el 35%. Se resalta que sólo el 0,7% de las prescripciones presentaron características potencialmente interactivas, siendo ellas: tramadol y fluconazol y tramadol y prometazina. ***Conclusión:*** se presentó, en el estudio, la importancia de los plazos establecidos en la Enfermería, asociado al dominio de la Farmacología, para una buena práctica profesional. Se apunta que, a pesar de que los pacientes son polimedicados, los profesionales buscan no administrar los analgésicos junto a otros fármacos, evitando posibles interacciones. ***Descritores*:** Analgésicos. Unidades de Cuidados Intensivos. Manejo del Dolor. Enfermería; Incompatibilidad de Medicamentos; Atención de Enfermería.

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INTRODUCTION

It is known that the intensive care unit (ICU) is intended for the care of critically ill patients who require intensive care and high complexity, who require permanent medical and nursing care, in addition to continuous monitoring, including qualified human resources and technological devices advanced and sophisticated.[1]

It is observed in intensive care that, in front of the working professionals, the nurses stand out because they play the crucial role of coordinating and being responsible for the Nursing team and for being the main care manager. It is also understood as the responsibility of the nurse, the appointment of medications, which refers to the planning of times and intervals of medication administration. This responsibility is defined as a process that includes daily evaluation of the patient's laboratory and clinical situation in order to prevent complications related to the route of administration and to the toxicity of the drugs.[2]

It is noted that pain is the most common of experiences and stress factors in critically ill patients. It is pointed out that the symptoms of the diseases, as well as the large number of interventions and procedures performed in the intensive care unit, worsen the pain. It should be noted that although pain management has become a priority in recent years and knowing that pain can be classified in many ways, it is not always possible to make clear distinctions about pain. It is known that uncontrolled pain triggers physical and emotional stress responses, inhibits healing and increases the risk of other complications and length of stay in the intensive care unit.[3]

It is essential for the treatment of pain to assess its intensity. The World Health Organization (WHO) provides an analgesic ladder, which divides pain-fighting medicines into three different steps. Initially, the use of non-opioid drugs is recommended, followed by the weak opioids and, subsequently, the strong opioids, depending on the increase in pain intensity. It is considered common for these patients to present pain of a multifactorial nature, therefore, effective pain control is necessary, considering their underlying mechanisms, which allow the choice of a treatment directed to each patient.[4]

It is noteworthy, considering the need to evaluate the characteristics of the drugs, that patients hospitalized in ICU, due to severe clinical conditions, are frequently submitted to polymedication schemes, aiming at the recovery of general health status. Due to the complexity of poly-pharmacotherapy, there is an increased risk of accidental drug interactions, as well as the therapeutic index and pharmacokinetic characteristics, together with the physiological changes resulting from organic dysfunctions.[5]

It is pointed out, however, that the prevention of drug interactions is a technical responsibility of the nurse, since this acts directly in the assistance to users, both in the execution, as well as in the supervision that they perform before the Nursing team, during medication administration.6 Therefore, nurses should be aware of the correct use of analgesics, know how to perform the appropriate treatment and identify possible drug interactions, so as not to expose patients to situations and unwanted reactions.

Painkillers are found in many medical prescriptions for patients admitted to intensive care units and it is pointed out that they present, for the most part, some toxic potential. This factor must be observed by the nurse, who has an important assignment with respect to the execution of the medical prescription that is continuously fulfilled at pre-established times, according to a functional distribution system of tasks for the Nursing team.

It is understood, in this sense, that the correct analysis of the appointments made by the nurse professional will determine the success of the therapeutic plan that has, as objective, to guarantee quality assistance in the administration of drugs in intensive care

OBJECTIVE

- To analyze the analgesic drugs tests administered by nurses.

METHOD

This is a cross-sectional documentary study, carried out at the General Hospital of Fortaleza (CE). The patients admitted to the Intensive Care Center were interviewed, composed of 38 beds separated by color (green, blue and yellow). It is known that the green ICU usually serves clinical patients, and is composed of 16 beds; the ICUs classified with the colors blue and green also serve clinical patients, being composed of eight beds. Finally, the yellow ICU is indicated, which is composed of 14 beds and usually provides care to neurosurgical patients and general surgery.

Included in the study were all critical (clinical and surgical) patients hospitalized at the time of collection. Patients younger than

18 years and those with a reserved diagnosis were excluded, as were incomplete data records.

Data was collected from September 2016 to March 2017, through a semi-structured script, during the medical records, while the patient was hospitalized. The sociodemographic characteristics, data related to hospitalization (reason, type of surgery, etc.) and the medical diagnoses present in critical patients were investigated (raising the main clinical and surgical dysfunctions associated with patient admission). It is also contemplated by the instrument, to analyze the appointments made by the nurses and the potential interactions of analgesics.

The data was studied in the Statistical Package for Social Sciences (SPSS, version 22). The descriptive class variables were presented in tables containing the absolute (n) and relative (%) frequencies. Pearson's test was used to verify the correlation. A 95% confidence level was adopted for a significance level of $p < 0.05$ and 5% for sample error.[7] Based on these parameters, a sample of 404 medical prescriptions was established.

The Nursing appointments were analyzed according to the analgesic ladder of the World Health Organization. Discussion was done through relevant literature (books, scientific articles), and drug interactions were analyzed through the MICROMEDEX® database DrugReax System, accessible through the Coordination Portal for the Improvement of Higher Education Personnel (CAPES).

In accordance with the ethical principles governing research with human beings, as recommended by Resolution N. 466/12 of the National Health Council, this study was approved by the Institutional Research Ethics Committee, under protocol N. 1,718,575 and the free and informed consent of the participants was obtained after elucidation of the objectives and the way of conducting the research. It is added that, for patients without conditions to provide consent, a family member.

RESULTS

It was observed, when analyzing the age of the patients, that 15 (32.61%) participants were older than 60 years of age; 14 (30.43%) participants were between 46 and 60 years old; 12 (26.09%) participants, between 31 and 45 years old and five (10.87%) participants, between 18 and 30 years.

It was found that 28 (60.87%) participants were male and 18 (39.13%) were female participants.

It was verified, as far as the origin of the 46 patients evaluated, that 22 (47.8%) participants reside in Fortaleza and 19 (41.3%) reside in the interior of the State of Ceará.

It is pointed out that the predominant dysfunctions that motivated hospitalization in this unit were related to impairment of the neurological system (Figure 1).

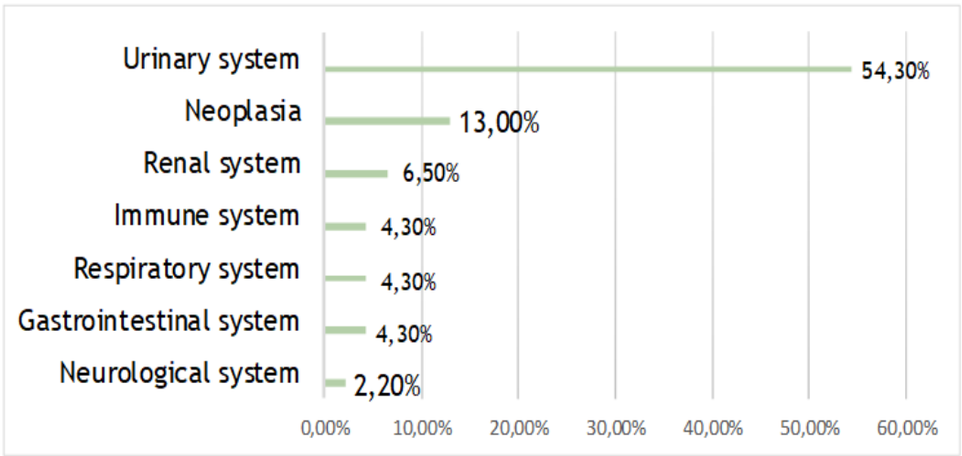

Figure 1. Distribution of the dysfunctions of the inpatient systems in the intensive care unit. Fortaleza (CE), Brazil, 2017.

It was observed that the most relevant percentage was related to patients who had not undergone surgical procedures: a total of 39 (84.8%) patients, followed by tumor resection, with a total of three (6.5%) patients. The aneurysm embolization, enterectomy, aneurysm clipping and carotid clipping surgeries were identified only once, in a percentage of 2.2%.

Table 1 shows that non-steroidal anti-inflammatory drugs (NSAIDs), associated with opioids, occupied more than half of the medical prescriptions.

Table 1. Distribution of the frequency of pharmacological classes of prescribed analgesics. Fortaleza (CE), Brazil, 2017.

Variables	n	%
NSAID's + Opioids	315	78.0
NSAID's	66	16.3
Opioids	23	5.7
Total	**404**	**100**

Table 2. Distribution of the order frequency of analgesics by nurses. Fortaleza (CE), Brazil, 2017.

Variables	n	%
Tramadol + Dipyrone	70	35.35
Fentanyl + Dipyrone	49	24.75
Dipyrone + Tramal	33	16.67
Dipyrone + Fentanyl	21	10.61
Morfina + Dipyrone	6	3.03
Dipyrone + Tramadol + Morphine	4	2.02
Dipyrone + Morphine	4	2.02
Morphine + Fentanyl	3	1.52
Dipyrone + Paracetamol	3	1.52
Tramadol + Fentanyl	1	0.51
Fentanyl + Tramadol	1	0.51
Dipyrone + Fentanyl + Morphine	1	0.51
Dipyrone + Tramadol + Morphine + Fentanyl	1	0.51
Paracetamol + Dipyrone	1	0.51
Total	**198**	**100**

The drug interactions between analgesics and other classes of drugs were investigated in table 3. It is worth noting that despite the difficulties of Nursing appointments in intensive care, 90.1% (364) of the nurses did not make appointments with other medications at the same time.

Table 3. Frequency of analgesics with other drugs at the same time. Fortaleza (CE), Brazil, 2017.

Variables	n	%
Tramal + Tazocin	15	37.5
Tramal + Dipyrone	7	17.5
Tramal + Lactulone + Ranitidine	6	15.0
Tramal + Dexamethasone + Sulfadiazine + Lactulone	4	10.0
Dipyrone + Meropenem + Teicoplanin + Nimodipino	3	7.5
Tramal + Promethazine + Oxacillin + Fluconazol	3	7.5
Fentanyl + Dipyrone	1	2.5
Dipyrone + Simethicone + Anlodipine	1	2.5
Total	**40**	**100**

It was verified that, when analyzing the results obtained in the correlation test in table 4, the existence of a positive correlation, referring to most of the results, and a negative correlation in one of the correlated items. The correlation between dysfunctions and correlated items is generally poor, indicating that baseline dysfunction does not lead to an increase in the amount of prescribed analgesics, but, depending on the health problem and medication indicated, there may be interactions medicines.

A significant association between dysfunctions and pharmacological class ($p = 0.03$) and prescribed analgesics and drug interactions was identified ($p = 0.000$).

It is necessary, in this context, through the results found in this study, to carry out other research related to the probability of occurring drug interactions, according to these associations.

Table 4. Pearson correlation. Fortaleza (CE), Brazil, 2017.

Variables	n		%	
	Pharmacological class	Prescription analgesics	Order of Appointment	Drug interactions
System dysfunction	0.156**	- 0.255*	0.054	0.243*

Pearson's Significant Correlation: ** p<0.05 | * p<0.01

DISCUSSION

It is verified that the number of elderly over 60 years in ICUs increases substantially as the population ages, and the mean age of patients in ICUs is higher than in previous years. It is pointed out that this scenario does not only occur in the Brazilian territory, but worldwide. It has been shown in studies that the hospitalization of the elderly over 80 years is quite significant, having a percentage of at least 50% of hospitalizations.[8]

A higher rate of male patients hospitalized in the ICU was explained in the aforementioned study, explained, according to the National Policy of Integral Attention to Man's Health, by the fact that man considers himself invulnerable, which reflects the neglect of self-care and greater exposure to situations of risk and violence, compared to those suffered by women.[9]

In a convergence with the aforementioned study, a survey carried out in an adult ICU of a university hospital located in the city of Rio de Janeiro showed that 26.6% of the patients who used analgesics hospitalization, malignant neoplasms, followed by diabetes (17.9%) and comorbidities related to respiratory problems (8%).[10] It was evidenced, in another study, respiratory dysfunction was the most frequent, found in 54.3% of the patients; however, the highest mortality rate was found in the dysfunctions of blood and neurological coagulation, since all patients with these dysfunctions died.[11]

It is important to highlight that ICU patients are constantly submitted to painful procedures and, therefore, the use of analgesic drugs with the objective of offering comfort to the patient is a priority care in intensive care.[9]

It is known that inattentive pain can result in imbalance of vital parameters such as blood pressure, heart rate and respiratory rate, increasing the risk of hypoventilation, hypercapnia, persistent increase in cardiac workload and reduction of blood perfusion.[12]

The predominance of NSAIDs associated with opioids was observed when analyzing the frequency of pharmacological classes of prescribed analgesics. This data is corroborated in another study that shows, with a percentage of 47.9%, that the analgesic combination plays a significant role in the control and prevention of pain.[13]

The association of tramadol and dipyrone is related to the frequency of the order of analgesics ordered by nurses. This association was described as safe, but the literature does not present studies that test the way the order of the drugs interferes in the management of pain. It is understood that tramadol is a weak μ opioid receptor agonist and effective in treating moderate to severe pain. It is generally considered that the drug has a similar adverse effect profile as that of strong opioids (tolerance, dependence, anaphylactoid reactions, seizures).[14]

The dipyrone drug, although not a pharmacological class of non-steroidal anti-inflammatory drugs (NSAIDs), is a potent analgesic, indicated for mild to moderate pain and for fevers, in which the use of acetylsalicylic acid (ASA) does not is recommended. Dipyrone is absorbed by different routes of administration and its mechanism of action is in the inhibition of the synthesis of prostaglandins, prostacyclins and thromboxanes and by the reversible and irreversible inhibition of the cyclooxygenase (COX) enzyme in its known isoforms.[15]

It is inferred, regarding the order of the Nursing appointments of analgesics, that analgesia can enhance the effectiveness in the treatment of pain, especially of the patients hospitalized in intensive care. It is observed that opioids, in turn, act at a central level, inhibiting GABAergic transmission in a local circuit, such as the brainstem, where GABA inhibits the inhibitory neuron of pain and presents, on average, half-lives of four to six hours. NSAIDs are considered to have a more peripheral action when compared to opioids, acting on the synthesis of prostaglandins by the inhibition of the enzymes cicloxigenase 1 and 2 and having a half-life of one to four hours.[16]

It is therefore suggested that opioids should first be used when used in association with NSAIDs, in order to prolong the effect of analgesia and promote greater patient comfort.

The analgesic ladder is used according to the intensity of the pain: if the non-opiate drug, administered at the recommended dose and frequency, does not relieve the pain, one

moves to the second step, where opioids must be added to the treatment weak, such as tramadol and codeine; if the combination of weak and non-opioid opioids is also not effective in relieving pain, weak opioids are substituted for strong opioids such as morphine, methadone, oxycodone, and fentanyl. It should be noted that there is no dosage limit for strong opioids, and the maximum dose is the one that achieves the best balance between analgesia and collateral effectsais.[17]

A study was carried out with oncology patients, in which the subjects were divided into two groups: the first group was treated according to the guidelines of the WHO analgesic ladder and in the first step, paracetamol was used every six hours; in the second, codeine every four hours, and morphine, every four hours, on the third step. It was found that the patients in the second group received only morphine every four hours and the adjuvant drugs included whenever necessary. It was pointed out that, in both groups, the techniques were effective, however, patients who used opioids alone showed more adverse effects.[18]

It is known that most drugs have the ability to interact with each other when associated, with or without relevant clinical repercussion, and this aspect should be taken into account when prescribing a particular drug. It is observed that many treatments require the drug association, with the purpose of potentiating the therapeutic effects, reducing the side effects, reducing therapeutic doses, preventing resistance, obtaining multiple and broad actions and providing greater convenience for the patient. It should be noted, however, that most associations occur inadvertently, in a situation of polytherapy, being harmful to the organism.[19]

In view of the findings in the medical prescription of this research, some failures can be perceived. It is understood that the literature emphasizes the non-association of two weak opioids in the same medical prescription as this may result in increased adverse effects as well as the non-association of a weak and a strong opioid unless the strong opioid is used as a rescue in times when there are pain spikes. It is also established that agonist-antagonist opioids, such as nalbuphine, or partial agonists, such as buprenorphine, should not be associated with other opioids due to the unpredictable response and the impairment of analgesia.[20]

It is shown that, among the medications scheduled at the same time, shown in table 3, 9.2% did not present potentially interactive characteristics and 0.7% had pharmacokinetic peculiarities that predispose to drug interaction. It is noted that the concomitant use of tramadol and fluconazole, for example, may result in increased potency of tramadol, increasing the risk of toxicity, and the use of tramadol and promethazine may result in seizures when associated.[21] It is noted that patients who use five drugs are 50% more likely to develop a drug interaction, and when this number of drugs increases to seven, the probability becomes 100%.[22]

It is suggested that the role of monitoring the therapy should be shared between the different professionals (doctors, pharmacists and nurses) and that they should recognize the clinical manifestations and warning signs resulting from the drug interactions, so that they are able to give the guidelines, especially in the context of intensive care, where patients are constantly submitted to complex therapeutic regimens. It is considered fundamental that the measures that reduce the risk of the interactions are carried out, which include the use of electronic prescriptions with alert of interactions and the scheduling, by the Nursing team, focused on the pharmacokinetic characteristics of the associated drugs.[23]

There are many obstacles to education and training of health professionals, including difficulty in assessing pain, insufficient knowledge of the pharmacology of opioids, conversion, equianalgesia and rotation, inadequate use of adjuvants, inappropriate diagnosis and treatment of adverse events, fear of opioid adverse events, non-prioritization of pain management, and other related symptoms, such as fatigue, sleep and depression, determination of the analgesic plan safe in the prognosis and not in the intensity of the pain, lack of medication documentation, dose and interval between doses, breakthrough pain, and difficulties in reevaluation of pain, according to the proposed treatments, including follow-up and drug intervals.[24]

It is understood, as the responsibility of the nurse, the safe release of painkillers, and a therapeutic drug plan, instituted specifically for each patient, should be organized; to this end, it must be aware of the pharmaco-dynamic characteristics of the drug, ensuring the efficacy of analgesia and avoiding possible drug interactions.[14,25]

It is considered fundamental to understand the conditions and complexities of the work environment in which nurses work and that can compromise the quality of care.[26] In this way, it is pointed out that in the

administration of analgesics, this professional plays an important role in the relief of the pain of patients admitted to intensive care.

CONCLUSION

In this study, the importance of the nursing appointment directed to the management of pain in the patients hospitalized at the Intensive Care Center was shown, in addition to showing that the field of Pharmacology is a determining factor for a good professional practice.

After analyzing the data, it was noticed that NSAIDs and opioids occupied more than half of the medical prescriptions and that the order of the most frequently prescribed analgesics was that of weak opioid followed by analgesics.

In terms of potential drug interactions, it was concluded that, despite the fact that the patients are medicated with several drugs, the professionals do not seek to administer analgesics along with other drugs. It is verified that a very small portion presented potentially interactive characteristics, however, the interactions that occurred were considered serious and could result in seizures or opioid toxicity.

The need to carry out new research in the field of Nursing regarding the correct use of analgesics was pointed out, because the literature has few studies about the use of analgesic ladder. It is pointed out, for example, that it does not show the time required to achieve good analgesia, or if the order of the appointments may interfere positively or negatively in the treatment of the patient.

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Submission: 2018/05/14
Accepted: 2019/01/13
Publishing: 2019/02/01

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