Original Article

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IMPLEMENTATION OF GOOD PRACTICES FOR ADMINISTERING VASOACTIVE AMINES: A QUASI-EXPERIMENTAL STUDY

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ABSTRACT

Objective: to analyze the implementation of training on good practices for administering vasoactive amines when facing undesirable clinical events in patients of a cardiointensive unit.
Method: this is a quasi-experimental study (before and after), carried out in three stages at a university hospital located in Rio de Janeiro, Brazil. An observation was performed in the first stage about the team's adherence to good practices in administering vasoactive amines. Training was conducted with the nursing team in the second stage to implement the actions, and adherence to good practices in administering vasoactive amines was evaluated in the third stage. Data collection was performed from October 2019 to July 2021. The McNemar test and the Wilcoxon non-parametric test were used to compare the differences in the pre- and post-intervention groups.
Results: a total of 280 patients were infused with vasoactive amines, 97 in the first stage (pre-intervention) and 183 after the intervention. The variables related to the administration in an exclusive way and the identification of the infusion pump obtained 100% assertiveness. A total of 37 (13.2%) undesirable clinical events related to the use of vasoactive amines were identified, 27 (27.8%) in the control group (pre-intervention) and 10 (5.5%) after the intervention, evidencing a significant reduction (p-value = 0.0001).
Conclusion: the implementation of the intervention significantly contributed to reducing the occurrence of undesirable clinical events related to administering vasoactive amines, contributing to safer drug therapy.

DESCRIPTORS: Patient safety. Cardiovascular drugs. Risk management. Nursing care. Medication systems in the hospital. Safety measures. Drug-related side effects and adverse reactions.

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IMPLEMENTAÇÃO DE BOAS PRÁTICAS PARA ADMINISTRAÇÃO DE AMINAS VASOATIVAS: UM ESTUDO QUASE-EXPERIEMENTAL

RESUMO

Objetivo: analisar a implementação de um treinamento sobre boas práticas para administração de aminas vasoativas frente à ocorrência de eventos clínicos indesejáveis em pacientes de uma unidade cardiointensiva.
Método: trata-se de um estudo quase-experimental (antes e depois), realizado em três etapas em um hospital universitário localizado no Rio de Janeiro, Brasil. Na primeira etapa, fez-se uma observação sobre adesão da equipe às boas práticas na administração de aminas vasoativas. Na segunda etapa, realizou-se um treinamento com a equipe de enfermagem para implementação das ações e, na terceira etapa, avaliou-se a adesão às boas práticas na administração de aminas vasoativas. A coleta de dados foi de outubro de 2019 a julho de 2021. Para comparar as diferenças nos grupos pré e pós-intervenção, utilizou-se o teste de *McNemar* e o teste não paramétrico de *Wilcoxon*.
Resultados: observaram-se 280 pacientes em infusão de aminas vasoativas, sendo 97 na primeira etapa (pré-intervenção) e 183 após a intervenção. As variáveis relacionadas à administração em via exclusiva e a identificação da bomba infusora obtiveram 100% de assertividade. Identificaram-se ao todo 37 (13,2%) eventos clínicos indesejáveis relacionados ao uso das aminas vasoativas, sendo 27 (27,8%) no grupo controle (pré- intervenção) e 10 (5,5%) após a intervenção, evidenciando uma redução significativa (p valor =0,0001).
Conclusão: a implementação da intervenção corroborou de forma significativa para redução da ocorrência de eventos clínicos indesejáveis relacionados à administração de aminas vasoativas, contribuindo para uma terapia medicamentosa mais segura.

DESCRITORES: Segurança do paciente. Fármacos cardiovasculares. Gestão de riscos. Cuidados de enfermagem. Sistemas de medicação no hospital. Medidas de segurança. Efeitos colaterais e reações adversas relacionados a medicamentos.

IMPLEMENTACIÓN DE BUENAS PRÁCTICAS PARA LA ADMINISTRACIÓN DE AMINAS VASOACTIVAS: UN ESTUDIO CUASI-EXPERIMENTAL

RESUMEN

Objetivo: analizar la implementación de capacitaciones sobre buenas prácticas para la administración de aminas vasoactivas ante la ocurrencia de eventos clínicos indeseables en pacientes de una unidad cardiointensiva.
Método: se trata de un estudio cuasi-experimental (antes y después), realizado en tres etapas en un hospital universitario ubicado en Río de Janeiro, Brasil. En la primera etapa, se realizó una observación sobre la adherencia del equipo a las buenas prácticas en la administración de aminas vasoactivas. En la segunda etapa, se realizó capacitación con el equipo de enfermería para la implementación de las acciones y, en la tercera etapa, se evaluó la adherencia a las buenas prácticas en la administración de aminas vasoactivas. La recolección de datos fue de octubre de 2019 a julio de 2021. Para comparar las diferencias en los grupos pre y post intervención se utilizó la prueba de McNemar y la prueba no paramétrica de Wilcoxon.
Resultados: 280 pacientes fueron infundidos con aminas vasoactivas, 97 en la primera etapa (preintervención) y 183 después de la intervención. Las variables relacionadas con la administración de forma exclusiva y la identificación de la bomba de infusión obtuvieron 100% de asertividad. Se identificaron un total de 37 (13,2%) eventos clínicos indeseables relacionados con el uso de aminas vasoactivas, 27 (27,8%) en el grupo control (preintervención) y 10 (5,5%) después de la intervención, evidenciándose una reducción significativa (valor p = 0,0001).
Conclusión: la implementación de la intervención contribuyó significativamente para la reducción de la ocurrencia de eventos clínicos indeseables relacionados con la administración de aminas vasoactivas, contribuyendo para una terapia farmacológica más segura.

DESCRIPTORES: Seguridad del paciente. Fármacos cardiovasculares. Gestión de riesgos. Cuidado de enfermera. Sistemas de medicación en el hospital. Medidas de seguridad. Efectos secundarios y reacciones adversas relacionados con los medicamentos.

INTRODUCTION

Errors resulting from drug therapy are one of the main causes of avoidable adverse events in the world healthcare system, costing public coffers amounts estimated at US$42 billion annually[1]. It is estimated that one person per day in the United States dies from medication errors and annually about 1.3 million suffer some damage. This impact can be even greater in underdeveloped countries, especially with regard to lost years of healthy life[1–2].

The Institute for Safe Practices in the Use of Medicines (*Instituto para Práticas Seguras no Uso de Medicamentos - ISMP*) in Brazil points out that approximately 8,000 deaths a year are attributed to medication errors. It was evidenced that incidents and adverse reactions resulting from administering medication corresponded to 7.0% of hospitalizations in the health system, which represented an average of 840 thousand cases/year. If intensive care units (ICUs) are considered as a scenario, the mortality rate due to medication errors can be even higher and reach 7.9% of hospitalizations[3–4].

Vasoactive amines stand out among the drugs most used in intensive care units, considered as potentially dangerous drugs and which are among the drugs most commonly related to serious adverse events. Due to their high plasma half-life, amines require adequate surveillance and continuous hemodynamic monitoring of the patient when administered[2–5].

The nursing team plays a key role in the continuous surveillance of patients using vasoactive amines in these highly complex scenarios, being responsible for preparing, administering, monitoring the therapeutic effect and recording adverse events. The need to monitor these events is directly related to the pharmacokinetics and pharmacodynamics of these drugs, which means that minimal changes in the infused dose generate important hemodynamic repercussions which directly impact the maintenance of cardiac output, which can generate cardiac arrhythmias, hypotension, arterial hypertension, bradycardia, tachycardia and changes in urinary output[5].

Given the importance of effective monitoring and the need to mitigate incidents related to the infusion of amines in critically ill patients, institutions have increasingly expanded and updated adoption and implementation of good infusional practices in health services. These actions have positively impacted the care provided, generating standardized care in accordance with the best scientific evidence[6].

In this context, the objective of this study was to analyze training implementation on good practices for administering vasoactive amines in facing undesirable clinical events in patients of a cardiointensive unit.

METHOD

This is a quasi-experimental study (before and after) following the recommendations of the Revised Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0) guidelines[7].

The SQUIRE guidelines provide a model for improving and enhancing healthcare services. It is a checklist composed of 18 items which must be considered in elaborating improvement studies[7].

The study was conducted in three stages. An observation of the team's adherence to good practices in administering vasoactive amines was performed in the first stage. Next, training was carried out with the care team to implement the actions in the second stage, and a new observation of adherence to good practices in administering vasoactive amines was then performed in the third stage.

The study was conducted in a cardio-intensive unit of a large university hospital located in Rio de Janeiro. The sector contains nine beds for both genders. The nursing team is composed of nurses, technicians and nursing assistants who work 24-hour shifts per 120 hours of rest. All professionals who work in preparing and administering medicines have this workload.

A sample calculation of a probability sampling was performed to conduct the first and third stages of the study using a random sample by convenience. A sample of 97 patients who were on amine infusions were analyzed in the first stage, and then the sample consisted of 183 patients in the third stage. A sampling error of 5% was considered in both. The sample difference is justified by the change in the profile of the unit and the reduced hospitalization rate due to the COVID 19 pandemic.

All data collected in the first stage were referred to as the control group (pre-intervention), while the data in the third stage were referred to as the post-intervention group. Regarding the eligibility criteria, patients admitted to the cardiac intensive care unit aged over 18 years, of both genders, and using at least one vasoactive amine were included in the first and third stages. Patients hospitalized with less than 24 hours in the unit were excluded.

All 53 professionals (population) were trained in the second stage (intervention) of the study, including nursing residents who worked in the unit during the data collection period. Training for the study intervention was based on the use of a validated standard operating protocol related to the safe use of vasoactive amines[5]. After training all professionals, the protocol (as shown in Chart 1) was implemented in the sector. The original version of the protocol was adapted in order to adapt to the reality of the institution and the unit.

An analysis of the impact of implementing good practices for safely administering vasoactive amines was performed in facing the occurrence of undesirable clinical events in patients of a cardiointensive unit after the third stage. Undesirable clinical events were considered when systolic blood pressure (SBP) was >200mmhg and <50mmhg, and heart rate (HR) was >150 bpm and >50bpm.

Data collection in the first stage took place between October and November 2019, through a collection form containing variables related to patient characteristics, administration of infused vasoactive amines, and aspects related to the recording and monitoring of vital signs.

The implementation of good practices (intervention) took place in the second stage between April and May 2021 in the workplace collectively, at appropriate times according to the availability of on-call workers. The training was based on participatory methodologies with the nursing team from all shifts. There was no stratification in training between professional categories. All professionals in the unit were trained.

The participatory methodology applied was conducted following the precepts of convergent care research (CCR) which enabled effective performance of professionals in the educational process, implementation and adaptation of the protocol to reality, without considering them mere recipients.

After in-service training and implementation, good practices and the occurrence of undesirable clinical events in cardiac patients admitted to the unit were analyzed in the third stage. This analysis was performed by the main researcher with the help of the research team. Data collection took place between May and July 2021 using the same form used in the first phase, with patients admitted to the cardio-intensive unit who met the eligibility criteria.

Data tabulation and organization were performed using the Microsoft Excel software program and analysis was performed using the Jamove statistical software program. A descriptive and comparative analysis was carried out in order to summarize and explore the behavior of the data collected.

Chart 1 - Good practices for nursing intervention for patients using vasoactive drugs. Rio de Janeiro, RJ, Brazil, 2021.

<table>
<tr><td>Good practices for administering vasoactive amines - Nursing Interventions</td><td>Title: nursing interventions for patients using vasoactive drugs (Dobutamine, Dopamine hydrochloride, Nora hemitartrate epinephrine and Vasopressin.</td></tr>
<tr><td rowspan="2">Objective: contribute to improving the quality of care for critically ill patients using vasoactive drugs.</td><td>Agents: Nurses and Nursing Technicians.</td></tr>
<tr><td>Vasoactive drug concept: set of drugs which have significant pharmacodynamic properties that result in great clinical expression, as they can maintain the lives of patients with serious pathologies.</td></tr>
<tr><td colspan="2">Interventions common to all vasoactive amines</td></tr>
<tr><td colspan="2">1. Only infuse in an infusion pump and perform strict flow control.
2. Assess the patency of the intravenous catheter every three hours, checking the flow of the infused solution.
3. Perform continuous monitoring of heart rate and oxygen saturation.
4. Check blood pressure every 15 minutes during dose adjustment and every 60 minutes during maintenance dose.
5. Change continuous solutions every 24 hours; prepare solution immediately before completion and perform the exchange quickly.
6. Identify the solution with a label containing: patient’s name; name of the drug, its concentration and quantity; diluting solution, its concentration and quantity; administration route; start date and time; start flow; and name of the professional who prepared it.</td></tr>
<tr><td colspan="2">Dobutamine, hydrochloride</td></tr>
<tr><td colspan="2">Indication: is a potent inotropic agent. It is used in chronic low-output heart failure and ventricular failure in the acute phase of myocardial infarction.</td></tr>
<tr><td colspan="2">Solution for dilution: 5% glucose or 10% glucose or 0.9% sodium chloride or ringer lactate.
Initial dose: 2.5 mg/kg/min; Maximum dose: 20mg/kg/min.</td></tr>
<tr><td colspan="2">1. Always infuse into an intravenous catheter with a large diameter, preferably central. Give preference to the proximal lumen.
2. In the event of using a peripheral intravenous catheter, pay attention to the presence of inflammatory signs at the catheter insertion site.
3. Pay attention to the appearance of arrhythmias, such as supraventricular tachycardia, non-sustained ventricular tachycardia and atrial fibrillation, and assess hemodynamic repercussion (nurse only).
4. Perform strict control of infused and eliminated liquids.
5. Pay attention to signs of hypovolemia: arterial hypotension, tachycardia, low urinary output, cold and moist skin.
6. Be aware of drug incompatibility: it should not be added to solutions containing sodium bicarbonate or other alkaline solutions (for example, aminophylline and phenytoins), hydrocortisone sodium succinate, cefazolin, cefamandole, neutral cephalothin, penicillin, ethacrynic acid and sodium heparin).</td></tr>
</table>

Chart 1 - Cont.

Good practices for administering vasoactive amines - Nursing Interventions	**Title:** nursing interventions for patients using vasoactive drugs (Dobutamine, Dopamine hydrochloride, Nora hemitartrate epinephrine and Vasopressin.
Norepinephrine, tartrate	
Indication: is a vasoconstrictor agent used in the emergency recovery of blood pressure in acute hypotensive states.	
Solution for dilution: 5% glucose. **Initial dose**: 0.05 to 1mg/kg/min; **Maximum dose**: 1.5 to 2mg/kg/min.	
1. Always infuse into an intravenous catheter with a large diameter, preferably central. Give preference to the proximal lumen. 2. Frequently monitor peripheral perfusion, skin color and temperature. 3. In the event of using a peripheral intravenous catheter, pay attention to the presence of inflammatory signs at the catheter insertion site. 4. Pay attention to the appearance of arrhythmias, such as ventricular tachycardia, ventricular and atrial fibrillation, and assess hemodynamic repercussion (nurse only). 5. Protect from light: use a solution bottle wrapped in a protective cover for photosensitive solutions and appropriate equipment for photosensitive parenteral solutions. 6. Be aware of incompatibility with sodium bicarbonate or other alkaline solutions (aminophylline, phenytoin, etc).	
Vasopressin	
Indication: potent vasopressor used in septic shock, diabetes insipidus and gastrointestinal bleeding.	
Solution for dilution: 5% glucose, 0.9% sodium chloride or ringer lactate. **Initial dose**: 0.01 UI/min; **Maximum dose**: 0.04 UI/min.	
1. Always infuse into an intravenous catheter with a large diameter, preferably central. Give preference to the proximal lumen. 2. In the event of using a peripheral intravenous catheter, pay attention to the presence of inflammatory signs at the catheter insertion site. 3. Pay attention to the appearance of arrhythmias and signs of water intoxication. 4. Perform strict control of infused and eliminated liquids. 5. Watch out for interactions with demeclocycline, norepinephrine, lithium, heparin, and alcohol. Medications such as carbamazepine, chlorpropamide, clofibrate, urea, fludrocortizone and tricyclic antidepressants increase the effect of vasopressin.	

Source: adapted[5].

The McNemar test was applied to categorical and dichotomous variables in paired samples to compare the differences in the pre- and post-intervention groups, and the non-parametric Wilcoxon test for variables with asymmetric distribution in the same group. A significance level of $p<0.05$ was considered for all statistical tests.

In compliance with Resolution No. 466/2012, the study was submitted and approved by the Research Ethics Committee. An Informed Consent Form (ICF) was requested and granted to patients included in the first and third stages of the study. All trained professionals signed the ICF.

RESULTS

In all, 280 patients were infused with vasoactive amines, 97 in the first stage (control) and 183 after training (intervention).

Regarding the professionals who participated in the study, 10 (19%) were nurses, 32 (60%) were nursing technicians and 11 (21%) were nursing residents. The professionals were between 26 and 48 years of age and all had more than 6 months of experience and work in the study setting.

It was evidenced that the variables related to "administration by exclusive route" and "identification of the infusion pump" in characterizing the administration of vasoactive amines obtained 100% of assertiveness in the control group and in the post-intervention group, which demonstrates that some recommended actions were already followed prior to training, as shown in Table 1.

When correlating the assertiveness rates related to administration in the proximal lumen, a significant improvement in the success rate was identified after the intervention, from 46 (47.4%) to 146 (79.8%).

Table 1 - Pre-training and post-training characterization of the administration of vasoactive amines. Rio de Janeiro, RJ, Brazil, 2022. (n=280)

Variable	Group				Total		*p-value*
	Control		Post-Intervention				
	n	%	n	%	n	%	
Exclusive route							
yes	97	100	183	100	280	100	1
no	0	0	0	0	0	0	
Route correctly identified							
yes	85	**87.6**	173	**94.5**	258	92.1	**0.041**
no	12	12.4	10	5.5	22	7.9	
Proximal lumen administration							
yes	46	**47.4**	146	**79.8**	192	68.6	**< 0.0001**
no	51	52.6	37	20.2	88	31.4	
Pump identified							
yes	97	100	183	100	280	100	1
no	0	0	0	0	0	0	
Validate infusion							
yes	97	100	183	100	280	100	1
no	0	0	0	0	0	0	
Frequency of monitoring vital signs							
1h	1	0.5	0	0	1	0.4	**< 0.0001**
2h	50	**51.5**	183	**100**	233	83.2	
4h	47	48.5	0	0	47	16.8	

*p-value calculated by the Wilcoxon test.

The frequency of monitoring of vital signs also showed a significant improvement, but hourly monitoring as recommended was not achieved.

Among the 280 amine infusions observed, a total of 37 (13.2%) undesirable clinical events were identified, which are described in Table 2.

When evaluating data from the control group (pre-training), 27 (27.8%) undesirable clinical events related to the use of vasoactive amines were identified. After the intervention, there was a reduction to 10 (5.5%), with a p-value of < 0.001, which demonstrates significant variation between groups.

All clinical events measured by the McNemar test had a significant reduction after the intervention performed (p-value < 0.001).

Table 2 - Comparison of undesirable clinical events in the control group (n=27) and post-intervention (n=10). Rio de Janeiro, RJ, Brazil, 2022.

Variable	Total		Group				*p-value**
			Control		Post-Intervention		
	n	%	n	%	n	%	
Registry of undesirable clinical events							
yes	37	13,2	27	27,8	10	5,5	<,001
no	243	86,8	70	72,2	173	94,5	
SBP† > 200 mmHg							
yes	6	2,1	4	4,1	2	1,1	<,001
no	274	97,9	93	95,9	181	98,9	
SBP†< 50 mmHg							
yes	4	1,4	0	0	4	2,2	< ,001
no	276	98,6	97	100	179	97,8	
HR‡ > 150 bpm							
yes	26	9,3	23	23,7	3	1,6	<,001
no	254	90,7	74	76,3	180	98,4	
HR‡ < 50 bpm							
yes	1	0,4	0	0	1	0,5	<,001
no	279	99,6	97	100	182	99,5	

* p-value calculated by the McNemar test; †Systemic Blood Pressure; ‡ Heart Rate

DISCUSSION

"Exclusive administration of vasoactive amine" showed good frequency in the care practice of the study scenario among the variables presented by the study, with no variation before and after the intervention. Vasoactive amines belong to the group of high-alert medications, and therefore they are prone to cause damage, and/or permanent or fatal injuries to patients. Studies reinforce that exclusively administering vasoactive amines is a good recommended practice, as it prevents inadvertent bolus administration, which may induce dosage variations[5,8–9].

Another investigated aspect refers to identifying the route in which the vasoactive amine is being administered. It was evident that there was a relevant improvement in the adherence rate

related to this good practice after the intervention. Strategies are increasingly being sought in order to prevent drug incidents. Identification of the infusion route with the name of the drug is a strategy described and recommended by several studies. In addition to facilitating identification of the route by the professional, this strategy can also prevent errors related to drug incompatibility. Therefore, this practice has been adopted as a safety measure to mitigate the occurrence of errors related to medication administration[8–9].

Another aspect evaluated in the study which deserves to be highlighted refers to the significant improvement related to administering vasoactive amines in the proximal lumen, as it presented 47.4% before the intervention, and after the training adherence it was 79.7% (p-value=0.0001). Administration in the proximal lumen is a much-discussed recommendation, but with little evidence; however, studies indicate that this strategy is basically based on leaving the distal lumen, which is larger, for administration of bolus drugs or for concomitant infusions. It is recommended to identify the proximal part of the device with the name of the drug in order to signal to the nursing team that it is prohibited to administer other drugs in this route[8–9].

It is noteworthy that 100% of the continuous infusion pumps in this study were correctly identified, with the name of the drug and the validity of the solutions. Another study[8] pointed out that 99.6% of continuous infusion pumps were identified, which shows that this is a well-spread care practice with high professional adherence. It is also noteworthy that the identification of the infusion pump is a relevant safety barrier for reducing risk in drug therapy, especially with infusion of potentially dangerous drugs in an adult intensive care unit[8].

Based on the findings of this study, it is inferred that undesirable clinical events showed a significant reduction between the control group and the intervention, with a greater emphasis on maintaining heart rate. However, success was observed in reducing undesirable clinical events related to the use of vasoactive amines when evaluating the data from the control group. The data were high at 27.8%, but there was a reduction to 5.5% after the intervention, which demonstrates the effectiveness of the adopted intervention.

Professional updating and adopting well-defined protocols in care practice are directly linked to the clinical outcomes identified in the institutions. This statement is in line with the result of a study which evaluated care compliance and the adherence of nursing professionals to protocols for safely administering medications. Most professionals (66.7%) reported not knowing the protocol established by the Ministry of Health, and 77.8% of nurses stated that care protocols were not available in the unit[10].

Cardiac arrhythmias, hypotension and/or arterial hypertension, bradycardia, tachycardia and changes in urinary output stand out among the main undesirable clinical events related to vasoactive amines. There is relevance in monitoring and recording vital signs, since minimal changes in the infusion of amines can generate important changes which impact cardiac output maintenance[5]. An improvement in the intervals for monitoring vital signs is highlighted in the scenario under study.

In view of the improvements identified in the adherence to good practices in administering vasoactive amines, it is recommended that in-service training be more frequent and the protocols made available and disseminated in order to promote the knowledge of professionals. Encouraging training of professionals working in hospital units is necessary due to the importance of adhering to error prevention barriers, practices based on scientific evidence and encouraging a patient safety culture. It is known that training is a beneficial process for both the professional, their work team and for the patients[11–12].

It is considered a limiting factor that the study was carried out with nursing professionals from a single sector of the institution. However, the applicability of the protocol implemented in the unit is highlighted, as it is a current tool and has been validated in other scenarios.

CONCLUSION

The implementation of the protocol led to significant adherence to good care practices related to administering vasoactive amines. A significant reduction from 27.8% to 5.5% (p-value = 0.0001) of undesirable clinical events was identified, which contributes to better clinical outcomes and improved quality of care in intensive care units.

It is expected that implementing the Standard Operational Procedure (SOP) for safely administering vasoactive amines will contribute to strengthening Advanced Practice Nursing in critical care, valuing autonomy and promoting safer care based on scientific evidence. In addition, further research is recommended in other vasoactive amine administration scenarios aiming at a constant update of the clinical protocol.

REFERENCES

1. Organização Pan-Americana da Saúde. Esforço global para reduzir pela metade os erros relacionados à medicação em cinco anos. [Internet]. 2020 [cited 2020 Apr 23]. Availablefrom: https://www.paho.org/pt/noticias/29-3-2017-oms-lanca-esforco-global-para-reduzir-pela-metade-os-erros-relacionados.
2. Instituto para Práticas Seguras no Uso dos Medicamentos (ISMP Brasil). Desafio global de segurança do paciente medicação sem danos. Boletim ISMP [Internet]. 2018 [cited 2020 Sept 5];7(1). Availablefrom: https://www.ismp-brasil.org/site/wp-content/uploads/2018/02/ISMP_Brasil_Desafio_Global.pdf
3. Härkänen M, Julkunen KV, MurrellsT, Rafferty AM, Franklind BD. Medication administration errors and mortality: incidents reported in England and Wales between 2007-2016. Res Social Adm Pharm [Internet]. 2019. [cited 2020 May 20];15(7):858-63. Availablefrom: https://doi.org/10.1016/j.sapharm.2018.11.010
4. Melo EM, Cavalcante HPO, Marques AM, Ferreira AMM, Abreu MAF, Lima VF, et al. Conhecimento do enfermeiro sobre as drogas vasoativas utilizadas em pacientes críticos. Rev Enferm UFPE online [Internet]. 2016 [cited 2020 Aug 1];10(8):2948-55. Availablefrom: https://doi.org/10.5205/reuol.9373-82134-1-RV1008201621
5. Paim AE, Nascimento ERP, Bertoncello KCG, Sifroni KG, Salum NC, Nascimento KC. Validation of an instrument regarding nursing intervention in patients in vasoactive therapy. Rev Bras Enferm [Internet]. 2017 [cited 2020 Sept 3];70(3):453-60. Availablefrom: http://doi.org/10.1590/0034-7167-2016-0254
6. Camargo FC, Iwamoto HH, Galvão CM, Pereira GA, Andrade RB, Masso GC. Competences and barriers for the evidence-based practice in nursing: an integrative review. Rev Bras Enferm [Internet]. 2018 [cited 2020 Dec 5];71(4):2030-8. Availablefrom: http://doi.org/10.1590/0034-7167-2016-0617
7. Ogrinc G, Davies L, Goodman D, Batalden P, Davidoff F, Stevens D. SQUIRE 2.0 (Standards for QUality Improvement Reporting Excellence): revised publication guidelines from a detailed consensus process. BMJ Qual Saf [Internet]. 2016 [cited 2021 Dec 5];25(12):986-92. Availablefrom: https://doi.org/10.1136/bmjqs-2015-004411
8. Fagundes LC, Almeida LF, Camerini FG, Maciel RO, Paula VG, Henrique DM, et al. Uso de medicamentos potencialmente perigosos em uma Unidade de Terapia Intensiva. Res Soc Dev [Internet]. 2020 [cited 2021 Nov 3];9(8):e499985831. Availablefrom: https://www.rsdjournal.org/index.php/rsd/article/view/5831

9. Moraes MV. Gerência de farmacovigilância da Anvisa lança pesquisa para conhecer o perfil dos notificadores de eventos adversos de medicamentos. Boletim ISMP [Internet]. 2019 [cited 2021 Nov 5];8(1). Availablefrom: https://www.ismp-brasil.org/site/wp-content/uploads/2019/02/615-boletim-ismp-fevereiro-2019.pdf

10. Llapa-Rodriguez EO, Silva LSL, Menezes MO, Oliveira JKA, Currie LM. Assistência segura ao paciente no preparo e administração de medicamentos. Rev Gaúcha Enferm [Internet]. 2017 [cited 2021 Nov 5];38(4):e2017-0029. Availablefrom: https://www.scielo.br/j/rgenf/a/mfp3NmJBdnNjnC6VVq8tpLr/?format=pdf&lang=pt

11. Custódio IL, Lima FET, Pascoal LM, Barbosa LP, Carvalho REFL, Almeida PC, et al. Training on intravenous medication administration in pediatric nursing: a before-after study. Rev Esc Enferm USP [Internet]. 2021 [cited 2022 Jan 27];55:e20210195. Availablefrom: https://doi.org/10.1590/1980-220X-REEUSP-2021-0195

12. Reis MAS, Gabriel CS, Zanetti ACB, Bernardes A, Laus AM, Pereira LRL. Medicamentos perigosos: identificação de riscos e barreiras de prevenção de erros em terapia intensiva. Texto Contexto Enferm [Internet]. 2018 [cited 2021 Dec 6];27(2):e5710016. Availablefrom: https://doi.org/10.1590/0104-07072018005710016

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