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MEDICATION ERRORS: MANAGEMENT OF THE MEDICATION ERROR INDICATOR TOWARD A MORE SAFETY NURSING PRACTICE

ERRO DE MEDICAÇÃO: GESTÃO DO INDICADOR PARA UMA PRÁTICA MAIS SEGURA

ERROR DE MEDICAMENTO: GESTION DEL INDICADOR PARA UNA PRÁTICA MÁS SEGURA

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ABSTRACT

Objectives: to characterize the medication error and know causes and actions performed after its occurrence. ***Methods:*** it is a descriptive and exploratory study, retrospective (2007-2013). The sample comprised spreadsheets and medication error notifications provided by the nursing service of a teaching hospital. ***Results:*** the incidence of medication error was 1.4%. The main type of mistake was "omission" (28; 31.2%) and inpatient units were the most notified (48; 53.3%). The main cause related to error was "inattention" (84; 93.3%) and related to the work processes have not been notified (72; 80%). The action performed after the error was "individual counseling" (64; 71.1%). ***Conclusion:*** the historical series made possible to visualize the evolution of reducing medication error incidence and may represent a favorable perspective on security, the causes mapped the risks and education were the bases of the actions. ***Descriptors:*** Medication Errors; Quality Indicators of Health Care; Health Evaluation; Notification; Nursing.

RESUMO

***Objetivos*:** caracterizar o erro de medicação e conhecer causas e ações realizadas após sua ocorrência. ***Método*:** estudo descritivo-exploratório, retrospectivo (2007 a 2013). A amostra abrangeu planilhas e notificações de erro de medicação disponibilizadas pelo serviço de enfermagem de um hospital de ensino. ***Resultados*:** a incidência de erro de medicação foi de 1,4%. O principal tipo de erro foi "omissão" (28;31,2%), unidades de internação foram as que mais notificaram (48; 53,3%). A principal causa relacionada ao erro foi "desatenção" (84;93,3%) e ao processo de trabalho não foi notificada (72;80%). A ação realizada após o erro foi "aconselhamento individual" (64; 71,1%). ***Conclusão*:** a série histórica possibilitou visualizar a evolução da redução da incidência de erro de medicação podendo representar uma perspectiva favorável à segurança, as causas mapearam os riscos e a educação foi a base das ações. ***Descritores*:** Erros de Medicação; Indicadores de Qualidade em Assistência à Saúde; Avaliação em Saúde; Notificação; Enfermagem.

RESUMEN

Objetivos: caracterizar el error de medicación y conocer causas y acciones realizadas después de su ocurrencia. ***Método:*** estudio descriptivo-exploratorio, retrospectivo (2007 a 2013). La muestra abarcó planillas y notificaciones de error de medicación disponibilizadas por el servicio de enfermería de un hospital universitario. ***Resultados:*** la incidencia de error de medicación fue de 1,4%. El principal tipo de error fue "omisión" (28;31,2%), unidades de internación fueron las que más notificaron (48; 53,3%). La principal causa relacionada al error fue "desatención" (84;93,3%) y al proceso de trabajo no fueron notificadas (72;80%). La acción realizada después del error fue "asesoramiento individual" (64; 71,1%). ***Conclusión:*** la serie histórica posibilitó visualizar la evolución de la reducción de la incidencia de error de medicación pudiendo representar una perspectiva favorable a la seguridad, las causas mapearon los riesgos y la educación fue en base a las acciones. ***Descriptores:*** Errores de Medicación; Indicadores de Calidad en Asistencia a la Salud; Evaluación en Salud; Notificación; Enfermería.

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INTRODUCTION

Medical errors are highlighted in scientific circles and the media, because of the relevance and impact of the healthcare system. These include medication errors common in hospitals.[1-2] This type of error is defined as any preventable event occurred at any stage of drug therapy being related to professional practice, healthcare products, procedures and systems, which may or may not cause any harm to the patient.[3-4]

Medication errors occur by several factors and are of a multidisciplinary nature, taking place at any stage of care to the individual's health as well as in different hospitals. The areas with large patient demand with greater severity and clinical complexity are more subject to this occurrence.[1,5] The classification of these errors follows as their cause and the determining factor.[6] One of the classifications of medication errors is prescription, omission, time, dose, administration, inappropriate drugs for use, adhesion, transcription, and separation or disposal.[7]

Consequently, medication errors can cause emotional, physical and financial losses for the team, patient, family, institution and society.[8-9] As a result of the errors, damage, adverse reactions, temporary or permanent injuries, probably worse and lead to death.[10-11] There is a need to improve the work processes to ensure the quality of care and based on the measurement results. For this purpose the quality indicators guide the assessment in health and help the manager to understand the event dimension.[12]

The incidence of medication errors is one of the indicators proposed by the Commitment to Hospital Quality Program (CQH) to be used as a management tool.[13] It is important that institutions encourage the notification and that the professionals included in this practice have besides the knowledge, the awareness of its importance.[14] Recognizing the cause of the error is necessary to know where and how to intervene. The notification helps to treat the causes rationally and act directly on them.[15]

Due to the magnitude of the problem the occurrence must be verified with special attention, the causes and consequences of medication errors. This recognition favors directed prevention. There are many ways to prevent medication errors. Therefore, it is essential that the notification of medication errors to be an essential tool for improving the quality of care provided to patients. Nurses need to have a thorough knowledge of the correct preparation as well as about medicines and solutions. The incentive for the quality of care have an active participation and valorization of the professionals must come from a non-punitive culture from the institutions. The form should be studied both by the institution and the professional both should be aware of this need, seeking the safe assistance and harm free.

OBJECTIVES

- To characterize the medication error.
- To know causes and actions performed after its occurrence.

METHOD

It is a descriptive-exploratory study, documentary, quantitative and retrospective (2007-2013). The research field is a quaternary-level teaching hospital with extra capacity (720 beds), which provides care for patients of the Unified Health System (SUS) and agreements, serves more than two million inhabitants, with an average of 46,000 visits/month, located in São Paulo state.

The institution participates in the CQH program. Thus the data for the medication error incidence indicator are collected in units by clinical nurses and forwarded to Nursing Management, which provided the data for this research, after authorization of the field of study and approved by the Research Ethics Committee of the Faculty of Medicine of São José do Rio Preto (Opinion No. 325 938). Data related to the occurrence of medication errors were used to calculate of the quality indicator of medication errors incidence (IEM) in equation proposed by the CQH in its Manual of Nursing indicators.[13]

$$\text{IEM} = \frac{\text{Number of errors related to medication administration}}{\text{number of patients/day}} \times 100$$

The notification about the indicator is manually by clinical nurses of the units. These are collected exclusively from observation and notification of the nursing team. This spreadsheet has data with the number of errors, patients and classification of error types. This process is daily performed on a printed spreadsheet and forwarded to nursing management at the end of the month. In addition to collecting data relating to the

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indicator it must complete the form entitled "notification of non-medication compliance" in the hospital information system. This form contains data about the characterization of error and adopted conduct. At the end of the filling, the form is printed and sent to nursing management.

For the classification of causal factor and the consequence after the error, the study field uses its standardization. In medication error classification it was found the annotation error variables, omission, time, dose, unauthorized drug administration, dilution error, wrong medication, wrong patient, via error and infusion time. For the causal factor it was a division between personal causes and another topic for process causes. Both the causal factor as conduct after the error, the questions was structured by whose notifier could tick one or more options and could include the desired option.

In the age characteristics were considered ages according to the stage of human development, from zero to 11 years old children, from 12 to 18 years adolescent, 19 to 59 years adults and over 60 years elderly.

During the studied period the hospital consisted of 26 units, but only 12 participated in the study because there was no notification from the others. The participating units were classified in clinical-surgical hospitalization, consisting of six units. The specialized were composed by pediatrics, surgery center and emergency. The Intensive Care Units (ICU) were divided into child and adult ICU. Of the three child ICUs, the only one which notified the errors was the cardiac-pediatric ICU, and from the five adult ICUs only two reported.

For data collection related to medication error quality indicator the nursing management of the institution provided worksheets in Excel 2007 program, in digital media, containing some errors data and some specific medications at each hospital. The forms of non-compliance medication notification were available in printed form. The data were tabulated in Excel 2007 spreadsheets. After its tabulation were analyzed separately and crossing information that could promote management of the problem according to the objective of the study.

RESULTS

In the studied period 16,753 errors were reported with a median of 1,855 errors/year, and in 2008 was observed the greatest error register 4,168 (24.9%) and, in 2013 the lowest - 704 (4.2%). The average was 2.393 (1.474 SD) errors/year. Throughout the studied historical series the incidence (Table 1) was 1.4%, with a decrease during the period, a decrease of 50% from 2009 (2.1%) to 2011 (0.9%).

Table 1. Distribution of the medication error incidence indicator from 2007 to 2013. São José do Rio Preto, 2015.

Year	N errors	%	N pt/day	%	Ind.
2007	3,808	22.7	159,078	13.8	2.4
2008	4,168	24.9	176,706	15.3	2.3
2009	3,759	22.4	179,088	15.5	2.1
2010	1,855	11.1	118,731	10.3	1.5
2011	1,533	9.2	174,643	15.1	0.9
2012	926	5.5	183,790	15.9	0.5
2013	704	4.2	163,573	14.1	0.4
Total	16,753		1,155,609		1.4

N pt/day= number of patient per day; Ind. = indicator.

90 notification forms of the years 2011 to 2013 were available, being 11 (12.2%) of 2011, 12 (13.3%) of 2012 and 67 (74.5%) of 2013. 89 (98.9%) patients were characterized according to age and gender (Table 2); one form had no such information. The mean age of patients was 42 (SD ± 28.2) years old and average 50 years (1 month to 93 years). About age groups, 38 (42.3%) were adults (19-59 years) and the most frequent type of error in this age group was the omission, with 14 (36.8%) notifications. The higher incidence of errors occurred in females, 48 (53.3%).

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Table 2. Distribution of medication error classification according to age group and gender of the patients from 2011 to 2013. São José do Rio Preto, 2015.

	0-11		12-18		19-59		≥60		Gender			
Classification	N	%	N	%	N	%	N	%	F	%	M	%
Annotation	1	4.3	-	-	3	7.9	1	3.8	3	6.3	2	4.9
Omission	4	17.4	-	-	14	36.8	10	38.5	14	29.2	14	34.1
Time	5	21.7	1	50.0	4	10.6	3	11.6	6	12.5	7	17.1
Dose time	1	4.3	-	-	-	-	-	-	1	2.1	-	-
Dose	2	8.8	-	-	1	2.6	4	15.4	4	8.3	3	7.3
MNA	-	-	-	-	1	2.6	-	-	1	2.1	-	-
Dilution	2	8.8	-	-	1	2.6	-	-	1	2.1	2	4.9
Medication	-	-	1	50.0	1	2.6	1	3.8	-	-	3	7.3
Patient	1	4.3	-	-	8	21.1	4	15.4	7	14.6	6	14.6
Via	-	-	-	-	-	-	1	3.8	1	2.1	-	-
Infusion time	7	30.4	-	-	5	13.2	2	7.7	10	20.8	4	9.8
Total	23	25.5	2	2.2	38	42.3	26	28.9	48	53.3	41	45.6

MNA= Unauthorized Medicament.

For the period that medication errors occurred the night was the most notified 35 (38.9%), followed by the morning 31 (34.5%) and vespertine 20 (22.2%). Four (4.4%) events occurred in more than one period, two (2.2%) of them during three shifts and the others two (2.2%) during two shifts.

For the professionals included in forms, 55 (61.2%) were nursing assistants, 30 (33.3%) technicians, 1 (1.1%) nurse and 1 (1.1%) doctor. Two forms (2.2%) indicated that the error was shared between the nurse and technician, and one (1.1%) had no answer. As for employment 51 (56.6%) had a link, 23 (25.6%) more than one and in 16 forms (17.8%) this item was not answered. Exercise time in years, in the function was variable, 22 (23.9%) had less than one, 17 (18.6%) from one to five, 12 (13%) from six to ten, 7 (7.6%) from 11 to 15, 5 (5.4%) from 16 to 20, only 1 (1.1%) had more than 20 years and 28 (30.4%) had no answer.

The proportion of nursing staff (Table 3) presented an average of 0.16 professional/patient at inpatient units and specialized and 0.5 professional/patient in child and adult ICUs. The most frequent type of error was omission with 28 notifications (31.2%), the inpatient units were the most reported 48 (53.3%), and the main type of error was omission with 23 (47.9%) followed by the adult ICU with 17 (18.9%), and its main type of error was time with 6 notifications (35.3%).

The notifications were filled by nurses about personal factors and work processes that contributed to the occurrence and conduct after the error (Table 4). Inattention and other associated factors were the main personal cause - 84 (93.3%), followed by not checking the identification bracelet and associated factors - 11 (12.2%). Regarding the cause of the working process in 72 (80%) forms has no answer and 13 (14.4%) forms were related to medical prescription and associated factors. As for the conduct taken after the error individual counseling was cited in at least one of the actions in 64 (71.1%) occurrences and guidance procedure and routine in 57 (63.3%).

During the hospitalization, it was medication error re-incidence in 7 (7.8%) patients totaling 17 (18.9%) errors. The classification and incidence of errors were: seven (41.1%) of time, six (35.3) of omission, one (5.9%) of unauthorized medication administration, one (5.9%) of annotation, one (5.9%) dilution and one (5.9%) diverging from the prescribed infusion time. It is noteworthy that three (3.3%) patients suffered the same kind of error, totaling nine (10%) errors, being six (67%) of time and three of omission (33%).

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Table 3. Distribution of medication error classification by hospitals and proportion of nursing team from 2011 to 2013. São José do Rio Preto, 2015.

Classification	Hospitalization			Specialized			Child ICU			Adult ICU			Total		
	n	%	p	n	%	p	n	%	p	n	%	p	n	%	p
Annotation	-	-	-	-	-	-	1	6.3	0.50	4	23.5	0.50	5	5.6	0.50
Omission	23	47.9	0.16	-	-	-	4	25.0	0.50	1	5.9	0.50	28	31.2	0.30
Time	1	2.1	0.20	-	-	-	6	37.4	0.50	6	35.3	0.50	13	14.4	0.30
Dose time	1	2.1	0.16	-	-	-	-	-	-	-	-	-	1	1.1	0.16
Dose	2	4.2	0.16	2	22.3	0.30	1	6.3	0.50	3	17.6	0.50	8	8.9	0.30
MNA	-	-	-	-	-	-	-	-	-	1	5.9	0.50	1	1.1	0.50
Dilution	-	-	-	-	-	-	2	12.5	0.50	1	5.9	0.50	3	3.3	0.50
Medication	2	4.2	0.14	1	11.1	0.16	-	-	-	-	-	-	3	3.3	0.14
Patient	9	18.7	0.16	3	33.3	0.14	-	-	-	1	5.9	0.50	13	14.4	0.20
Via	1	2.1	0.20	-	-	-	-	-	-	-	-	-	1	1.1	0.20
Infusion time	9	18.7	0.20	3	33.3	0.16	2	12.5	1.00	-	-	-	14	15.6	0.25
Total	48	53.3	0.20	9	10.0	0.16	16	17.8	0.50	17	18.9	0.50	90		0.25

P= Nursing staff proportion.

Table 4. Distribution of medication error classification according to the causes and conducts after the error from 2011 to 2013. São José do Rio Preto, 2015.

Classificatio	Personal cause	n	%	Process cause	n	%	Conduct after error	n	%
Annotation	Inattention	5	100.0	Not identified	5	100.0	Orientation	1	20.0
Omission	Work overload	4	14.3	Medical prescription	4	14.3	Orientation and individual c.	8	28.6
Time	Incomplete prescription reading	2	15.4	Medical prescription	5	38.5	Orientation and individual c.	7	53.8
Dose time	Not identified	1	100.0	Medical prescription	1	100.0	Orientation	1	100.0
Dose	Lack of knowledge	3	37.5	Similar packaging	2	25.0	Orientation and individual c.	4	50.0
MNA	Incomplete prescription reading	1	100.0	Not identified	1	100.0	Orientation and individual c.	1	100.0
Dilution	Inappropriate emotional and physical conditions and lack of knowledge	2	66.7	Medical prescription	1	33.3	Orientation	2	66.7
Medication	Without glasses	1	33.3	Similar packaging	2	66.7	Orientation	1	33.3
Patient	Not checked the ID	1 1	84.6	Not identified	13	100.0	Recycling/SOP elaboration	2	15.4
Via	Inattention	1	100.0	Not identified	1	100.0	Individual c.	1	100.0
Infusion time	Work overload and inattention	4	26.7	Not identified	15	100.0	Recycling and associated factors	2	13.3

Orientation= procedure orientation or routine; Individual c. = individual counseling; SOP = Standard Operational Procedures.

DISCUSSION

The incidence of "medication error" is a quality indicator proposed by CQH. In 2013 an average of 42 general hospitals with over 50 beds had registered this indicator in the program. The median was 0.15% errors in the year[13] lower than that found in the historical series of this research (1.5%). A study performed in a public pediatric University Hospital tertiary and large[16] found a 0.1% error rate, also lower than the findings of this study (1.4%). Notification of medication error is a worldwide problem, because there is a punitive culture within today compromising the data veracity.[17] To notify the error is only the first step to preventing it, because when systematized results in getting more accurate data.[15]

Patients were predominantly female (53.3%) and the median age of 50 years corroborating the research in sentinel hospital where the female also stood out (59.9%) with an average of 47 years.[18] These findings contrast with an integrative review of this topic in pediatrics which states that children are more vulnerable to the occurrence of errors, because of intrinsic and extrinsic factors.[19] However these data may not reflect the reality since there is under-notification and the number of adult hospitalizations is higher than children in the investigated institution.

This study found that the most frequent type of error was "omission" (31.2%). A research in medical records of a clinical surgical unit of a sentinel hospital, showed similar data because "omission" (34.6%) was the main type of error found.[18] However a multicenter research performed in four hospitals using quantitative and qualitative approach, questioned nurses about the most common types of errors, the prescription was the most cited (29.5%).[20] Research that found the cause of medication errors affirms that lapses, forgetfulness and lack of attention are factors contributing to human errors that lead to omission acts and that the supervision of nurses in medication management practice can be an effective barrier for prevention.[15]

Most notifications in this study occurred in inpatient units (53.3%). Differing from observational research in a municipal hospital sentinel[21], points out that the ICU had a higher number of errors (41.1%), being justified by the complexity of care.

The proportion of the nursing team in this study presented relation of 0.16 professional/patient in the inpatient unit and specialized units and 0.5 professional/patient in ICU for adults and children. Corroborating these findings an investigation into university,tertiary and large hospital show the proportion of 0.6 professionals for each patient in the ICU; however the proportion of professionals in inpatient and specialized units differs with the amount of 1.3 nursing professionals for each patient.[22] Still, multicenter research conducted in ICUs found the average ratio of 2.45 professionals/patient and reports that the amount of ideal professional helps to ensure quality and safety in the care process[23] as well as overwork, lack of staff, the amount of tasks, heavy workload, and the number of patients with a large number of drugs are recognized as a risk factor.[20]

The main cause of the error showed by the notifiers nurses was the "inattention" (57.7%) in an exploratory *Survey* which analyzed medication errors at a university hospital also points out the "inattention" (27.6%) as the main cause of medication errors.[24] It is observed that there is a predominance to point out individuals instead of system failures.[20] It can be affirmed that the lack of a tool for error mapping and the structure of the form have directed the investigation of the error cause to the person and not stratified to the characteristics of the work process. This proposition is confirmed, therefore in this study the notifiers mistakenly recorded heavy workload as a personal factor, and not a process factor. This is a global reality since most of the institutions assign error guilt exclusively to the individual, regardless of the systemic and structural causes and the existing weaknesses in the medication system.[25-26]

After the error occurrence it is important that any action is taken, however not punitive, because it can lead to under-notification and not to solve the problem.[27] A study that questioned the nursing staff of a hospital in São Paulo about the actions that nurses take after the occurrence of medication error shows that 63.9% of professionals have witnessed any conduct after the error. Among these actions, 66% were punishments ranging from mild to severe[28] differing from this study in which no punitive action has been notified.

The medication error recurrence was observed (18.9%) and to these problems exists limitations that need to be considered. On a global level the issue is controversial and there is a large under-reporting of data. It is believed that this is also the reality of this institution because it realized the lack of systematization in the notification of errors.

CONCLUSION

This study analyzed the medication error since its occurrence, type, cause, and conduct, presenting an overview of this indicator as a tool for management decision-making for a safer practice. There is a tendency to relate the error to the person. Another important question is about the action that should be taken after the occurrence. A preventive work, based on educational measures should be done to obtain a more proactive attitude in developing actions to prevent the error.

The notification is still a challenge for this type of error because the punitive culture is still in force and professionals end up having a fear of reprisals. Managers should encourage educational culture so the notification leads to preventive, effective and directed measures as well as a systematic error notification process, so there is no loss of data compromise. We suggest a reevaluation of the instrument used by nurses to notify the error with greater emphasis on work process. Furthermore it is favorable to use tool for error mapping and implantation of barriers to prevent this.

REFERENCES

1. Lasseter JH, Warnick ML. Medical errors, drug- related problems and medication errors: a literature review on quality of care and costs issues. J Nurs Care Qual [Internet]. 2003 July/Sept [cited 2013 Jun 04];18(3):175-81. Available from: http://www.ncbi.nlm.nih.gov/pubmed/12856901

2. Rosa MB, Perini E, Anacleto TA, Neiva HM, Bogutchi T. Erros na prescrição hospitalar de medicamentos potencialmente perigosos. Rev Saúde Pública [Internet]. 2009 Apr [cited 2013 June 08];43(3):490-8. Available from: http://www.scielo.br/pdf/rsp/v43n3/7265.pdf

3. Cassiani SHB, Monzani AAS, Silva AEBC, Fakih FT, Opitz SP, Teixeira TCA. Identificación y análisis de los errores de medicación en seis hospitals brasileños. Cienc Enferm [Internet]. 2010 [cited 2013 June 08];16(1):85-95. Available from:

4. http://www.scielo.cl/pdf/cienf/v16n1/art_10.pdf

5. Belela ASC, Peterlini MAS, Pedreira MLG. Erros de medicação: definições e estratégias de prevenção. São Paulo: COREN; 2011.

6. Pelliciotti JSS, Kimura M. Erros de medicação qualidade de vida relacionada à saúde de profissionais de enfermagem em unidades de terapia intensiva. Rev Latino-am Enferm [Internet]. 2010 Nov/Dec [cited 2013 June 12];18(6):1062-9. Available from: http://www.scielo.br/pdf/rlae/v18n6/pt_04.pdf

7. Pedreira MLG, Peterlini MAS, Harada MJCS. Tecnologia da informação e prevenção de erros de medicação em pediatria: prescrição informatizada, código de barras e bombas de infusão inteligente. Rev Soc Bras Enferm Ped [Internet]. 2005 Jul [cited 2013 June 15];5(1):55-61. Available from: http://www.sobep.org.br/revista/images/stories/pdf-revista/vol5-n1/v.5_n.1-art7.revi-tecnologia-da-informacao-e-prevencao-de-erro.pdf

8. Cassiani SHB. A segurança do paciente e o paradoxo no uso de medicamentos. Rev Bras Enferm [Internet]. 2005 Jan/Feb [cited 2013 June 04];58(1):95-9. Available from: http://www.scielo.br/pdf/reben/v58n1/a19.pdf

9. Ucha-Samartin M, Pichel-Loureiro A, Vázquez-López C, Payero MA, Parente DP, Castro NML. Impacto económico de la resolución de problemas relacionados con medicamentos en un servicio de urgencia. Farmacia Hospitalaria [Internet]. 2013 Jan/Feb [cited July 01];37(1):59-64. Available from: http://scielo.isciii.es/pdf/fh/v37n1/09original08.pdf

10. Ranchon F, Salles G, Späth HM, Schwiertz V, Vantard N, Parat S, Broussais F, You B, Tartas S, Souquet PJ, Dussart C, Falandry C, Henin E, Feyer G, Rioufol C. Chemotherapeutic errors in hospitalised cancer patients: attributable damage and extra costs. BMC Cancer [Internet]. 2011 Nov [cited 2013 July 15];11:478. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3262863/

11. Carvalho VT, Cassiani SHB. Erros na medicação e consequências para profissionais de enfermagem e clientes: um estudo exploratório. Rev Latino-am Enferm [Internet]. 2002 July/Aug [cited 2013 Jun 29];10(4):523-9.Available from: http://www.scielo.br/pdf/rlae/v10n4/13364.pdf

12. Toffoletto MC, Padilha KG. Consequências de medicações em unidades de terapia intensiva e semi-intensiva. Rev Esc Enferm USP [Internet]. 2006 Jun [cited 2013 July 02];40(2):247-52. Available from: http://www.scielo.br/pdf/reeusp/v40n2/12.pdf

13. Vituri DW, Mitsuda LM. Validação de conteúdos de indicadores de qualidade para avaliação do cuidado de enfermagem. Rev Esc

Enferm USP [Internet]. 2009 [cited 2013 July 02];43(2):429-37. Available from: http://www.scielo.br/pdf/reeusp/v43n2/a24v43n2.pdf

14. Compromisso com a Qualidade Hospitalar (CQH). Manual de indicadores de enfermagem NAGEH. 2ª ed. São Paulo: APM/CREMESP [Internet]; 2012. Available from: http://www.cqh.org.br/portal/pag/doc.php?p_ndoc=125

15. Bohomol E, Ramos LH. Erros de medicação: importância da notificação no gerenciamento da segurança do paciente. Rev Bras Enferm [Internet]. 2007 Jan/Feb [cited 2013 Jun 28];60(16):32-6. Available from: http://www.scielo.br/pdf/reben/v60n1/a06v60n1.pdf

16. Teixeira TCA, Cassiani SHB. Análise da causa raiz: avaliação de erros de medicação em um hospital universitário. Rev Esc Enferm USP [Internet]. 2010 Mar [cited 2013 June 12];44(1):139-46. Available from: http://www.scielo.br/pdf/reeusp/v44n1/a20v44n1.pdf

17. Yamamoto MS, Peterlini MAS, Bohomol E. Notificação espontânea de erro de medicação em hospital universitário pediátrico. Acta Paul Enferm [Internet]. 2011 [cited 2014 Jan 22];24(6):766-71.Available from: http://www.scielo.br/pdf/ape/v24n6/a06v24n6.pdf

18. Coimbra JAH. Prevenção e detecção de erros de medicação. Ciênc Cuid Saúde [Internet]. 2006 [cited Jan 25];5(Supl):142-8. Available from: http://periodicos.uem.br/ojs/index.php/CiencCuidSaude/article/view/5181/3352

19. Paranaguá TTB, Bezerra ALQ, Santos ALM, Silva AEBC. Prevalência e fatores associados aos incidentes relacionados à medicação em pacientes cirúrgicos. Rev Esc Enferm USP [Internet]. 2014 [cited 2014 Jan 25];48(1):41-8. Available from: http://www.scielo.br/pdf/reeusp/v48n1/pt_0080-6234-reeusp-48-01-41.pdf

20. Belela ASC, Peterlini MAS, Pedreira MLG. Erros de medicação em pediatria. Rev Bras Enferm [Internet]. 2011 Mai/Jun [cited 2014 Jan 22];64(3):563-69. Available from: http://www.scielo.br/pdf/reben/v64n3/v64n3a22.pdf

21. Miasso AI, Grou CR, Cassiani SHDB, Silva AEBC, Fakih FT. Erros de medicação: tipos, fatores causais e providências tomadas em quatro hospitais brasileiros. Rev Esc Enferm USP [Internet]. 2006 Dec [cited 2014 Feb 02];40(4):524-32. Available from: http://www.scielo.br/pdf/reeusp/v40n4/v40n4a10.pdf

22. Silva LD, Camerini FG. Análise da administração de medicamentos intravenosos em hospital da rede sentinela. Texto & Contexto Enferm [Internet]. 2012 Jul/Sep [cited 2014 feb 05];21(3):633-41. Available from: http://www.scielo.br/pdf/tce/v21n3/v21n3a19.pdf

23. Matsushita MS, Adami NP, Carmagnani MIS. Dimensionamento do pessoal de enfermagem das unidades de internação do Hospital São Paulo. Acta Paul Enferm [internet]. 2005 [cited 2014 feb 20];18(1):9-19. Available from: http://www.scielo.br/pdf/ape/v18n1/a02v18n1.pdf

24. Perroca MG, Jericó MC, Calil ASG. Composição da equipe de enfermagem em unidades de terapia intensiva. Acta Paul Enferm [Internet]. 2011 [cited 2014 Feb 20];24(2):199-205. Available from: http://www.scielo.br/pdf/ape/v24n2/07.pdf

25. Silva AEBC, Cassiani SHB. Erros de medicação em hospital universitário: tipos, causas, sugestões e providências. Rev Bras Enferm [Internet]. 2004 Nov/Dec [cited 2014 Feb 14];57(6):671-4. Available from: http://www.scielo.br/pdf/reben/v57n6/a07.pdf

26. Melo ABR, Silva LD. Segurança na terapia medicamentosa: uma revisão bibliográfica. Esc Anna Nery Rev Enferm [Internet]. 2008 mar [cited 2014 feb 12];12(1):166-72. Available from: http://www.eean.ufrj.br/revista_enf/20081/28ARTIGO24.pdf

27. Telles Filho PCP, Pereira Júnior AC, Veloso IR. Identificação e análise de erros na administração de medicamentos em uma unidade pediátrica hospitalar. Rev enferm UFPE on line [internet]. 2014 Apr [cited 2014 Oct 02];8(4):943-50. Available from: www.revista.ufpe.br/revistaenfermagem/index.php/revista/.../10165

28. Praxedes MFS, Telles Filho, PCP. Erros e ações praticadas pela instituição hospitalar no preparo e administração de medicamentos. REME Rev Min Enferm [Internet]. 2011 Jul/Sep [cited 2014 jul 02];15(3):406-11. Available from: http://www.reme.org.br/artigo/detalhes/52

29. Silva BK, Silva JS, Gobbo AFF, Miasso AI. Erros de medicação: condutas e propostas de prevenção na perspectiva da equipe de enfermagem. Rev Eletrônica Enferm [Internet]. 2007 Sep/Dec [cited 2014 June 22];9(3):712-23. Available from: https://www.fen.ufg.br/fen_revista/v9/n3/pdf/v9n3a11.pdf

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