



The nurse in the management of materials in teaching hospitals*

O enfermeiro no gerenciamento de materiais em hospitais de ensino
El enfermero en la gestión de materiales en hospitales de enseñanza

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ABSTRACT

Objective: To present the nurse's integration within materials management of six teaching hospitals of Paraná – Brazil, and to describe the activities performed by nurses within this process. **Method:** A study of a qualitative approach and descriptive nature, conducted in teaching hospitals in Paraná, between June and August of 2013. The data collection was conducted through semi-structured interviews with eight nurses who worked in materials management; data were analyzed using content analysis. **Results:** These showed that nurses perform ten categories of activities, distributed into four of the five steps of the materials management process. **Conclusion:** The nurse, in performing of these activities, in addition to favoring the development of participative management, contributes to the organization, planning, and the standardization of the hospital supply process, giving greater credibility to the work with professionals who use the materials, and to the suppliers.

DESCRIPTORS

Nursing; Material Resources in Health; Materials Management, Hospital; Hospitals, Teaching.

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INTRODUCTION

The number of teaching hospitals (TH) in Brazil is increasing. In 2013, 134 institutions distributed throughout the national territory were certified, with 80 public, 47 philanthropic, and seven private institutions. São Paulo is the state with the highest number of this type of organization, with 42 hospitals; whereas the state of Paraná is ranked fourth, with 14 certified hospitals. Correlating with the Unified Health System - UHS (*Sistema Único de Saúde-SUS*), these hospitals comprise 10% of the beds licensed to the network which, in turn, involve 12% of hospital admissions, 11% of the outpatient care, 25% of the intensive care unit beds, and 37% of the highly complex procedures⁽¹⁻²⁾.

These institutions have a commitment, in addition to providing health care to the population, to educate and permanently develop human resources in the health area, to develop research activities, and increase scientific and technological evaluation. Additionally, there is a search for improvements in the field of management, with practices that contribute to the maintenance of financial balance of the institutions⁽³⁻⁴⁾.

Concerning the management of TH and their financial equilibrium, one study suggests that the high technological advances observed in this context are one of the enhanced factors of care, and increase the need for funding⁽⁵⁾. The World Bank declared in a report that the UHS consumes 20% of the amount invested in expenditure on materials needed for patient care⁽⁶⁾. It is estimated that the amount invested in health within the USA is 50% higher than in other nations, and still growing; however, regulatory agencies of that country did not find any evidence that its health care is the best⁽⁷⁾.

In contradiction to the increased spending, paying and financing sources, such as the UHS, push health institutions to adjust their work processes and management by raising efficiency standards in the use of resources⁽⁸⁾. The reaffirmation of the commitment of the good use of public money, and improvement in care delivery to the population, are understood as representing an imminent change of management perspective, aimed at optimizing invested resources. In this context, the commitment of TH is emphasized, with the training of health professionals who are aware of and able to make rational use of financial resources.

One of the strategies adopted to improve materials management (MM) processes is the approximation of consumer sectors with that of management and purchasing, through active techniques and advisory committees composed of different professionals. Those in possession of technical knowledge contribute to decision making related to the adoption, discontinuity and requirements of quality for materials in use⁽⁹⁾.

Compounding the consumer sector, the nurse, due to his role in coordinating care units, is responsible for predicting actions, the provision and control of resources used by the team, as well as being a provider of direct patient care and intermediate consumer of materials. He has accumulated technical and practical knowledge about inputs, allowing

the nurse to judge functionality, quality and indispensability of items applied in health care⁽¹⁰⁻¹¹⁾.

The specificity and diversity of activities enables him to occupy spaces in various management processes, such as materials management⁽¹²⁾.

So, considering this perspective of nursing practice, the relevance of his involvement in decision-making processes, his impact on the technical and administrative dimensions inherent to the processes of care management, the guiding question of this study was: *How should nursing actions be designed within materials management in TH of Paraná?* Therefore, the study had the objective of presenting the context of the nurse's integration into materials management, and to describe the activities developed by him within this process.

METHOD

This was a qualitative, descriptive study developed in TH of Paraná during the period from June to August of 2013. The population studied was composed of eight nurses working in materials management within six teaching hospitals of Paraná.

In August of 2012, the National Register of Health Establishments was consulted to identify likely scenarios to search for a sample population, and it was realized that the Paraná had twelve hospitals with TH certification⁽¹⁾. The inclusion criteria in the research applied to these hospitals - having professional nurses performing in materials management - which culminated in the exclusion of four hospitals: three had no nurse performing that activity, and one hospital, in which the only nurse was the actual researcher of this study. There was also two hospitals sharing the same professional for such a function, therefore leaving eight hospitals in which we could consult with nurses about their desire to participate.

In these eight hospitals the existence of a population of ten nurses working at MM was found, to which, in turn, the exclusion criteria for participation in the study was applied: being absent from work for any reason (holidays, special leave, medical leave, etc.) during the data collection period. At this stage, one nurse was excluded and two refused to participate in the survey, which led to the removal of the hospitals in which they were employed. Finally, the study population was composed of eight nurses and six TH.

The research was conducted in accordance with Resolution 466/12 - MS⁽¹³⁾, submitted to the Research Ethics Committee (REC) of the Federal University of Paraná - (Universidade Federal do Paraná - UFPR), and approved on February 13, 2013, according to CAAE with Protocol 09281912.4.0000.0102.

Data collection, by recorded audio interviews, included an guiding instrument composed of identification data, professional education (degree, graduation time, time working in materials management, previous professional activities), as well as open-ended questions. The transcribing of the statement was submitted to thematic content analysis in the form of boxes⁽¹⁴⁾. The boxes, or pre-categories, were guided by the flow of the materials management resources activities framework, which consists of the division of this process and its

activities into five stages: 1 - Programming; 2 - Purchasing; 3 - Receiving; 4 - Storing; 5 - Distributing and Control⁽¹⁵⁾.

RESULTS

Participants were seven female nurses and a male nurse with a mean age of 47 years, 21 years post-graduation, and with three years and seven months of experience in MM. Regarding qualification, four were certified/specialists without a graduate degree, one had a graduate degree, and three did not report any expertise. The reported professional experiences prior to MM were mainly in critical care units, such

as an intensive care unit, operating room, emergency room, and central sterilization departments.

Data analysis enabled the delineation of the activities performed by nurses in MM, with the extraction of ten subcategories or groups of activities, from which eight were classified into four steps (1 - Programming, 2 - Purchasing; 4 - Storing; 5 - Distributing and Control), while the Receiving stage did not had any recorded activity. Moreover, the existence of two different activities not included within any of the steps was verified; these were considered to be emerging categories.

Chart 1 - Steps of materials management flow and activities performed by the materials management nurse - Curitiba, Brazil, in June 2013 August 2013

	Activity group	Registration unit	Extracts of the statements
1. Programming	Dimensioning of material resources	In functioning units	<i>Let's go, unit by unit, to see what is missing daily, with the manager and the nurses (MM5).</i>
		For expansion and opening of new units	<i>There is a lack of concern on these projects; the impact that this is going to have for managing materials, for really providing what will be necessary (MM6).</i>
	Database management of products	Review of registrations	<i>Whether it is a catheter, equipment, everything comes here, so it makes it into the record, and from here we forward it, or send it to the warehouse or to the pharmacy (MM5).</i>
		Registration of new items	<i>We try to describe it in a way that it covers all suppliers, manufacturers, etc. We always request, when we are procuring, that we are provided the maximum amount of possible things about it; so that you have a good description to buy well; the richer the description, the better will be the product purchased (MM4).</i>
		Description of product specifications	
	Participation in committees related to MM		<i>Reprocessing materials is directly related to the prediction of purchase; the standardization of materials is closely linked to the planning and purchase of materials, and the approval of their quality (MM4).</i>
	Routine standardization for product evaluation		<i>We have here a protocol of some tests; we do it before sending to the user who will give the technical opinions (MM8). In order to have at least one script after evaluation (MM5).</i>
Development of terms of reference		<i>It will guide what should be included in the public notice (...) there are several materials requiring attention at the moment that have terms, in order to have a special clause. This is usually the point at which we interfere the most (MM4). In this public notice, we have a protocol, where we put the quantity of material that comes for sample, to which sectors these materials or equipment will be allocated (MM5).</i>	
2. Purchasing	Product evaluation	In biddings and for the prequalification of products	<i>We worked with the two modes of evaluation, both the sample that is on the trading session, during the bidding, and now we are working with the pre-qualification of materials (MM5). We do the analysis of that sample to see if all is right with respect to documentation, labeling, registration at Anvisa, etc. (MM4). Before releasing a final report, we analyze it, the team discusses some things that generated doubts, then we give the opinion (MM8).</i>
		In partnership with users on care units	
4. Storing	Guidance for the storage of products		<i>With regard to storage, we guide the warehouse personnel (MM8).</i>
5. Distributing and Control	Technovigilance	Receipt and technical analysis of complaint	<i>I also work with the part of technovigilance, then the notifications come to our service (MM6).</i>
		Containing and resolving the technical complaints	<i>If it is a punctual grievance, inside a sample and does not compromise the batch, we do not change the batch; if it compromises it, if it is a serious grievance, we ask for exchange of the batch or we cancel the installment plan of that supplier (MM8).</i>
		Notification in NOTIVISA	<i>Technovigilance is also very important because it supports us at the time we complete the technical report (MM4).</i>
		Parameter of supplier selection	

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	Activity group	Registration unit	Extracts of the statements
Emergent categories	Development of projects to raise government funds		<i>And you have a budget value for the project, amendment, all these resources that we are expecting. Then everyone comes here to us to develop these projects (MM5).</i>
	Continuing education of staff		<i>Then, we have tried to work with residents, (...) to say what is our service; that we always have students, new residents, employees that sometimes do sector rotation; we try to make them aware of their importance so they have appropriate materials to perform the activities, and to provide security for both the patient and the employee (MM6).</i>

DISCUSSION

The statements demonstrate the performance of the MM nurse in four stages of the MM flow in TH: programming, purchasing, storing, distributing and control. Their participation in the material receiving phase was not referred to.

In the programming step, the work begins with the *estimate of material resources*, exercised as a way of control and orientation of the allocation of inputs in the units, whether they are functioning, in expansion, or about to be opened. For this purpose, data such as an historical item of consumption and volume of the services performed are used, as well as the normative and health resolutions issued by regulatory agencies.

The resource forecast, an ordinary activity in the daily life of nurses, is intended to ensure appropriate conditions for the performance of patient care⁽¹⁶⁾. Adopting a distributive practice based only on consumption experience can initiate a cumulative and harmful cycle to MM, composed of excessive requests, followed by partially met requisitions, and an increase of orders in an attempt to take into account the necessary service⁽¹⁷⁾.

Currently, several tools and technological resources for the control and distribution of supplies are available. By analyzing one of these technologies it was found that the economy of hours of nursing work, previously dedicated to the activities of the MM units, was the main benefit achieved, saving about 78,521 hours of work, an average of 7.5 minutes / day / member of the nursing staff / shift. In addition, there was a reduction of cost of approximately \$ 109,453, with the lack of materials expired in inventories⁽⁶⁾.

In addition to data based on the consumer experience, the concern in meeting health standards as a means to guide and support the resource forecasting activity became apparent. Lack of clarity in the reports on which resources and management tools were used in this activity, instigating the development of other studies on this perspective.

Activities related to the *management of the product database* (records review, preparing new records and descriptions of products) are reported as developed and focused on the MM nurse. These kind of practices are foreseen in the manual published by the National Health Surveillance Agency (Agência Nacional de Vigilância Sanitária - ANVISA)⁽⁹⁾. However, different from what was observed in this study, such tasks are considered to be the responsibility of the Materials Standardization Committee. Given this, it appears that the transfer of those to MM nurses has the aim of optimizing the time available for the committee's work,

since the nurse already performs the tasks of description and inclusion of new items into the catalog.

It is understood that the development of the description by the MM nurses is advantageous when it allow the following of two requirements: the approach of more functional and qualitative aspects of the products in the descriptions, and the approximation of the purchasing area to the area in which the material will be used. According to authors, more detailed, clear and appropriate descriptions about the purpose of use are crucial for improving the purchasing processes^(9,18). Incomplete specifications also may be found right in the gap between those who buy and those who use, as each one has its own understandings, with the construction of different understandings of the same material⁽¹⁹⁾.

This approach, between administrative and care areas, is also perceived in other activities of the programming step: *the participation of nurses in committees related to MM*. These committees are composed of professionals from technical and administrative areas that trigger the purchasing process and use the materials, respectively. These can be considered important environments of debate on issues such as standardization of materials, waste management, reprocessing of products, among others, and contribute to the organization of work⁽¹⁶⁾. It is believed that this integration allows the MM professionals to position themselves, exposing, acquiring and developing their knowledge, which assists and supports the development of work.

The activity of *standardization of routines of evaluation* is reported by the participants, and intended to guide product analysis in the purchasing process. First, by the compliance of minimum requirements of the product description, and second, by listing key points related to the functionality and efficiency, so that technical the staff can deliver a substantial opinion on the item.

As with other activities in MM, there is little recorded literature concerning the standardization of routines of evaluation. However, it has been observed that for the public nature of hospitals regulated by Bidding Law 8.666 / 93, it is instructed that the public notice should include clear judgment criteria and objective parameters for the object under bid⁽²⁰⁾. And Decree 5,450 / 2005, which specifically addresses the trading modality, dictates that the judgment of proposals should be conducted in accordance with the required technical specifications, quality and performance requirements recommended in public notice⁽²¹⁾. It is understandable, then, that this activity gives credibility to the MM process and its professionals coordinators, because standardizing the activity of evaluation and the treatment

of products of different brands reduces the chance of possible bias and objections of manufacturers and / or suppliers.

All the work performed according to the research participants in the programming step can be visualized in the summary form in the *preparation of terms of reference*. In this document the MM nurse provides an explicit technical description of the product, evaluation methods, special clauses on supply and, through it, subsidizes the preparation of the bidding documents. The action is supported by Decree No. 5450 / 05, which also states that such a document should be drawn up by the sectors requesting the products⁽²¹⁾. It is perceived that this as a unique moment for the MM nurse in a public TH, as it allows him/her to express needs and concerns of the product users, which contributes to the acquisition of items that provide patients and professionals with relevant, quality, safe products at the best price.

After reaching the purchasing step, the attention of the MM nurse turns toward *evaluating the products*, an activity that was performed in all of the institutions surveyed, in partnership with the users of products. In its exercise, information from the programming step (product database, terms of reference) and the distributing and control step (adverse events, quality deviations) are solicited. In recognition of this convergence of information from different stages of MM, its influence in the construction of opinions and therefore in decision making for purchase of products, the need of the MM nurse to integrate the other stages of the process is highlight.

Regarding the partnership with users of products, It is claimed that compromising the professional with critical screening and responsible of inputs used by him, seeing its effect on health of the patient, is always a good measure for achieving quality of service⁽²²⁾, and that nursing professionals are conscious of this responsibility at MM, requiring only a greater awareness, so that they are integrated into the process and promote changes⁽²³⁾. It is believed that this integration consent, with the exposure of knowledge and opinion of other professionals, assists them in the actual needs, but mostly leads to the accomplishment of successful purchases. Also, it is believed that it strengthens the process of management, and the MM nurse functions as a link between care and administrative authorities of the TH.

The role of a nurse in the storing step, observed in only one of the TH, is committed to the continuing education of the warehouse team for proper storage of materials. Considering that maintaining the viability of the items until they are distributed to the units is directly related to storage conditions (temperature, humidity, ventilation) and optimized *layout*⁽¹⁷⁾. Therefore, it is important that the remaining MM nurses also perform such guidelines, and promote the extension to other sectors that store smaterials.

In the last step of the MM flow, distributing and control, the nurse's activities focus on the surveillance of the post-purchase product, or technovigilance, and correspond to the receipt of technical complaint and analysis, containment measures and resolving complaints, inputting of the product into the Notification System on Sanitary Surveillance (Sistema de Notificações em Vigilância Sanitária -

NOTIVISA), and use of technovigilance information for of selection of suppliers and quality control of products.

At this moment, receiving of notifications appears as an indicator of quality, which can measure the quality of the products acquired and the level of security to which patients and professionals are exposed⁽²⁴⁾. At this time, the importance not only of receiving the notifications, but mostly ther analysis is noteworthy, which in turn, before implying the culpability of those involved, should encourage the improvement of processes and the prevention of similar events⁽²⁵⁾.

Nurses in MM state that after receiving the complaints, investigations are triggered and, depending on the results, referrals for resolution and limitation of problems are undertaken. Examples include staff training, retention and request of product batch exchange, complaint or adverse event notification to the NOTIVISA, company notification and, if necessary, exchange of supplier, which may also imply an administrative process for compensation of losses to the institution.

Notifications of products with quality deviation to the NOTIVISA, and its consequences, discourages the adoption of opportunistic behavior by suppliers, reducing the number of unsuccessful acquisitions and their risks, improving purchasing processes⁽²⁶⁾. Added to this, the notification allows Risk Management (HRM) personnel of the hospital and the ANVISA / technovigilance to monitor problems related to the use of materials and equipment for the health in the country, and to review its regulatory and surveillance actions⁽²⁷⁾.

According to the *Food and Drug Administration* (FDA)⁽²⁸⁾ advances in post-marketing surveillance products could be even greater if organizations were better able to recognize and report events, as well as to obtain the feedback of support reporting and feedback after each notification. This is because much of the data received by the agency does not allow a full understanding of the problems associated with an adverse event, or what precautions the agency should take for public protection.⁽²⁸⁾

Accordingly, the statements of the nurses point to the development of *continuing education of the staff* as an inherent activity for MM of TH, and it is an indispensable tool in the implementation of the evaluation routines, preparation of users / evaluators for the tests; use, quality control and rational use of products already acquired; in addition to development of new professionals for MM activities.

Study shows that 46% of nurses consider training focused on MM to be very important, but 86% of them reported never having participated in such training⁽²⁹⁾. Professionals of TH the state of São Paulo pointed to the continuing education of staff as a strategy to combat and minimize waste materials, reducing costs⁽³⁰⁾. Given this, it is believed that continuing education should be a daily and intensive practice of the MM nurse, as a way to disseminate knowledge and recognition of the professional activity.

Finally we found out the participation of MM nurses in *developing projects for raising funds*, an activity related to the

strategic planning of a public organization, directly influences the MM programming step. For its implementation, the nurse must identify the needs of the general hospital, estimated as medium and long-term, use his/her knowledge regarding specific standards for the operation of services, the clientele profile, and goals of care to be achieved with the investment required, as well as to provide the process with technical and legal justifications that support the application for releasing costs.

To be included in this action, nurses are recognized as consumer of materials, who have knowledge about them, and are able to debate and consider the best choice in acquisition procedures and strategic planning for MM.

CONCLUSION

This research enabled the recognition of the nursing work in MM areas of TH of Paraná, understanding that the integration of nurses occurs in almost all stages of the process. It is believed that this results from the nurse's capacity

for administrative activities combined with the knowledge derived from the care activities, and allows him/her to act in favor of optimization of available resources, to evaluate and consider the choice of materials that suit the needs of patients and professionals, and which provide safe care.

It is noticed that for the performance of the function, the MM nurse acquires other knowledge, such as the normative regulation of health products and services and legislation that supports the bidding process in public hospitals, favoring interdisciplinarity and enriching his/her practice.

Despite the limitations resulting from the methodology, as a result of the small number of professionals in the sample, this research contributes to the understanding of the nurse's role in the management processes, which, in addition to promoting the building of a more participatory management, contributes to the organization, planning and systematization of supply process of the TH of Paraná, providing greater credibility to the work with suppliers and professionals who use the materials.

RESUMO

Objetivo: Apresentar o contexto de inserção do enfermeiro no gerenciamento de materiais de seis hospitais de ensino do Paraná - Brasil e descrever as atividades por ele desenvolvidas neste processo. **Método:** Estudo de abordagem qualitativa e natureza descritiva desenvolvido em hospitais de ensino do Paraná, no período de junho e agosto de 2013. A coleta foi realizada por meio de entrevista semiestruturada a oito enfermeiros atuantes no gerenciamento de materiais e os dados foram analisados pela técnica de análise de conteúdo. **Resultados:** Mostraram que o enfermeiro desempenha dez categorias de atividades, distribuídas em quatro das cinco etapas do processo do gerenciamento de materiais. **Conclusão:** O enfermeiro no desempenho destas atividades, além de favorecer a construção de gerenciamento participativo, contribui para a organização, o planejamento, e a sistematização do processo de abastecimento dos hospitais, conferindo maior credibilidade ao trabalho junto aos profissionais que fazem uso dos materiais e fornecedores.

DESCRITORES

Enfermagem; Recursos Materiais em Saúde; Administração de Materiais no Hospital; Hospitais de Ensino.

RESUMEN

Objetivo: Presentar el marco de inserción del enfermero en la gestión de materiales de seis hospitales de enseñanza de Paraná - Brasil y describir las actividades por él desarrolladas en ese proceso. **Método:** Estudio de abordaje cualitativo y naturaleza descriptiva desarrollado en hospitales de enseñanza de Paraná, en el período de junio y agosto de 2013. La recogida se llevó a cabo mediante entrevista semiestructurada a ocho enfermeros actuantes en la gestión de materiales y los datos fueron analizados por la técnica de análisis de contenido. **Resultados:** Mostraron que el enfermero desempeña diez categorías de actividades, distribuidas en cuatro de las cinco etapas del proceso de gestión de materiales. **Conclusión:** El enfermero en el desempeño de esas actividades, además de favorecer la construcción de gestión participativa, contribuye con la organización, planificación y sistematización del proceso de suministro de los hospitales, brindando mayor credibilidad al trabajo junto con los profesionales que utilizan los materiales y los proveedores.

DESCRIPTORES

Enfermería; Recursos Materiales en Salud; Administración de Materiales de Hospital; Hospitales Escuela.

REFERENCES

1. Brasil. Ministério da Saúde, Secretaria de Atenção à Saúde. Cadastro Nacional de Estabelecimentos de Saúde. Indicadores de Hospitais de Ensino - Paraná [Internet]. Brasília; 2012 [citado 2012 out. 15]. Disponível em: <http://goo.gl/Qsf1q6>
2. Machado SP, Kuchenbecker R. Desafios e perspectivas futuras dos hospitais universitários no Brasil. Ciênc Saúde Coletiva [Internet]. 2007 [citado 2013 out. 15];12(4):871-7. Disponível em: <http://www.scielo.br/pdf/csc/v12n4/06.pdf>
3. Brasil. Ministério da Educação; Ministério da Saúde. Portaria Interministerial n. 1.000, de 15 de abril de 2004. Estabelece critérios para a certificação e o reconhecimento dos Hospitais de Ensino [Internet]. Brasília; 2004 [citado 2012 out. 24]. Disponível em: <http://www.brasilsus.com.br/legislacoes/inter-ministerial/14257-1000.html>
4. Brasil. Ministério da Educação; Ministério da Saúde. Portaria Interministerial n. 1.006, de 31 de maio de 2004. Cria o programa de reestruturação dos hospitais de ensino do Ministério da Educação no Sistema Único de Saúde - SUS [Internet]. Brasília; 2004 [citado 2015 maio 16]. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2004/anexo/anexo_pri1006_27_05_2004.pdf
5. Dallora MELV, Forster AC. A importância da gestão de custos em hospitais de ensino – considerações teóricas. Medicina (Ribeirão Preto). 2008;41(2):135-42.

6. Banco Mundial. Unidade de Gerenciamento do Brasil. Governança no Sistema Único de Saúde (SUS) do Brasil: melhorando a qualidade do gasto público e a gestão de recursos. Relatório n. 36601-BR [Internet]. Brasília; 2007 [citado 2012 ago. 16]. Disponível em: <http://sitere-sources.worldbank.org/BRAZILINPOREXTN/Resources/3817166-1185895645304/4044168-1186326902607/19GovernancaSUSport.pdf>
7. Bendavid Y, Boeck H, Philippe R. Redesigning the replenishment process of medical supplies in hospitals with RFID. *Bus Process Manag J* [Internet] 2010 [cited 2014 May 05]. Available from: <http://www.emeraldinsight.com/journals.htm?articleid=1891625>
8. Jericó MC, Castilho V. Cost management: the implementation of the Activity-Based Costing method in sterile processing department. *Rev Esc Enferm USP* [Internet]. 2010 [cited 2013 May 28];44(3):745-52. Available from: http://www.scielo.br/pdf/reeusp/v44n3/en_28.pdf
9. Brasil. Ministério da Saúde; Agência Nacional de Vigilância Sanitária, Unidade de Tecnovigilância. Pré-qualificação de artigos médico-hospitalares: estratégia de vigilância sanitária de prevenção. Brasília: ANVISA; 2010.
10. Hausmann M, Peduzzi M. Articulação entre as dimensões gerencial e assistencial do processo de trabalho do enfermeiro. *Texto Contexto Enferm*. 2009;18(2):258-65.
11. Chaves LDP, Camelo SHH, Laus AM. Mobilizing competences for nursing care management. *Rev Eletr Enferm* [Internet]. 2011 [cited 2012 July 25];13(4):594-6. Available from: <http://www.fen.ufg.br/revista/v13/n4/pdf/v13n4a01-en.pdf>
12. Brito MJM, Spagnol CA, Haueisen Martin S, Alves M.A enfermeira no contexto das práticas de gestão: desafios e perspectivas em um hospital de Belo Horizonte, Minas Gerais, Brasil. *EG Enferm Mundial* [Internet]. 2005 [citado 2012 out. 12];4(2):1-14. Disponível em: <http://revistas.um.es/eglobal/article/view/477>
13. Brasil. Ministério da Saúde; Conselho Nacional de Saúde. Resolução n. 466, de 12 de dezembro de 2012. Dispõe as diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos [Internet]. Brasília; 2012 [citado 2013 jan. 12]. Disponível em: <http://conselho.saude.gov.br/resolucoes/2012/Reso466.pdf>
14. Bardin L. A análise de conteúdo. Lisboa: Edições 70; 2011.
15. Castilho V, Gonçalves VLM. Gerenciamento de recursos materiais. In: Kurcgant P. coordenadora. Gerenciamento em enfermagem. Rio de Janeiro: Guanabara Koogan; 2011. p. 155-67.
16. Oliveira NC, Chaves LDP. Gerenciamento de recursos materiais: o papel da enfermeira de unidade de terapia intensiva. *Rev RENE*. 2009;10(4):19-27.
17. Vecina Neto G, Reinhardt Filho W. Gestão de recursos materiais e de medicamentos [Internet]. São Paulo: Faculdade de Saúde Pública, Universidade de São Paulo; 1998 [citado 2013 ago. 13]. Disponível em: <http://www6.ensp.fiocruz.br/visa/files/Volume12.pdf>
18. Garcia SD, Haddad MCL, Dellaroza MSG, Costa DB, Miranda JM. Gestão de material médico-hospitalar e o processo de trabalho em um hospital público. *Rev Bras Enferm*. 2012;65(2):339-46.
19. Paulus Junior A. Gerenciamento de recursos materiais em unidades de saúde. *Rev Espaço Saúde* [Internet] 2005 [citado 2012 nov. 13];7(1):30-45. Disponível em: <http://www.ccs.uel.br/espacoparasauade/v7n1/Gerenciamento.pdf>
20. Brasil. Lei n. 8.666, de 21 de junho de 1993. Regulamenta o art. 37, inciso XXI, da Constituição Federal, institui normas para licitações e contratos da Administração Pública e dá outras providências [Internet] Brasília; 1993 [citado 2012 nov. 13]. Disponível em: http://www.planalto.gov.br/ccivil_03/leis/L8666cons.htm
21. Brasil. Decreto n. 5.450, de 31 de maio de 2005. Regulamenta o pregão, na forma eletrônica, para aquisição de bens e serviços comuns, e dá outras providências [Internet] Brasília; 2005 [citado 2013 ago. 13]. Disponível em: http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2005/decreto/d5450.htm
22. Infante M, Santos MAB. A organização do abastecimento do hospital público a partir da cadeia produtiva: uma abordagem logística para a área de saúde. *Ciênc Saúde Coletiva* [Internet]. 2007 [citado 2012 jun. 10];12(4):945-54. Disponível em: <http://www.scielo.br/pdf/csc/v12n4/13.pdf>
23. Honório MT, Albuquerque GL. A gestão de materiais em enfermagem. *Ciênc Cuid Saúde* [Internet] 2005 [citado 2012 nov. 13];4(3):259-68. Disponível em: <http://periodicos.uem.br/ojs/index.php/CiencCuidSaude/article/viewFile/5206/3361>
24. Azulino ACO, Costa MHA, Carvalho MN, Moreira AS, Oliveira AF, Pinto ACG, et al. Queixas técnicas realizadas pelos profissionais da saúde, relacionadas aos produtos utilizados em Hospital sentinela de Belém – Pará. *Rev Bras Farm Hosp Serv Saúde* [Internet] 2013 [citado 2014 jul. 10];4(3):13-6. Disponível em: <http://www.sbrafh.org.br/rbfhss/public/artigos/2013040302000442BR.pdf>
25. Harada MJ, Pedreira MLG. O erro humano e sua prevenção In: Brasil. Agência Nacional de Vigilância Sanitária. Assistência segura: uma reflexão teórica aplicada à prática [Internet]. Brasília: ANVISA; 2013 [citado 2014 maio 13]. p. 41-58. Disponível em: <http://www.anvisa.gov.br/hotsite/segurancadopaciente/documentos/junho/Modulo%201%20-%20Assistencia%20Segura.pdf>
26. Cavalcanti ACF, Biancolino CA, Martens CDP. Análise da gestão da qualidade nas aquisições de produtos e serviços de saúde de um hospital público de São Paulo. *RAHIS Rev Adm Hosp Inov Saúde* [Internet]. 2014 [citado 2015 maio 16];11(4):247-65. Disponível em: <http://www.spell.org.br/documentos/download/31918>
27. Kuwabara CCT, Évora YDM, Oliveira MMB. Risk management in technovigilance: construction and Validation of a Medical-Hospital Product Evaluation Instrument. *Rev Latino Am Enfermagem* [Internet] 2010 [cited 2013 June 15];18(5):943-51. Available from: <http://www.scielo.br/pdf/rlae/v18n5/15.pdf>
28. U.S. Food and Drug Administration. Protecting and Promoting Your Health. Initiatives underway to expand postmarketing risk assessment [Internet]. Silver Spring, MD; 2009 [cited 2014 May 17]. Available from: <http://www.fda.gov/Safety/SafetyofSpecificProducts/ucm180552.htm>
29. Grossi MG, Bitar E. A substituição de materiais de consumo na dinâmica de trabalho do enfermeiro em um hospital cardiológico. *RAHIS Rev Adm Hosp Inov Saúde* [Internet]. 2012 [citado 2014 maio 17];8(8):42-51. Disponível em: <http://revistas.face.ufmg.br/index.php/rahis/article/view/1560/987>
30. Castilho V, Castro LC, Couto AT, Maia FOM, Sasaki NY, Nomura FH, et al. Survey of the major sources of waste in the health care units of a teaching hospital. *Rev Esc Enferm USP* [Internet]. 2011 [cited 2014 May 15];45(n.spe):1613-20. Available from: http://www.scielo.br/pdf/reeusp/v45nspe/en_v45nspe12.pdf