Factors that contribute to prolonged length of stay in the hospital environment

Silva, Ana Maria Nunes; Souza, Evany France Dias; Andrade-Barbosa, Thiago Luis; Silva, Carla Silvana Oliveira; Gomes, Ludmila Mourão Xavier

Federal University of Rio de Janeiro State

Journal of Research Fundamental Care Online

UNIRIO PPgEnfBio PPGENF

ISSN 2175-5361

DOI: 10.9789/2175-5361

RESEARCH

Fatores que contribuem para o tempo de internação prolongada no ambiente hospitalar

Factors that contribute to prolonged length of stay in the hospital environment

Factores que contribuyen para el tiempo de internación prolongada en el ambiente hospital

Ana Maria Nunes Silva[1], Evany France Dias Souza[2], Thiago Luis de Andrade Barbosa[3], Carla Silvana de Oliveira e Silva[4], Ludmila Mourão Xavier Gomes[5]

ABSTRACT

Objective: To identify factors to contribute to the increased length of stay in hospital. **Method:** a prospective study with inpatient surgical clinics in male and female of a philanthropic hospital in Montes Claros (MG), throughout the month of November 2011. The study included patients who extrapolated the hospital stay further the number of days allowed by the Unified Health System Data were collected from medical records of hospitalized patients. **Results:** there were several reasons for extrapolated residence. The most frequent were delays or cancellations of surgical procedures, clinical instability, expected stabilization of the clinical picture in patients and antibiotic therapy. **Conclusion:** the factors mentioned contribute to increase the average stay, hospital costs increasing and decreasing the turnover of beds, pointing to the need for complex measures to control these factors. **Descriptors**: Length of stay, Health management, Hospital administration.

RESUMO

Objetivo: Identificar os fatores que contribuem para o aumento do tempo de internação no ambiente hospitalar. **Método:** estudo prospectivo realizado com os pacientes internados nas clínicas cirúrgicas masculina e feminina de um hospital filantrópico de Montes Claros (MG), durante todo o mês de novembro de 2011. Participaram do estudo os pacientes que extrapolaram a permanência hospitalar além do número de dias autorizados pelo Sistema Único de Saúde. Os dados foram provenientes dos prontuários dos pacientes internados. **Resultados:** os motivos de permanência extrapolada foram variados. Os mais frequentes foram atrasos ou cancelamentos de procedimentos cirúrgicos, desestabilização clínica, espera de estabilização do quadro clinico e pacientes em antibioticoterapia. **Conclusão:** os fatores apontados contribuem para incrementar a média permanência, aumentando o custo hospitalar e diminuindo a rotatividade dos leitos, apontando a necessidade de medidas complexas para controle desses fatores. **Descritores**: Tempo de internação, Gestão em saúde, Administração hospitalar.

RESUMEN

Objetivo: Identificar los factores que contribuyen al aumento del tiempo de internación en el ambiente de los hospitales. **Método:** se realizó un estudio prospectivo en clínicas quirúrgicas de hombres y mujeres de un hospital filantrópico en Montes Claros (MG), durante el mes de noviembre de 2011. El estudio incluyó pacientes que extrapolaron la estadía hospitalaria y el número de días permitidos por el Sistema Unificado de Salud. Los datos se obtuvieron de los registros médicos de los pacientes hospitalizados. **Resultados:** las razones fueron variadas para la estadía extrapolada. Las más frecuentes fueron los atrasos o cancelaciones de los procedimientos quirúrgicos, la inestabilidad clínica, espera de la estabilización del cuadro clínico de los pacientes y la terapia antibiótica. **Conclusión:** los factores mencionados contribuyen para aumentar la media de la estadía, aumentando los costos hospitalarios y disminuyendo la rotación de las camas, que apunta a la necesidad de adoptar medidas complejas para controlar estos factores. **Descriptores:** Tiempo de permanencia, Gestión en salud, Administración hospitalaria.

[1] Nurse. Graduate from Faculdades Santo Agostinho de Montes Claros. [2] Nurse. Graduate from Faculdades Santo Agostinho de Montes Claros. [3] Nurse. Master of the Graduate Program in Health Scienses of Universidade Estadual de Montes Claros - Unimontes. PhD student of Unimontes. [4] Nurse. PhD in Scientes of Universidade Federal de São Paulo. Professor of Department of Nursing at Unimontes. [5] Nurse. Master of the Graduate Program in Health Scienses of Unimontes. PhD student of Universidade Federal de Minas Gerais.

INTRODUCTION

The search for quality in health services is a behavioral approach in favor of better processes and results, a prerequisite for survival in an increasingly competitive market. The construction, validation and indicators use in the health area have spurred many actions to improve assistance, reflecting on the different contexts of practice[1].

The length of hospital stay, commonly used as an indicator of hospital efficiency and substitutionary measure costs, has been seen as an indicator related to the quality of care provided. However, the nature of that relationship remains unclear, because significantly shorter stays than expected may indicate the presence of efforts aimed at reducing costs through premature patients high,i.e, low quality. On the other hand, residence times significantly longer than expected also can be seen as indicative of administrative inefficiency or poor quality of care provided, once the permanence may be necessary as a result of complications resulting from poor care[2].

The factors that generate the extrapolation of average permanence are the most varied, making it necessary that existing resources are used, taking into consideration the criteria of efficiency, efficacy and effectiveness. The quality care and patient safety are goals to be achieved by the professionals and health institutions. However, despite efforts to achieve quality care, free of risks and flaws, coexists with numerous occurrences of adverse medicines events. This fact compromises the effectiveness of care and may worsen the clinical condition of the patient, which can increase the costs to the institutions and society or lead to death[3].

The workload of the multi-professional team can also compromise the assistance practice, increasing the rates of morbidity and mortality of patients, the length of hospitalization and, consequently, the hospital costs. Similarly, an overrated proportion between patient/nursing or overcrowded units impact the quality of services provided, making bigger the risk of adverse events such as patient falls, medication errors and infection related to healthcare[1,4].

Another aspect to be considered in increasing permanence is the profile of the seriousness of the inpatient cases, because it exerts a strong influence on the result of care provided and has been highlighted as an important confounding factor[2].

It is believed that the long permanence can also be partially explained by the necessity of carrying out complementary examinations and specialized during the hospitalization. Improper administration of hospital resources can contribute to increase the permanence, as lack of material and quality hospital staff and, finally, a reason that has increased a lot the average permanence in Brazil is the infamous and undesirable hospital infection[5]. In other words, the infection prolongs the stay of a patient in the hospital at least four days[6]. Surgical site infection has been singled out as one of the most important sites of infection, leading to

an average increase of 60.0% in hospitalization period, in addition to requiring great efforts for its prevention[7].

The high increase in hospital costs due to daily extrapolated is a real problem that exists in several hospitals. When the patient exceeds the daily limit established in the procedures of the Single Health System (SUS), the hospital does not receive the financial compensation equivalent to the extra daily and, when the average stay is high, it means that the patient in the bed is low, situation that can derail the institutions from a financial point of view[5]. Given this, the study aimed to identify the factors that contribute to the increase in the length of stay in a philanthropic hospital of Montes Claros, Minas Gerais.

METHOD

We conducted a prospective study on surgical clinic in male and female wings of a large philanthropic hospital, situated in the North of the State of Minas Gerais. The hospital has 325 beds, 80% of them being intended for attendance at SUS, and conducts about 90 thousand procedures per month. Moreover, it is the first hospital in the region to possess the Full Accredited Hospital Certificate (Accreditation at level 2), title awarded by the National Accreditation Organization (ONA) and Health Ministry (MS)[8].

The study subjects were all inpatients consecutively over a period of 30 days, which extrapolated the hospital stay beyond the authorized number of days by SUS[9]. From the study were excluded patients whose medical records data were incomplete.

The follow-up period of patients happened throughout the month of November 2011. A daily census was used to identify patients with daily extrapolated. For data collection, it was elaborated a form that consists of the following variables: sex, age, diagnosis, number of extrapolated days and reason which led to the prolonged permanence.

For patients who have undergone to more than one surgical procedure and generated more than one hospitalization authorization (AIH), the sum of the fractions of days extrapolated between each procedure were done, in order to obtain the daily total extrapolated these patients. In this case, it was not consider the criterion of bigger length stay. The record of bigger length stay is when the hospitalization period exceeds double the days set out in the average of permanence, considering what is defined in the unified table management system of procedures (SIGTAP) for the main procedure informed on AIH[9].

The records were daily reviewed and the multi-professional team questioned about the reason for the prolonged stay of the patients. The data collection form has been updated for each day of extrapolated stay.

The data were submitted to descriptive statistics with frequency calculation, mean values and standard deviation. For this, we used the *Software Statistical Package for the Social Sciences* 18.0 version.

This research was previously approved by the Ethics in Research Committee with opinion n° 3008/2011, attending the resolution n° 196/96 of the National Health Council of

Silva AMN, Souza EFD, Barbosa TLA et al.   *Fatores que contribuem …*

the Health Ministry. We used the Institutional Agreement Term and the Free and Informed Consent Term, for professionals in the multi-professional team researched sector. Confidentiality and the anonymity were guaranteed for the patients whose recordss were used.

RESULTS E DISCUSSION

63 records were identified with daily extrapolated, of which eight were excluded due to incomplete information. Of 55 eligible studied records, there was a predominance of males (34; 61.8%) compared to female (21; 38.2%). The average patients age surveyed was 50.4 years (DP=19,8). The most frequent age group was patients with 60 years or more, representing 38.2% of total patients (Table 1).

Table 1 - Distribution of hospitalized patient in male and female surgical clinics extrapolated daily of a philanthropic hospital, according to age group, Montes Claros, Minas Gerais, 2011.

Age Group	N	%
13 to 19 years old	02	3.6
20 to 39 years old	16	29.1
40 to 59 years old	16	29.1
60 years or more	21	38.2
Total	55	100.0

The overall average of hospitalization days was 14.8(DP=11,9), 11.6 for females and 17.2 for males. The average number of overdue days was also greater for males with 11.2 days; the females showed an average of 6.9 days overdue. In relation to the age group, the average number of hospitalization days of patients aged 60 or more years was 16.8 days with an average of days accrued of 13.4 days.

The average rate of permanence in two studied wings during the survey period was of 8.18 days. About sex, this rate amounted to 9.13 days in male wing and 6.8 days in feminine. The average number of allowed days was 5.4(DP=3,16) and overdue days amounted to 9.71 (DP = 10.7).

Among inpatient diagnoses, there is a predominance of external causes, represented by 11 (20%) patients, followed by diseases of the circulatory system with nine (16.4%) and neoplasms tumor with eight (14.5%). However, compared to the average of overdue days, the infectious and parasitic diseases, respiratory diseases and diseases of the genito urinary tract exhibited the highest averages with 33.3, and 19.0 15.0, respectively (table 2).

Table 2 - Frequency distribution of diagnoses and average days outstanding of inpatients in surgical clinic of a philanthropic hospital, Montes Claros, Minas Gerais, 2011.

CID-10	N	%	Overcome average days
Circulatory System Diseases	9	16.4	4.3
Tumor Neoplasms	8	14.5	7.8
Diseases of the musculoskeletal system and connective tissue diseases	4	7.3	14.2
Symptoms, signs and abnormal findings of clinical and laboratory exams not classified elsewhere	3	5.5	7.3
Genito urinary disease	1	1.8	15.0
Certain infectious and parasitic diseases	3	5.5	33.3
Disease of the skin and subcutaneous tissue	2	3.6	9.5
Endocrine Metabolic and nutritional diseases	3	5.5	12.3
Disease of digestive tract	7	12.7	7.8
Injury, poisoning and certain other consequences of external causes	11	20.0	7.6
Diseases of the respiratory system	1	1.8	19.0
Pregnancy, childbirth and the puerperium	2	3.6	10.5
Nervous system diseases	1	1.8	1.8
Total	55	100.0	

The most impacted diagnoses, by submitting a high average of hospitalization days and daily due were infectious and parasitic diseases averaging 37.3 days of hospitalization and daily average 33.3 daily due; respiratory system diseases with an average of 25 hospitalization days of and average 19 overcome daily; genito-urinary diseases tract with an average of 19 hospitalization days and average 15 overcome daily, according to the table 2.

In table 3, were identified the reasons to justify the extrapolated permanence. The most frequent reasons were related to delays or cancellations of surgical procedures (12; 21.8%), waiting for stabilization (9; 16.4%), clinic destabilization (7; 12.7%).

Table 3 – Frequency distribution of the reasons that have led to extrapolating the daily average and won on a philanthropic hospital surgical clinic, Montes Claros, Minas Gerais, 2011.

1594

Permanence extrapolated reasons			Overcome average daily
	N	%	
Completion delay and diagnosis test results	4	7,3	2,5
Surgical site infection	3	5,5	12,0
Specialist Assessment delay or Inter – query	3	5,5	5.3
Surgical procedure delay or cancellation	12	21.8	14.1
Clinics destabilization	7	12.7	18.6
Antibiotic Therapy*	7	12,7	10,3
Waits of stabilization situation	9	16,4	5,3
Chemotherapy delay	2	3,6	4,0
Waits for a new surgery	4	7,3	4,3
Pending vacancy on the CTI for post-op	1	1,8	4,0
Waits ward vacancy	2	3,6	4,0
Others	1	1,8	7,5
Total	55	100.0	

* Patients with surgical site infection were not included in antibiotics patient.

About overtime days, the reasons that more points to total value of days extrapolated were: clinic destabilization with an average of 18.6 per day overdue, surgical infection with 12 daily and patients on antibiotics with 10.3.

The factors that have led to extrapolating the permanence average are most varied and may be related to the patient profile and of the provided assistance, as with the available resources in the institution.

In 2011, for Montes Claros municipality, was recorded a higher frequency of hospitalization of females compared to males, the first represented approximately 55.4% of all hospitalizations and the second approximately 44.6% 9. However, in the present study, it was observed predominance in males hospitalizations (61.8%) compared to women (38.2%). Municipal data are confirmed in retrospective study conducted in general surgery service of the university hospital of Cuiabá (MT)[10], in the period from 2005 to 2008.

The number of day's average of hospitalization of studied patients was of 14.9, 11.6 for females and 17.2 for males. In Montes Claros this average was 6.8 days, being 8.4 days for

Silva AMN, Souza EFD, Barbosa TLA et al.   *Fatores que contribuem …*

males and 5.5 for female[9]. About average of number of overdue days, it was observed that this was also greater for men with 11.2 days, while women showed 6.9 overdue days.

Among patients with extrapolated days, it was observed an increased frequency of patients aged above 60 years, represented 38.2% of the total number of evaluated patients. In this context, elderly consume more health services, so the hospitalizations are more frequent and the bed occupancy time is greater than that of other age groups. Generally, the pathologies that affect the elderly linger for several years and require medical follow-up and permanent multidisciplinary teams, in addition to ongoing interventions[11-12].

According to the Hospital Information System (SIH), in September 2011, to the Montes Claros municipality, the average hospital stay of persons 60 years or older was 8.3 days. This age group accounted 31.8% of the total number of days of hospital stay[9]. When comparing the results of the present study to the SIH data, it was found that the elderly showed an average of days of hospital stay greater than average described for Montes Claros municipality averaging 16.8 days of stay. It is worth mentioning that this difference was already expected due to the fact the patients surveyed were only those with average permanence extrapolated. In a study conducted with elderly people admitted to a public hospital of Petrópolis (RJ), it was revealed that the stay length will depend on factors such as the type of illness, the general condition, the response to treatment and potential complications[13].

On studied institution, the rate of hospital stay was of 8.18 days. About sex, the average of the male ward was 9.13 days and female was 7.24 days. It is observed in this study, that men had an average permanence time greater than the presented by the municipality. A justification for this proportion seems to be associated with the fact that the female ward have fewer beds than the male and also not occur hospitalizations of pregnant women, women who have recently given birth and in female ward.

The SIH pointed out that the three most prevalent diagnoses in September 2011, for Montes Claros municipality, according to the CID-10, were circulatory system diseases with 20.6% of hospitalizations; pregnancy, childbirth and the puerperium with 19.8%; injury, poisoning and certain other consequences of external causes with 11.2%. Also in this period, the diagnoses with higher average presented were diseases of the central and peripheral nervous system with 13 days; respiratory tract diseases with 11.3 days and some infectious and parasitic diseases with an average of 10.6 days[9]. In this study, the three most frequent diagnoses were the external causes, circulatory diseases and tumor neoplasms, what confirms results already singled out by literature as an epidemiological transition result observed in emerging countries such as Brazil[14-16].

In relation to the average number of overdue days, the infectious and parasitic diseases groups, respiratory and genitourinary system, presented the biggest extrapolate of time. These findings reflect the fact that these diseases groups have prolonged treatment due to the medical condition of the patient, comorbidities and age extremes. It is important to highlight that infectious diseases still account for most of the hospitalizations in hospital units in the country[17].

In the present study, the most frequent extrapolated permanence motives were related to delays or cancellations of surgical procedures, clinic destabilization, waiting stabilization waiting and patients on antibiotics. Some patients have long period between

hospitalization and surgery, for lack in outpatient elective procedures, programming for early detection of signs and symptoms that impede the realization of surgical programming[5]. In relation to delays or cancellations of surgical procedures, most of them are associated with inadequate preoperative preparation of, for example, breakage of fasting for lack of guidance to patients, lack of diagnostic tests and effective assessment of the patient, lack of pre-anesthetic evaluation and lack of vacancy in the surgical block. In this sense, the literature reveals that the use of multimodal protocols has obtained satisfactory results, which reflect a greater turnover of beds, with increase in the number and precocity of the hospital ridge[10]. It is worth mentioning the importance of the average time of permanence as an indicator of clinical performance, considering that the better hospital structure, better service performance and reduced the length of hospitalization[18].

Another aspect to be considered in increasing permanence is the profile of severity of inpatients, exercises strong influence over the outcome of the care provided[2]. In this context, we highlight the destabilization of clinic patients as a factor associated with the extrapolation of the daily number, since it increases the demand of assistance offered to the patient. In a Hospital Information System study (SIH-SUS), it was verify the existence of interrelation between time of stay, severity of the case and complication arising from care in the prolongation stay[19]. Allied to this, there is evidence that mortality is directly proportional to the length of hospital stay[20].

Surgical site infection was singled out as an important factor in the daily extrapolation for inpatients in the sectors described in the study. The Disease Control and Prevention Center (CDC) reveals that 14 to 16% of hospital-acquired infections are attributed to the surgical site infections, which shows significant costs, with regard to health care due to complications of these infections[21]. Although this study did not have investigated mortality due to the increased length of stay, hospital jobs found positive relationship between increased mortality and patients with diagnosis of hospital infection[17,22]. This fact reflects the importance of surveillance of hospital-acquired infections such as sentinel event on the proposition of preventive actions aimed at the quality of assistance provided.

In this study, patients who overstay their permanence due to the use of antimicrobials represented a significant portion of the daily total extrapolated, accounting for an average of 10.3 days. In this context, it is worth saying that the indiscriminate use of antimicrobials in the hospital context causes the average hospital stay general rise in about 10 days[23]. Critically ill patients, colonization by resistant micro-organisms represents a constant concern to public health, since it brings serious economic, social and political implications[24].

One of the limitations of this study is being conducted in a single hospital, which prevents the generalization of the findings in relation to other hospitals of the same size. In addition, the short period of time as regards on related permanence reasons, to the record of the information in medical records, to the characteristics of the population assisted and the professionals involved. The type of delineation constitutes another factor which limits the research findings by virtue of not being able to establish cause and effect to the extension of the hospital stay. Although the AIH analyzed do not represent the universe of admissions made by SUS, a source of relevant information remains for the evaluation of medical assistance. This subsidizes the reflections about the multi-professional team working process

it was held in an accredited hospital and, as such, seeks, above all, the quality of its services by means of the effectiveness of their actions.

CONCLUSION

The factors that generate an increase in hospitalization time are the most diverse, and may vary according to sex, age, diagnosis, provided assistance and resources available in the institution. The clinical conditions of the patients are also a relevant factor, which may generate many daily extrapolated. The grounds relating to the resources available and the processes of the institution, as surgeries delay/cancellation and delays in implementation and delivery of results test diagnoses are subject to correction, implying the need for a reformulation in the processes, so that they flow with greater efficiency and effectiveness.

There is also that, due to the extrapolation of average permanence, there is an increased cost and decreased turnover of hospital beds, which reveals the need for increasingly complex studies to reduce the occurrence of these reasons that generate the extrapolation of average permanence. Allied to this, the use of specific protocols can determine the improvement in morbidity through the planning of assistance provided to the patient.

REFERENCES

1. Culolo DF, Perroca MG. Monitorando indicadores de desempenho relacionados ao tempo de assistência da equipe de enfermagem. Rev esc enferm USP. 2010 jun; 44(2):497-503.

2. Roque KE, Melo ECP. Tempo de internação e a ocorrência de eventos adversos a medicamentos: uma questão da enfermagem. Esc. Anna Nery Rev Enferm. 2011 jul-set; 15(3):595-601.

3. Rozenfel S. Agravos provocados por medicamentos em hospitais do Estado do Rio de Janeiro, Brasil. Revista de Saúde Pública. 2007 fev; 41(1):108-15.

4. Krokoscz, DVC. Efeitos da alocação de pessoal e carga de trabalho de enfermagem nos resultados da assistência em unidades de internação médico-cirúrgicas [dissertação]. São Paulo: Escola de Enfermagem, Universidade de São Paulo; 2007.

5. Filho JCS, Costa MAE. Alternativas de redução de custos hospitalares através da redução da média permanência em um hospital de urgência e emergência na área do trauma. Fortaleza: Universidade Federal do Ceará; 2003.

6. Dantas CB. Análise da incidência de infecção hospitalar em função dos custos dos materiais consumidos na sua prevenção: um estudo no Hospital de Pediatria da UFRN. In Anais do 11°

Congresso USP de Controladoria e Contabilidade; 2010 jul 26-27; São Paulo (SP), Brasil. São Paulo (SP): USP; 2011.p.1-9.

7. Oliveira AC, Ciosak SI. Infecção de sítio cirúrgico em hospital universitário: vigilância pós-alta e fatores de risco. Rev esc enferm USP. 2007 jun; 41(2): 258-63.

8 Santa Casa. Santa Casa: Hospital acreditado pleno. [citado 20 ago de 2012]. Disponível em: URL: http://www.santacasamontesclaros.com.br/index.php/acreditacao_hospitalar.

9. Brasil. Ministério da Saúde (MS). Indicadores Demográficos segundo o IBGE e Sistema de Informações Hospitalares do SUS (SIH/SUS). [citado 29 jul 2012]. 2011. Disponível em: URL: http://www.datasus.gov.br/catalogo/sihsus.htm.

10. Bicudo-Salomão A, Meireles MB, Caporossi C, Crotti PLR, Aguilar-Nascimento JE. Impacto do projeto acerto na morbi-mortalidade pós-operatória em um hospital universitário. Rev Col Bras Cir. 2011 jan-fev; 38(1):3-10.

11. Gois ALB, Veras RP. Informações sobre a morbidade hospitalar em idosos nas internações do Sistema Único de Saúde do Brasil. Ciênc saúde coletiva, Rio de Janeiro. 2010 set; 15(6):2859-69.

12. Lima-Costa MF, Veras R. Saúde pública e envelhecimento. Cad Saúde Pública. 2003 mai-jun;19(3):700-1.

13. Motta CCR, Hansel CG, Silva J. Perfil de internações de pessoas idosas em um hospital público. Rev Eletr Enf. [periódico na Internet]. 2010 [acesso 2012 Mai 26]; 12(3): 471-7. Disponível em: http://www.fen.ufg.br/revista/v12/n3/v12n3a08.htm.

14. Cavalcanti AL, Bárbara VBM. Mortalidade por causa externa Campina Grande, Paraíba, Brasil. Sci Med. 2008 out-dez; 18(4):160-5.

15. Brasil. Ministério da Saúde (MS). Hipertensão arterial sistêmica. Brasília: Ministério da Saúde (MS); 2006.

16. Rosa LV, Issa JS, Salemi VMC, Younes RN, Kalil-Filho, R. Epidemiologia das doenças cardiovasculares e neoplasias: quando vai ocorrer o cruzamento das curvas? Rev Soc Cardiol Estado de São Paulo. 2009 out-dez; 19(4): 526-34.

17. Lima ME, Andrade D, Haas VJ. Avaliação prospectiva da ocorrência de infecção em pacientes críticos de unidade de terapia intensiva. Rev bras ter intensiva. 2007 jul-set; 19(3):342-7.

18. Colli L, Junior LC, Matsuo T. Avaliação de indicadores hospitalares antes e após a implantação da gestão plena do sistema municipal em município do sul do Brasil. Epidemiol Serv Saúde. 2010 out-dez; 19(4):367-77.

19. Dias MAE, Martins M, Navarro N. Rastreamento de resultados adversos nas internações do Sistema Único de Saúde. Rev Saúde Pública. 2012 ago; 46(4):719-29.

20. Senturk E, Senturk Z, Sem S, Ture M, Avkan N. Mortalidade e fatores associados em uma UTI de cirurgia torácica. J Bras Pneumol. 2011 mai-jun; 37(3):367-74.

21. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for Prevention of Surgical Site Infection. Hospital Infection Control Practices Advisory Committee. Infect Control Hosp Epidemiol. 1999; 20(4):250-78

22. Oliveira AC, Kovner CT, Silva RS. Infecção hospitalar em unidade de tratamento intensivo de um hospital universitário brasileiro. Rev Latino-Am Enfermagem. 2010 abr; 18(2):233-9.

23. Carneiro M, Ferraz T, Bueno M, Koch BE, Foresti C, Lena VF et al. O uso de antimicrobianos em um hospital de ensino: uma breve avaliação. Rev Assoc Med Bras. 2011 jul-ago; 57(4):421-4.

24. Oliveira AC, Andrade FS, Diaz MEP, Iquiapaza RA. Colonização por micro-organismo resistente e infecção relacionada ao cuidar em saúde. Acta paul enferm. 2012; 25(2):183-9.

Contact of the corresponding author:
Ludmila Mourão Xavier Gomes.
Avenida Castelar Prates, 196, Major Prates, Montes Claros, Minas Gerais, Brasil. CEP: 39403206. E-mail: ludyxavier@yahoo.com.br