ACTA 30 YEARS 1988 - 2018

Original Article

Clinical profile of long-living elderly at an intensive care unit

Perfil clínico de longevos em uma unidade de terapia intensiva

Perfil clínico de longevos en una unidad de terapia intensiva

Joice Barbosa Vilas Boas da Silva[1]
Larissa Chaves Pedreira[1]
Jessica Lane Pereira Santos[1]
Cláudia Silva Marinho Antunes Barros[1]
Rose Ana Rios David[1]

Descritores
Idoso de 80 anos ou mais; Idoso; Serviços de saúde para idosos; Unidade de terapia intensiva

Keywords
Aged, 80 and over; Aged; Health services for the aged; Intensive care units

Descriptores
Anciano de 80 o más Años; Anciano; Servicios de salud para ancianos; Unidades de cuidados intensivos

Submitted
October 16, 2017

Accepted
February 15, 2018

Abstract
Objective: To identify the clinical and sociodemographic profile of long-living elderly at an intensive care unit.
Methods: Cross-sectional, retrospective and quantitative study, developed at the ICU of a private hospital in Salvador. The participants were long-living elderly admitted between January 2014 and December 2015, hospitalized for 24 hours or longer. The data were collected in the patients' electronic charts. The data collection instrument was constructed based on the information contained mainly in the nursing history, aiming to register the sociodemographic and clinical variables. The collected data were typed in Excel 2010 and analyzed using statistical software. For the sake of comparison between the variables, Pearson's χ^2 test was used. The results are presented in tables and their discussion rests on evidence about the theme.
Results: Among the 252 long-living elderly identified, 64.3% were female. 63.9% came from the emergency service, a statistically significant factor if related to mortality, and 91.3% of them presented comorbidities, particularly non-transmissible chronic conditions, mainly cardiovascular conditions (81.7%) and diabetes mellitus (32.9%). Non-infectious manifestations (84.5%) were the main causes of hospitalization. Upon admission, 71.0% were hydrated, 65.1% eutrophic, 39.3% breathing environmental air spontaneously, 57.5% with spontaneous diurhesis and 77.0% with intact skin. The prevailing length of hospitalization was between 11 and 20 days (24.6%), with death as the main outcome (51.6%).
Conclusion: Even in favorable conditions upon admission, the duration of hospitalization at the unit was long and the percentage of deaths was high.

Resumo
Objetivo: Identificar o perfil clínico e sócio demográfico de longevos em uma unidade de terapia intensiva.
Métodos: Estudo transversal, retrospectivo e quantitativo, realizado na UTI de um hospital privado de Salvador. Participaram os longevos admitidos entre janeiro de 2014 e dezembro de 2015, internados por um período igual ou superior a 24 horas. Os dados foram coletados nos prontuários eletrônicos dos pacientes. O instrumento de coleta foi construído a partir das informações contidas principalmente no histórico de enfermagem, para registro das variáveis sócio demográficas e clínicas. Os dados coletados foram digitados no programa Excel 2010 e analisados por meio de um Software estatístico. Para a comparação entre as variáveis foi utilizado o teste χ^2 de Pearson. Os resultados são apresentados em tabelas e sua discussão respaldada em evidências sobre o tema.
Resultados: Dos 252 longevos identificados, 64,3% eram do sexo feminino. 63,9% tiveram como procedência a unidade de emergência, fator estatisticamente significante se relacionado com a mortalidade, e 91,3% deles apresentavam comorbidades, destacando-se as doenças crônicas não transmissíveis, principalmente as afecções
cardiovasculares (81,7%) e a diabetes mellitus (32,9%). As manifestações não infecciosas (84,5%) foram as principais causas de internação. Na admissão, 71,0% apresentavam-se hidratados, 65,1% eutróficos, 39,3% em ventilação espontânea ao ar ambiente, 57,5% com diurese espontânea e 77,0% com pele íntegra. O tempo de internação prevaleceu entre 11 e 20 dias (24,6%), com grande desfecho de óbito (51,6%).
Conclusão: Mesmo em condições favoráveis na admissão, os longevos tiveram alta permanência na unidade e elevado percentual de óbito.

Resumen
Objetivo: Identificar el perfil clínico y sociodemográfico de longevos en una unidad de terapia intensiva.
Métodos: Estudio transversal, retrospectivo, cuantitativo, realizado en UTI de hospital privado de Salvador. Participaron los longevos admitidos entre enero de 2014 y diciembre de 2015, internados por período igual o superior a 24 horas. Datos recolectados de historias clínicas electrónicas de los pacientes, mediante instrumento construido a partir de la información incluida en el histórico de enfermería, para registro de variables sociodemográficas y clínicas. Los datos fueron registrados en planilla Excel 2010 y analizados por Software estadístico. Se utilizó test χ^2 de Pearson para comparación entre variables. Resultados presentados en tablas, discusión respaldada en evidencias temáticas.
Resultados: De 252 longevos identificados, 64,3% era de sexo femenino, 63,9% provenía de servicio de urgencias, factor estadísticamente significativo al relacionárselo con mortalidad, y 91,3% presentaba comorbilidades, destacándose enfermedades crónicas no transmisibles, particularmente afecciones cardíacas (81,7%) y diabetes mellitus (32,9%). Las principales causas de internación fueron manifestaciones no infecciosas. En admisión, 71,0% estaba hidratado, 65,1% eutrófico, 39,3% en ventilación espontánea ambiental, 57,5% con diuresis espontánea y 77,0% con integridad dérmica. Prevaleció tiempo de internación entre 11 y 20 días (24,6%), con notable desenlace en fallecimiento (51,6%).
Conclusión: Inclusive en condiciones favorables de admisión, los longevos tuvieron largas estadías en la unidad y elevado porcentaje de fallecimientos.

Corresponding author
Jessica Lane Pereira Santos
http://orcid.org/0000-0001-6528-0689
E-mail: jessicalane84@gmail.com

DOI:
http://dx.doi.org/10.1590/1982-0194201800007

How to cite:
Silva JB, Pedreira LC, Santos JL, Barros CS, David RA. Clinical profile of long-living elderly at an intensive care unit. Acta Paul Enferm. 2018; 31(1):39-45.

[1]Escola de Enfermagem, Universidade Federal da Bahia, Salvador, BA, Brazil.
Conflicts of interest: none to declare.

Introduction

The increased life expectancy and aging have generated changes in the age structure of the Brazilian population, with a growing increase in the number of elderly people.[1] This fact also promotes an increase in these people's demand for hospitalization, including in intensive care units (ICU), where health professionals have perceived this reality.[2]

Regarding longevity, a prospective study carried out over a period of 30 months at a general ICU of *Hospital do Servidor Público Estadual de São Paulo*, published in 2016, identified that 18.2% of the patients admitted in the period were 80 years old or older. Among these, ICU mortality was 26.3%, in hospital 45.7% and 48.4% in the 180 days after hospital admission.[1] In Canada, a study published in 2015, conducted in 22 hospitals, monitored the long-living elderly after 24 hours of hospitalization and for a period of 12 months, identified a mortality rate of 14% in the ICU, 26% in the hospital and 44% at home after hospital discharge.[3]

Prolonged hospitalization time may result in loss of autonomy, unfavorable prognosis and increased mortality of the long-living elderly, and may be related to the occurrence of adverse events. Thus, a careful evaluation of the hospitalization decision and the appropriate time for discharge is recommended, in order to guarantee the minimum length of stay, reduction of complications and hospital costs.[4]

In this sense, health policies that encourage professional qualification focused on elderly care are essential for health professionals, especially nurses, to provide quality care. Therefore, it is important that the multiprofessional team pays attention to the profile of the long-living elderly hospitalized in the ICU, so that they can discover and attend to their particularities that demand specific care, necessary to avoid iatrogenic and unfavorable clinical outcomes.

In view of these findings, the aim of the study was to identify the clinical and sociodemographic profile of the elderly in an intensive care unit.

Methods

Type of research design

Cross-sectional, retrospective study with a quantitative approach.

Place of study

Held in the ICU of a private hospital in Salvador. This unit has 30 intensive care beds for adult/elderly patients, with clinical and surgical demands. It was chosen due to the large number of long-living elderly admitted.

Sample

A convenience sample was used. The participants were all 80-year-old or older persons admitted to the ICU between January 1st 2014 and December 31st 2015 and who remained in this unit for a period equal to or longer than 24 hours.

Data collection and analysis

The data were collected through the search in the patients' charts between May and June 2016. At the place of study, the medical records are electronic. Thus, access and data collection were performed using the service password of one of the researchers, with the service's authorization. She is a resident student in the Intensive Care Nursing Residency Program of the Nursing School at *Universidade Federal da Bahia* and was carrying out practical activities at the Unit.

Initially, all charts of the people hospitalized in the unit were selected in the time interval of interest. Subsequently, the charts of patients aged 80 years or older, completed until the date of admission, were selected. Then, the inclusion criterion related to the length of stay longer than or equal to 24 hours was applied. The exclusion criterion was to remove from the study those elderly with incomplete medical records, without records such as the nursing history, registration form and most recent medical evolution. Thus, a total population of 252 long-living individuals who met the inclusion criteria was obtained, all of whom had complete records, and no exclusions were required.

The collection instrument was previously constructed, based on the information contained in the nursing history of the institution, the patient registration form and most recent medical evolution (outcome record), to identify the sociodemographic variables: gender, age, city of origin, origin and religion; and clinical variables: comorbidities, reasons for hospitalization, suspected diagnosis, general health status upon admission, days of hospitalization and outcome. The variable diagnosis upon admission was not used, but rather a suspected diagnosis, as the nursing history, completed upon admission, did not yet identify a closed medical diagnosis.

The collected data were entered into a database created for this purpose, using Excel 2010, and later imported and analyzed in statistical software IBM SPSS Statistics 14. For the sake of comparison between the variables, Pearson's χ^2 test was used, considering statistically significant differences at 5%. The presentation of the results was organized in tables and their discussion was supported by scientific evidence on the subject.

The project received the Hospital's agreement and approval from the Research Ethics Committee of the Nursing School at *Universidade Federal da Bahia*, under opinion 1.519.251. Exemption from the Free and Informed Consent Term was requested due to the collection of secondary data. To ensure patients' anonymity, the forms were identified using numbers and the data were treated in groups.

Results

Of the 1,099 patients admitted to the ICU from January 1st 2014 until December 31st 2015, 732 (66.6%) were older than 60 years. Of these, 252 (34.4%) were long-living and participated in the study. The sociodemographic characteristics of this population are shown in table 1.

It could be observed that the majority of the long-living hospitalized patients were women who lived in the capital of the State, Salvador, were self-declared Catholic and came from the emergency unit. A considerable part was transferred from other health institutions, both from the capital and from other cities.

Table 1. Sociodemographic characteristics of the population

Sociodemographic variables	n (%) (n=252)	*p-value*
Age range		0.142
80 and 90 years	200(79.4)	
> 90 years	52(20.6)	
Sex		0.436
Male	90(35.7)	
Female	162(64.3)	
City		0.338
Capital (Salvador – BA)	231(91.7)	
Interior	21(8.3)	
Religion		0.053
Catholic	148(58.7)	
Evangelical	36(14.3)	
Spiritist	7(2.8)	
Jehovah Witness	2(0.8)	
Candomblé	2(0.8)	
Did not answer	57(22.6)	
Origin		0.000
Emergency	161(63.9)	
Inpatient unit	25(9.9)	
Operating room	24(9.5)	
Other health institutions	42(16.7)	

When associated with the outcome, it is observed that the origin of these patients was the only statistically significant characteristic, and revealed that the long-living elderly who were admitted through the emergency service before admission to the ICU passed away.

In table 2, the distribution of the elderly is displayed according to the presence of one or more comorbidities/problems and the main ones, as well as the causes of hospitalization and the suspected diagnoses upon admission, as well as their relation with the outcome.

An important percentage of the long-living (91.3%) had comorbidities. Chronic noncommunicable diseases (CNCD) were the most frequent, with high prevalence of systemic arterial hypertension (90.8%), diabetes mellitus (DM) and neoplasias, in that order. Among the comorbidities related to neurological diseases, the sequelae of stroke and some cases of dementia prevailed, especially Alzheimer dementia, present in 82.1% of the long-living patients with this condition.

Regarding the main causes of hospitalization, the majority was related to noninfectious occurrences, especially lower level of consciousness in 36.6%

Table 2. Distribution of the long-living elderly hospitalized at the Intensive Care Unit.

Clinical variables	n(%) (n=252)	*p-value*
Comorbidities/problems		0.732
One	74(29.4)	
Two	87(34.5)	
Three	69(27.4)	
None	22(8.7)	
Main comorbidities/problems*		
Chronic noncommunicable diseases**		
Cardiopathies	206(81.7)	
DM	83(32.9)	
Neoplasia	25(9.9)	
Chronic respiratory disease	06(2.4)	
Neurological diseases		
Stroke	43(17.1)	
Dementia	28(11.1)	
Parkinson	04(1.6)	
Others		
Smoking	18(7.1)	
Osteoarticular disease	10(4.0)	
Causes of hospitalization		0.533
Non-infectious manifestations	213(84.5)	
Infectious manifestations	17(6.7)	
No record	22(8.7)	
Suspected diagnosis		0.478
Related to non-infectious causes	126(50.0)	
Related to infectious causes	63(25.0)	
No record	63(25.0)	

*For the main comorbidities/problems, "Chronic Noncommunicable Diseases", "Chronic respiratory diseases", "Neurological diseases" and "Others", many long-living elderly presented more than one. Therefore, the p-value could not be calculated.
**The Chronic Noncommunicable Diseases (CNCD) were groups based on the strategic action plan for coping with CNCD in Brazil between 2011 and 2022.[5]

Table 3. Health conditions of long-living elderly hospitalized at the Intensive Care Unit

Variables	n(%) (n=252)	*p-value*
Hydration condition		0.005
Hydrated	179(71.0)	
Dehydrated	59(23.4)	
No record	14(5.6)	
Nutritional status		0.138
Eutrophic	164(65.1)	
Overweight	67(26.5)	
Malnourished	21(8.3)	
Neurological status		0.000
Lucid and oriented	108(42.9)	
Sedated	27(10.7)	
Confused	48(19.0)	
Non-responsive	68(27.0)	
No record	1(0.4)	
Ventilation status		0.000
Spontaneous breathing of environmental air	99(39.3)	
Use of low-flow oxygen	73(29.0)	
Mechanical ventilation	49(19.4)	
Non rebreathing mask	18(7.1)	
Venturi mask	13(5.2)	
Skin condition		0.001
Intact	194(77.0)	
Lesions	58(23.0)	
Elimination condition		0.226
Spontaneous diuresis	145(57.5)	
Foley catheter	101(40.1)	
Cystostomy	1(0.4)	
Incontinent	1(0.4)	
No information	4(1.6)	
Days of hospitalization		0.059
1 to 2	38(15.0)	
3 to 5	42(16.7)	
6 to 10	54(21.4)	
11 to 20	62(24.6)	
> 20	56(22.2)	
Outcome		
Death	130(51.6)	
Discharge	112(44.4)	
Transfer	10(4.0)	

and dyspnea in 20.2% of these individuals. The main manifestation of the causes of hospitalization related to infectious occurrences was hyperthermia. It is noteworthy that, in 8.7% of the nursing records investigated, this data was not completed.

Other causes of hospitalization were less frequent, such as abdominal pain, precordial pain, vomiting, syncope, intestinal hemorrhage, hematemesis and fall from one's own height, as well as seizures and diarrhea.

Among the suspected diagnoses, the most frequent were also related to non-infectious causes, present in half of the elderly, with evidence of stroke in 32.5% and AMI in 10.3%, followed by infectious causes, sepsis in 41.3% of the patients, respiratory infection in 34.9% and septic shock in 23.8%. No records of suspected diagnosis were found in 25% of the charts, probably because the nursing history was completed before recording this data.

The association between these clinical variables and the outcome did not reveal statistical significance.

The data collected on the health conditions are presented in table 3. Most of the long-living patients were hospitalized in the ICU for a period between 11 and 20 days, followed by an inpatient period of more than 20 days. More than half of them, at the time of admission, were considered normal weight, hydrated, without skin lesions, lucid, oriented and breathing spontaneously. Little more than half of the individuals studied died. Hydration status, neurological status, ventilation status and skin condi-

tion were factors that showed a statistically significant association with the outcome death.

Discussion

In the study, there was a predominance of long-living hospitalized women, which may reflect their longer life expectancy in relation to men, following the worldwide trend of feminization of old age.[6]

This result, however, diverges from other studies that indicate a prevalence of hospitalizations of male patients, justified by the fact that men are more negligent with their health and are at greater risk of clinical decompensation.[2,7-9]

Most of the long-living patients came to the ICU for the emergency unit. Their most prevalent comorbidities were hypertension, diabetes and other heart diseases, with hypertension and diabetes being present in the majority. In addition, the cause of hospitalization was associated, to a great extent, with non-infectious manifestations, mainly lower consciousness level and dyspnea, followed by cough. Similar data were observed in another study, where the main organ dysfunctions presented the long-living patients presented upon admission to the ICU were respiratory (86.5%), cardiac (48.7%), neurological (40.1%), renal (28.1%) and infectious (21.7%).[10]

The presence and number of comorbidities found was not related to the outcome death, which was also observed in another study conducted in Rio Grande do Norte with elderly people hospitalized in the ICU.[11] In that study, it was observed that comorbidities and chronic diseases were not related to the survival of the elderly in survival studies with less than 30 days of follow-up; the presence of comorbidities was associated with unfavorable outcomes in the hospitalized elderly though when the follow-up was longer than 30 days.

CNCDs are a group of pathologies of multifactorial origins that develop throughout life and are long lasting, causing complications that may lead to the need for hospitalization of the elderly. Estimates by the World Health Organization appoint CNCDs as a severe public health problem, responsible for a total of 38 million deaths worldwide in 2012.[12] In Brazil, approximately 74.0% of deaths are associated to CNCDs.[13,14]

Regarding the suspected diagnosis at the time of admission, those related to noninfectious causes prevailed, especially stroke and AMI. With regard to suspected diagnoses related to infectious causes, sepsis, respiratory infection and septic shock were highlighted in this order. One study pointed out coronary diseases as the most prevalent diagnosis in the elderly between 80 and 85 years admitted to the ICU. Most of these, like in the present study, also entered through the emergency service.[2] In addition, in another study, sepsis had an impact on the mortality of elderly patients hospitalized at an ICU, regardless of the length of hospital stay.[11]

Hence, it is observed that the clinical demands of the long-living patients in the ICU stand out in comparison to the surgical demands, possibly due to the worsening of chronic problems. In one study, it was identified that acute clinical injuries and age over 80 years are associated with mortality in survival studies with follow-up of less than 30 days, and that situations such as lower consciousness level, use of mechanical ventilation and respiratory diseases are factors that worsen this outcome.[11]

The mortality of the long-living patients in this study was high (51.6%), and may also be related to the high rates of origin from the emergency unit, with prolonged hospitalization. A large part (24.6%) remained hospitalized for between 11 and 20 days, a longer period when compared to other studies.[11]

A study that investigated the factors related to the occurrence of adverse events in critically ill elderly people, although it did not relate these to the long-living age group, identified an average of 5.06 days of ICU hospitalization in those who did not suffer adverse events, against 10.62 days in those who did; for those who presented moderate to severe cases of these events, the mortality rate was 38.3%.[4]

In this study, even the long-living patients mostly presented a good general health condition at the time of admission, with intact skin, diuresis and spontaneous ventilation, preserved lucidity and ori-

entation; the length of hospital stay was significant, making them more fragile, dependent and vulnerable to the unfavorable outcome. In this sense, the study points out the need to remove the patient from the ICU as soon as possible and safely, in order to avoid damage. Therefore, however, all hospital staff needs training to provide high-quality care to these people, aiming to preserve their autonomy.

The presence of some risk factors for mortality was observed, such as the use of mechanical ventilation, present in 19.4% of the elderly. Regarding the functional and cognitive status pre-hospitalization, the former data was not found in the medical records and, regarding cognition, 27.0% were not responsive upon admission. With regard to mortality, unfavorable outcomes were associated with long-living elderly coming from the emergency service, with compromised neurological condition, ventilation status, skin condition and hydration upon admission, in line with other authors.[1,2,15]

In view of the above, it is necessary to discuss the criteria for the hospitalization of elderly in the ICU, in view of the professionals' difficulties to establish safe criteria for the admission of these people, and in view of continuing uncertainties as to when the benefit is greater than the risk.[11] In this respect, after favorable clinical trials, the use of the APACHE II score, which evaluates 12 physiological parameters, has been indicated as a gold standard to predict mortality in elderly patients.[2]

In addition, it is necessary to review the instruments used to approach the elderly, as important data for their monitoring and prognosis are not being evaluated or valued, such as prior functional status, marital status, context of life, among others, relevant to plan the care and discharge.

The absence of this information from the chart was a limitation of the study, which made it difficult to achieve a more detailed analysis of the length of hospital stay and the outcome. Regarding the prior functional status, for example, authors show its relation with morbidity and mortality in hospitalized elderly, representing important data to be collected upon admission.[16]

Conclusion

The clinical and demographic profile of the long-living elderly at the time of admission to the ICU showed that most patients presented good general health status, with intact skin, diuresis and spontaneous ventilation, lucidity and orientation. The hospitalization time was longer than that reported in the literature though, which may have influenced the unfavorable outcome, as more than half of the studied population died during hospitalization at the unit. In addition, the hydration status, neurological status, ventilation status and skin condition, as well as the elderly who were admitted to the ICU through the emergency service were factors that presented a statistically significant association with the outcome death. We hope that, through this study, the long-living elderly admitted to the ICU can gain more visibility, stimulating discussions about this subject, which are still lacking in our scenario. Prior knowledge on the personal, clinical, physical and functional conditions of these people is important, so that health professionals can weigh the risk-benefit of an ICU stay, and direct the care with higher quality and less risk.

Collaborations

Silva JBVB, Pedreira LC, Santos JLP, Barros CSMA and David RAR contributed to the conception of the Project, data collection and base, analysis and interpretation of the data, writing of the article and final approval of the version for publication.

References

1. Santos HS, Andrighettia AP, Manfredinia MC, Rezendea E, Juniora JMS, Venturaa MM. Hospitalization indications and its relation to mortality in very elderly patient in the ICU. Geriatr Gerontol Aging. 2016 10(3):140-5.

2. Reyes JC, Alonso JV, Fonseca J, Santos ML, Jimenez MD, Braniff J. Characteristics and mortality of elderly patients admitted to the Intensive Care Unit of a district hospital. Indian J Crit Care Med. 2016;20(7):391-7.

3. Heyland DK, Garland A, Bagshaw SM, Cook D, Rockwood K, Stelfox HT, et al. Recovery after critical illness in patients aged 80 years or older: a multi-center prospective observational cohort study. Intensive Care Med. 2015; 41(11):1911–20.

4. Toffoletto MC, Barbosa RL, Andolhe R, Oliveira EM, Janzantte DA, Padilha KG. [Factors associated with the occurrence of adverse events in critical elderly patients]. Rev Bras Enferm. 2016; 69(6):1039-45. Portuguese.

5. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Análise de Situação de Saúde. Plano de ações estratégicas para o enfrentamento das Doenças Crônicas Não Transmissíveis (DCNT) no Brasil 2011-2022 [Internet].. Brasília (DF): Ministério da Saúde; 2011. [citado 2017 Jun 17]. Disponível em: http://bvsms.saude.gov.br/bvs/publicacoes/plano_acoes_enfrent_dcnt_2011.pdf [Links]

6. Almeida AV, Mafra SC, Silva EP, Kanso, S. [The feminization of old age: a focus on the socioeconomic, personal and family characteristics of the elderly and the social risk] Textos & Contextos (Porto Alegre). 2015;14 (1): 115-31. Portuguese.

7. Levinson M, Mills A, Oldroyd J, Gellei A, Barrett J, Staples M, et al. The impact of intensive care in a private hospital on patients aged 80 and over: health-related quality of life, functional status and burden versus benefit. Internal Med J. 2016;46(6):694-702.

8. Cunha BS, Nascimento AS, Sá SP. [Clinical and sócio-demographic profile of elderly admitted to the emergency unit to the general hospital]. Estudos Interdisciplinares sobre o Envelhecimento. 2014;19 (1): 189-200. Portuguese.

9. Al-Dorzi HM, Tamim HM, Mundekkadan S, Sohail MR, Arabi YM. Characteristics, management and outcomes of critically ill patients who are 80 years and older: a retrospective comparative cohort study. Anesthesiology. 2014;14(126):1-9.

10. Maillet JM, Guerot E, Novara A, Le Guen J, Lahjibi-Paulet H, Kac G, et al. Comparison of intensive-care- unit-acquired infections and their outcomes among patients over and under 80 years of age. J Hosp Infect. 2014;87(3):152–158.

11. Bonfada D, Santos MM dos, Lima KC, Garcia-Altés A. [Survival analysis of elderly patients in Intensive care units]. Rev Bras Geriatr Gerontol. 2017; 20(2):197-205. Portuguese.

12. World Health Organization (WHO). Global status report on noncommunicable diseases 2014 [Internet]. Geneva: WHO; 2014 [cited 2017 Aug 04]. Available from: http://apps.who.int/iris/bitstream/10665/148114/1/9789241564854_eng.pdf?ua=1 .

13. World Health Organization (WHO). Mortality and burden of disease. Noncommunicable Diseases (NCD) Country Profiles, 2014: Brazil [Internet]. Geneva: WHO; 2014 [cited 2017 Aug 04]. Available from: http://www.who.int/nmh/countries/bra_en.pdf?ua=1 [Links]

14. Malta DC, Oliveira TP, Santos MA, Andrade SS, Silva MM. [Progress with the strategic action plan for tackling chronic non-communicable diseases in Brazil, 2011-2015]. Epidemiol Serv Saúde. 2016;25(2):373-90. Portuguese.

15. Borges CL, Silva MJ, Clares JW, Bessa ME, Freitas MC [Frailty assessment of institutionalized elderly]. Acta Paul Enferm. 2013;26 (4): 318-322. Portuguese.

16. Palleschi L, Fimognari FL, Pierantozzi A, Salani B, Marsilii A, Zuccaro SM, et al. Acute functional decline before hospitalization in older patients. Geriatr Gerontol Int. 2014;14 (4): 769-77.