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Online Brazilian Journal of Nursing

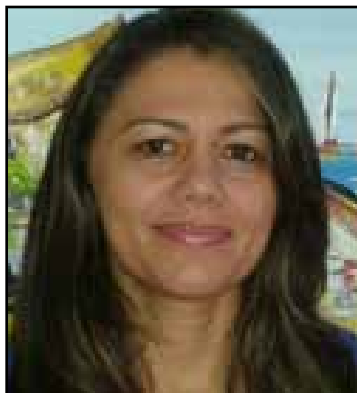
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Original Articles



Pressure ulcers in elders and in non-elders: a historical cohort study

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ABSTRACT

Aim: to compare demographical and clinical characteristics of elders and non-elders with pressure ulcers (PU), hospitalized in an Intensive Care Unit (ICU) of a public school hospital in the Brazilian state of Paraíba.

Method: this is a historical cohort study, which included 29 patients between the ages of 18 and 94 years, divided into two age groups (≥ 60 years old = elder; < 60 years old = non-elder). **Results:** 14 individuals were elders (average age 73.8 ± 10.7 years old) and 15 were non-elders (average age 38.3 ± 12.9 years old).

Comorbidities and PU in advanced stages were significantly more common among elders ($p=0.017$ and $p=0.010$, respectively). **Discussion:** it is recognized that the number of ulcers, their stage and parts of the body affected by them can influence the evolution of the clinical state of the patient in the ICU, as well as the acute disturbance responsible for the patient's hospitalization and associated comorbidities. **Conclusion:** elder patients present significantly more comorbidities and PU in advanced stages than non-elderly patients. Other characteristics here investigated did not show any significant differences based on the age group.

Descriptors: Pressure Ulcer; Intensive Care Unit; Hospitalized Patients.

INTRODUCTION

Pressure ulcers (PU) are skin lesions and/or subjacent tissues, normally located over a bone protuberance, a result of pressure, or the combination of this element and other shear features⁽¹⁾.

These problems can also be as a result of adverse hospitalization conditions, which reflect indirectly on the quality of the service provided. They represent one of the largest challenges for professionals in intensive care units (ICU), due to the budgetary issues they generate and in terms of the reduction in the quality of life of patients and their relatives. In addition, they require specific understanding, a considerable amount of sensibility, and need for observation with regard to the maintenance of the integrity of the skin of the patients being assisted by these health professionals⁽²⁾. A study shows that a scientific knowledge of nursing regarding PU can make important contributions to the practice of caring⁽³⁾.

Prevention is the fundamental issue in order to avoid these lesions. Therefore, it is important to work on this aspect beyond the remit of the nursing team to the multidisciplinary team, in order to evaluate the skin condition, identify the risk factors that predispose clients to develop PU, and recognize ulcers as a serious issue⁽⁴⁾. Among the risk factors, it is important to mention age because, due to cutaneous aging (cutaneous senescence) there are changes at the epidermis (such as the reduction of its thickness), dermis (such as the reduction of the thickness of the collagenous fibers and of the reticular fibers) and the hypodermis (such as the reduction in the volume and the number of adipocytes). Moreover, elderly patients present cellular, molecular and physiological changes in other organs and systems that directly affect the integrity of the skin. In addition, they may be suffering from certain morbidities (which is

one of the geriatric syndromes), and make use of pharmaceuticals (usually concomitantly)^(5,6).

According to the directives of the European Pressure Ulcer Advisory Panel and the National Pressure Ulcer Advisory Panel (EPUAP/NPUAP), PU must be avoided by adopting the following preventative steps: within health institutions, the creation of a policy of risk evaluation, followed by the education of health professionals about the way to proceed with such an evaluation and how to document all such evaluations; protection and promotion of skin integrity; general recommendations regarding nutrition to prevent PU; reduction of mechanical factors; and positioning and use of surfaces to distribute the points of pressure⁽¹⁾.

Hence, the quality of the direct assistance to the patient is essential to fulfill these goals. Thereby, to achieve improvement in terms of such assistance, it is necessary to recognize that PU is an issue that can interfere with this desired quality standard. Besides that, it is important to bear in mind that not only the nurse, but also the other members of the multiprofessional team must observe the need to become involved and be involved in providing assistance. This involvement is necessary in order to understand its meaning, the causes, consequences and risk factors in the development of these lesions, aiming to perform effective tasks in terms of prevention and treatment⁽⁷⁾.

According to specialized literature in the area, one of the quality indicators of ICU care relates to the well-being of the patient with regard to physical, mental and spiritual dimensions. Because of this, it is fundamentally important to be aware of the clinical characteristics that patients developed inside ICUs with regard to PU, as there has been a growth in the number of incidents associated with PU in such units^(7,8).

In the case of hospitalized ICU patients, PU are frequently found, especially with regard to

Pedrosa IL, Silva MSML, Araújo AA, Schwanke CHA, DeCarli GA, Gomes I. Pressure ulcers in elders and in non-elders: a historical cohort study. *Online braz j nurs* [internet]. 2014 Mar [cited year month Day]; 13 (1):82-91. Available from: <http://www.objnursing.uff.br/index.php/nursing/article/view/4111>

those who stay for an extended period of time, in that they present hemodynamic impairment, leading to impairment with regard to respiratory, neurologic, nutritional and circulation systems. The teams that work in these units deal with these issues, and face the challenges related to prevention and treatment. Therefore, it is important to gather all information that can generate information that can improve the quality of the assistance provided to this specific clientele^(8,9).

It is important to highlight that the ICU that was studied is composed of a multidisciplinary team, involving the participation of nurses, a physician, a nutritionist, a physiotherapist, and a psychologist, among others. All are involved in the adoption of preventive steps, aimed at avoiding the appearance or evolution of PU.

Therefore, this present study aims to compare the demographic and clinical characteristics of elders and non-elders with PU, hospitalized in a UCI of a public school hospital in the Brazilian state of Paraíba.

METHOD

This is a study that uses a historical cohort. It considers the medical records of 265 patients hospitalized in the seven bed general ICU of the College Hospital Lauro Wanderley (HULW, in Portuguese) in 2009. This is part of the Federal University of Paraíba (UFPB), located in the municipality of João Pessoa, Brazil. For this study, only the first hospitalization records of each patient were included. 84 records were excluded due to a lack of information when completing the paperwork. The data was collected by colleagues who were part of a university extension program, between the months of July and August 2010, based on the daily patient assessments done by physicians and nurses of the ICU. The demographic and clinical variables of this study were:

age, age group (studied age limit: ≥ 60 years old = elderly patients; < 60 years old = non-elderly patients), gender, place of residence, reason for hospitalization, period of residence in the ICU, comorbidities, result of the hospitalization, presence of PU during admission, stage, part of the body and number of PU (categorically dependent variables).

The data was transferred to an MS Excel spreadsheet and was then analyzed using the statistical software SPSS, version 17.0. The description of the variables was done through absolute and relative frequencies, as well as measures of central tendency (such as averages and standard deviations). The associations were tested through the use of a Pearson chi-square test and, in some specific cases, by the linear tendency chi-square test (ordinal variables: period of residence in the ICU, stage of PU and number of PU). They were considered meaningful when the associations achieved values of $p < 0.05$.

This research was approved by the Committee of Ethics in Research on Human Beings of the College Hospital Lauro Wanderley (CEP-HULW, in Portuguese), a division of the Federal University of Paraíba (UFPB, in Portuguese), under protocol number #387/09. During the proceedings, all aspects listed in Resolution 466/12⁽¹⁰⁾ by the Brazilian National Health Council of the Brazilian Ministry of Health (CNS/MS, in Portuguese) were followed.

RESULTS

In the case of 29 patients there was information recorded about the presence of PU; of those, 18 were male (62.1%) and 11 were female (37.9%). The average age of the total sample was 55.3 ± 19.8 years old (18-97 years old); 14 individuals were elderly patients (73.8 ± 10.7 years old) and 15 were non-elderly patients (38.3 ± 12.9 ye-

ars old). The period of hospitalization varied from 2 to 37 days, with an average of 11.59 ± 9.71 days.

Table 1 offers descriptions based on gender, outcome, reason and time of hospitalization in the ICU. As can be seen, the majority of the sample was composed of men, ended in death, arrived from another clinic inside the same hospital, and presented a hospitalization period of between 2 and 13 days. When analyzing the association between these variables and the age group (higher or below 60 years of age), it was not possible to find significant statistical differences. Acute respiratory failure (ARF) was the most frequent cause of hospitalization.

In Table 2 there is the distribution of comorbidities of the total sample, and according to the age group. It was found that 72.4% of

the patients presented comorbidities. This was particularly evident in the case of the population of 60 years of age or more, demonstrating a significant statistical correlation ($p=0.017$).

In the group of elders, there was the prevalence of diabetes mellitus (DM) with 35.7%, followed by congestive heart failure (CHF), cerebrovascular accident (CVA) and systemic arterial hypertension (SAH). It is important to highlight that, especially in this group, it was common to find individuals presenting more than one comorbidity. It was seen that when observing the comorbidities isolated from the other variables, there were no statistically significant differences.

Table 3 presents the distribution of PU regarding the admission of patients who had already presented ulcers, the stage and number

Table 1. Distribution of demographic and clinical characteristics and origin of the patient in the total sample and according to age group, in patients diagnosed with pressure ulcers, hospitalized in the ICU of a school hospital in the municipality of João Pessoa, 2009.

VARIABLE	TOTAL (N=29)	< 60 (N=15)	≥ 60 (N=14)	P
	N (%)	N (%)	N (%)	
Gender				
Female	11 (37.9)	5 (33.3)	6 (42.9)	0.442
Male	18 (62.1)	10 (66.7)	8 (57.1)	
Outcome				
Discharge	9 (31.0)	5 (33.3)	4 (28.6)	0.782
Death	20 (69.0)	10 (66.7)	10 (71.4)	
Origin				
Residence	01 (3.4)	0 (0.0)	1 (7.1)	0.558
Another clinic	20 (69.0)	11 (73.3)	9 (64.3)	
Another hospital	08 (27.6)	4 (26.7)	4 (28.6)	
Reason for hospitalization				
Respiratory failure	7 (24.1)	4 (26.7)	3 (21.4)	0.27
Cardiorespiratory arrest	3 (10.3)	1 (6.7)	2 (14.3)	
Digestive hemorrhage	3 (10.3)	2 (13.3)	1 (7.1)	
Sepsis	4 (13.8)	3 (20.0)	1 (7.1)	
Cephalic disease	5 (17.2)	4 (26.7)	1 (7.1)	
Respiratory failure and sepsis	3 (10.3)	0 (0.0)	3 (21.4)	
Others*	4 (13.8)	1 (6.7)	3 (21.4)	
Time of hospitalization in the ICU (in days)				
02 – 13	19 (65.5)	10 (66.7)	09 (64.3)	0.532*
14 – 25	06 (20.7)	04 (26.7)	02 (14.3)	
26 – 37	04 (13.8)	01 (6.7)	03 (21.4)	

*Kala-azar, AIDS, cerebral toxoplasmosis, seizures. P= chi-square test. ICU=intensive care unit. *Linear tendency chi-square test. Source: Designed by the authors, 2014*

Table 2. Distribution of comorbidities in the total sample and according to the age groups, in patients hospitalized with a diagnosis of pressure ulcers, at the ICU of a school hospital in the city of João Pessoa, 2009

VARIABLE	TOTAL	< 60	≥ 60	P
	(N=29)	(N=15)	(N=14)	
	N (%)	N (%)	N (%)	
Comorbidities				
Yes	21 (72.4)	8 (53.3)	13 (92.9)	0.017
No	8 (27.6)	7 (46.7)	01 (7.1)	
Systemic Arterial Hypertension				
Yes	4 (13.8)	1 (6.7)	3 (21.4)	0.249
No	25 (86.2)	14 (93.3)	11 (44.0)	
Diabetes Mellitus				
Yes	7 (24.1)	2 (13.3)	5 (35.7)	0.159
No	22 (75.9)	13 (86.7)	9 (64.3)	
Cerebral Vascular Accident				
Yes	7 (24.1)	3 (20.0)	4 (28.6)	0.59
No	22 (75.9)	12 (80.0)	10 (71.4)	
Chronic Renal Failure				
Yes	1 (3.4)	0 (0.0)	1 (7.1)	0.292
No	28 (96.6)	15 (100.0)	13 (92.9)	
Hepatic Failure				
Yes	5 (17.2)	4 (26.7)	1 (7.1)	0.164
No	24 (82.8)	11 (73.3)	13 (92.9)	
Cardiac Arrest				
Yes	8 (27.6)	4 (26.7)	4 (28.6)	0.909
No	21 (72.4)	11 (73.3)	10 (71.4)	

P= chi-square test. ICU= intensive care unit.

Source: Designed by the authors, 2014

of wounds, and the areas affected. As was observed, 37.9% of the patients were admitted with ulcers, with elderly patients being those most affected by such sores at 50.0% ($p=0.196$) of them. It is possible to see that stage II PU mainly affected those aged less than 60 years old, while the elderly population was more vulnerable to the development of PU in more developed stages, with a significant statistical correlation (III and IV; $p=0.010$). With regard to the number of ulcers, the majority of the patients had only one ulcer (65.5%), most commonly found in the sacral areas (86.2%).

An additional analysis performed in terms of the stages of PU and gender, did not show a significant statistical difference. Among men, 33.3% of the PU were in stage I, 38.9% were in

stage II, 16.7% in stage III and 11.1% in stage IV. Among women, these frequencies were 18.2%, 54.5%, 18.2% and 9.1%, respectively ($p=0.725$ – linear tendency chi-square test).

DISCUSSION

With regard to the association between the studied variables, the statistical analysis of the data did not show significant statistical differences. This result may be explained by the size of the sample studied.

Ulcers represent one of the main complications that affect critically ill patients. They are characterized by being difficult to treat, usually involving a long and expensive process which

Table 3. Distribution of the characteristics of the pressure ulcers in the total sample and according to age group in a school hospital located in the city of João Pessoa, 2009

VARIABLE	TOTAL	< 60	≥ 60	P
	(N=29)	(N=15)	(N=14)	
	N (%)	N (%)	N (%)	
Admission with ulcers				
Yes	11 (37.9)	4 (26.7)	7 (50.0)	0.196
No	18 (62.1)	11 (73.3)	7 (50.0)	
Stage of the ulcer				
I	8 (27.6)	6 (40.0)	2 (14.3)	0.010*
II	13 (44.8)	8 (53.3)	5 (35.7)	
III	5 (17.2)	1 (6.7)	4 (28.6)	
IV	3 (10.3)	0 (0.0)	3 (21.4)	
Number of ulcers				
1	19 (65.5)	9 (60.0)	10 (71.4)	0.719*
2	7 (24.1)	4 (26.7)	3 (21.4)	
3	2 (6.9)	2 (13.3)	0 (0.0)	
4	1 (3.4)	0 (0.0)	1 (7.1)	
Area of the ulcers Sacral				
Yes	25 (86.2)	12 (80.0)	13 (92.9)	0.316
No	4 (13.8)	3 (20.0)	1 (7.1)	
Calcaneus				
Yes	5 (17.2)	4 (26.7)	1 (7.1)	0.164
No	24 (82.8)	11 (73.3)	13 (92.9)	
Gluteus				
Yes	9 (31.0)	5 (33.3)	4 (28.6)	0.782
No	20 (69.0)	10 (66.7)	10 (71.4)	
Trochanteric				
Yes	3 (10.3)	2 (13.3)	1 (7.1)	0.582
No	26 (89.7)	13 (86.7)	13 (92.9)	
Medium Knee				
Yes	1 (3.4)	1 (6.7)	0 (0.0)	0.326
No	28 (96.6)	14 (93.3)	14 (100.0)	

P= chi-square test. ICU=intensive care unit. *Linear tendency chi-square test.

Source: Designed by the authors, 2014

slows the recovery of the patient and elevates the risk of the occurrence of other complications⁽¹¹⁾.

In ICU, the assistance of critical patients has many external factors that may be linked to the development of PU, such as impairment of physical mobility; respiratory instability, which demands keeping the patient in the Fowler position, increasing the pressure over certain areas, such as the sacral; the use of a waterproof mattresses or bed sheets; the presence of sweat and secretion; the weight of the patient, asso-

ciated with shear/friction forces; and the use of disposable diapers for fecal and/or urinary incontinence.

We highlight that the presence of other intrinsic factors such as pathologies, comorbidities, the nutritional state, and hemodynamic instability, which compromises gas exchanges and, as a consequence, blood perfusion. Hence, when defining the diagnosis of risks to the development of a PU in a certain patient, these various factors that predispose the origins of PU must be taken into consideration as well⁽¹²⁾.

Some studies confirm that the level of PU in patients in ICUs is much higher than in other units of a hospital. This is related to risk factors such as hemodynamic instability, respiratory failure, disease severity and multiple organ failure⁽⁰⁷⁾. Besides the risk factors, there are other conditions that can predispose the patient to PU, which may be triggered by metabolic, cardiac, respiratory, neurologic, chronic-degenerative, nutritional, circulatory, hematological and psychogenic alterations, as well as by the use of medication to depress the central nervous system⁽¹³⁾.

In the present study, it was observed that the largest proportion of the sample that had ulcers was composed of men, in accordance with the findings in another study⁽¹⁴⁾. It is important to mention that "male elders present thicker epidermis when compared to female elders"⁽¹⁵⁾. In Waterlow's scale, widely used in the United Kingdom to prevent the risk of PU, one of the items to be evaluated is gender/age⁽⁵⁾.

Differently from other studies, the age group was not a relevant factor in terms of detecting the development of ulcers, given that elderly and non-elderly patients developed ulcers at an approximately similar rate. This result was also noted by some other researchers, who demonstrated that the development of PU was not associated with age⁽¹¹⁾.

The results of this study suggest that, with regard to the outcome "death", there was no significant difference between elderly and non-elderly patients. In terms of this spectrum, it can be seen that the number of ulcers, their stage and the parts of the body affected are elements that can influence the development of a patient in an ICU. It is also recognized that other factors can influence the patient in an ICU, such as the acute disorder responsible for the hospitalization in the first place and the associated comorbidities, which can reduce the chances of

a patient's survival.

PU can generate fear and discouragement on the part of patients, besides creating an opening for infection, thus contributing to the increase in the morbimortality rate⁽¹⁶⁾. Therefore, they are an important cause of morbimortality, affecting the quality of life of the ill, and overloading the working routine of the health professionals who are directly involved in looking after the patient. Besides, PU are an avoidable unnecessary economic overload for health services as a whole⁽¹⁶⁾.

With regard to the reasons that lead to the hospitalization of the patients, it was seen that the majority had more than one medical diagnosis and more than one comorbidity associated with the illnesses found. It was seen that the sample had certain disturbances that sharply compromise blood perfusion, as for example, acute respiratory infection, cardiac arrest, sepsis and blood loss. Based on this, researchers point to the fact that cardiorespiratory changes mainly affect gas exchange. These changes, generated by some pathologies in the respiratory and cardiac system, contribute to the development of PU⁽¹¹⁾.

PU are caused by many factors, both extrinsic and intrinsic. The extrinsic factors are pressure, shear, friction and humidity. Among the intrinsic there is age, nutritional state, tissue perfusion, the use of some medication and/or the presence of some chronic diseases, the last of which were present in the majority of the sample considered in this study^(1,17).

It was also seen that the majority of the subjects arrived from other wards inside the same hospital, and that 37.3% of them were admitted to the ICU with PU. This information corroborates the results of another piece of research, which affirms that individuals arrived at the ICU with PU on admission to that unit. The patients of this last study were already hospitalized, with com-

promised organic functions, and were then seen to be vulnerable to the development of PU⁽⁹⁾

With regard to the presented comorbidities, in the group of elderly patients, the most commonly seen one was diabetes mellitus (DM) with 35.7%, followed by congestive heart failure (CHF), cerebrovascular accident (CVA) and systemic arterial hypertension (SAH).

The majority of the patients presented comorbidities, especially among the elderly population of this study, with the most common event being the occurrence of more than one disease. Congestive heart failure (CHF) was the most common comorbidity in the general population of this study, followed by DM and CVA. In the non-elderly group, the most common chronic diseases were hepatic failure and CHF, while among the elderly patients DM was the most prevalent, followed by CHF and CVA. Some authors point out the presence of many factors associated with the presence of PU, emphasizing chronic diseases such as DM and cardiovascular diseases in general⁽⁷⁾. Among the predisposing conditions to the occurrence of ulcers, there are metabolic changes, which are characterized by pathological situations of prolonged and progressive clinical evolution, such as happens in the case of diabetes^(7,11).

PU stages I and II were the most commonly seen stages in the population under consideration, being particularly focused on individuals of less than 60 years of age. It is important to highlight that, in critically ill patients, the ulcers in these stages can increase rapidly to subsequent stages, and if proper preventive and therapeutic steps are not taken, they can lead to the risk of serious complications⁽⁹⁾. It was observed that the elderly population was the most vulnerable to the development of PU, especially in terms of stages III and IV.

In a morphological study of the skin, performed on the elderly and the non-elderly in

autopsy, it was observed that "the thickness of the epidermis was significantly thinner in elder patients when compared to the non-elder ones". This study also found that "elders present a reduction of the thickness of the dermis and epidermis, which can facilitate the penetration of infectious agents, as well as the formation of cutaneous wounds"⁽¹⁵⁾.

With regard to the areas affected by PU, ulcers were found in the sacral area in all patients, followed by the presence of wounds in the gluteal, calcaneus, and trochanter regions, as well as in the medial knee. The highest incidence in the sacral area and in the calcaneus region is associated with the highest periods with mechanical ventilation and permanence in the ICU and, as a consequence, to the longer period of immobilization in bed, suggesting that patients kept in dorsal decubitus are at increased risk of developing PU. In research into this topic, it was found that 41.5% of the incidence of PU was in the calcaneus region, and 29.2% in the sacral area⁽⁹⁾. However, other studies mention the presence of ulcers in the malleolus and gluteus regions^(7,11).

Finally, there are some aspects in this study that need to be highlighted. The first aspect is related to the size of the sample, the main limitation of this study. If, on the one hand, this number is a consequence of the time constraint associated with this research, and the number of beds in the unit (seven beds) on the other hand, it is also a consequence of the low frequency of PU in the hospital studied (29 patients with PU, from a total of 265 patients; or equivalent to 10.9%). In studies performed in other ICUs in Brazil, it is seen that the prevalence of PU ranges from 22.93% to 57.89%^(18,19). Another Brazilian study demonstrated a differentiated prevalence of PU in elderly and non-elderly patients: 35.7% in individuals ≥ 60 years old and 6.7% in individuals < 60 years old⁽¹²⁾. Therefore,

it is suggested that additional studies be undertaken to confirm or otherwise the findings presented in this paper. The second aspect is linked to the difficulty in carrying out reviews of medical records, especially in the case of ICU patients due to their length and flaws in these records. The author of the book "Medical records and civil responsibility", shows that problem can be observed in Brazilian health services in general⁽²⁰⁾. This issue can be overcome, at least in part, with the implementation of electronic medical records. However, it can be seen that this study achieved its proposed goals, because it generated ideas relating to the existing or the non-existing differentiations between elderly and non-elderly patients with PU.

CONCLUSION

This study showed that the most advanced stages of PU were more frequently observed in elderly patients (≥ 60 years old), and that such patients presented more comorbidities than did younger individuals. With regard to the other variables here analyzed, there were no differences between the investigated age groups.

We highlight that 37.3% of the patients already had PU on admission to the ICU, and the most common outcome was death (69% of the patients).

It is also important to mention that the prevention and maintenance of the hemodynamic balance of the critically ill patient, as well as effective evaluation and treatment that takes into consideration the peculiarities of each patient, and the causes that led to hospitalization and their associated comorbidities, are fundamental to avoiding the development of ulcers.

Therefore, the susceptibility of the patients assisted in ICUs is a challenge to multiprofessional teams. Irrespective of age, we believe that the

implementation of a prevention and treatment protocol for PU, based on the risk factors and with the involvement of all professionals involved, will contribute to the reduction of these events among the observed clientele.

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Ivanilda Lacerda Pedrosa - Contribution: concept and planning of the research project, analysis and interpretation of data; writing and critical review.

Maria Socorro Moura Lins Silva - Contribution: analysis and interpretation of data; writing and critical review.

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Geraldo Atílio DeCarli - Contribution: analysis and interpretation of data; writing and critical review.

Irênio Gomes - Contribution: analysis; writing and critical review.

Received: 11/27/2012
 Revised: 02/18/2014
 Approved: 03/10/2014