Strategy for collaboration and cooperation of PAHO/WHO with Nursing in the Americas

The Health Network has adopted strategies to promote circulation and exchange of information, share experiences, collaborate on activities and projects, learn collectively, strengthen ties, and, above all, broaden the decision-making power of its members. These new forms of social organization are based on autonomous, non-hierarchical, and decentralized cooperation and collaboration among the participants, with intensive use of production technologies and information dissemination.

The Nursing Networks seek to expand their actions to defend global, regional, and local health policies and strengthen communication, linking, cooperation, and synergy strategies among people, institutions, and organizations who are interested in developing attention, management, research, information, and education in Nursing.

Currently, the Pan American Health Organization/World Health Organization (PAHO/WHO) coordinates 25 International Nursing Networks in the Americas. Overall, they compose the EnfAmericas Network which was created more than seven years ago. Information on each of these networks is available on the internet at <http://www.observatoriorh.org/?q=node/562>.

The International Network for Communication in Nursing (ReCEn) is among them and has fulfilled the role of broadening access to scientific information and promoting the exchange of experiences. Messages sent through the ReCEn are available on websites (http://listserv.paho.org/archives/enfamericas.html), Facebook (https://es-la.facebook.com/enfamericas), and Twitter (@EnfAmericas). Currently, many nurses exchange messages through e-mail, interact through Facebook, and follow through Twitter (more than 3150, 900, and 590, respectively). Therefore, there is a wide network of people in the Americas, making connections to share common interests such as nursing issues.

Thus, providing updated scientific information that favor integration between nurses and development of the profession is our goal. These are also the main priorities of the Unit for Human Resources in Health at PAHO/WHO.

However, we emphasize that the strength of the networks depends on each of their nodes, especially on their ability to articulate and collaborate. We hope that more people participate actively and collaborate using the EnfAmericas Network!

Cristianne Maria Famer Rocha
Professor at the Escola de Enfermagem, Universidade Federal do Rio Grande do Sul (Eenf/UFRGS).

Silvia Cassiani
Regional Advisor for Nurses and Health Techniques and member of the OPAS/OMS staff. She is responsible for the view expressed above, which does not necessarily represent the decisions or policies the PAHO/WHO.

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Tendency analysis of admission rates for bacterial pneumonia in children and adolescents

Análise da tendência das taxas de internações por pneumonia bacteriana em crianças e adolescentes

Marla Fabiula de Barros Hatisuka
Guilherme Oliveira de Arruda
Carlos Alexandre Molena Fernandes
Sonia Silva Marcon

Abstract
Objective: To analyze distribution and tendency of hospital admissions rates for bacterial pneumonia in children and adolescents.
Methods: This ecological, time series study included secondary data obtained from the Hospital Information System of the SUS. We calculated hospital admission coefficients for 10,000 inhabitants triennially. For the analysis of tendency, a model of polynomial regression was used.
Results: Most hospital admissions occurred in the East health macro-region between the second and fourth triennial periods. Rates were higher for children age one to four years and in male patients throughout the study period. We observed an increased tendency toward hospital admission in children younger than one year.
Conclusion: Hospital admission rates for pneumonia differ by health macro-region, age and sex. The region with the highest incidence was the East region, and boys aged one to four years were more affected. A growing tendency was seen in children younger than one year.

Keywords
Pneumonia, bacterial; Nursing in primary care; Child, hospitalized; Adolescent; Length of stay; Hospitalization/statistics & numerical data

Descritos
Pneumonia bacteriana; Enfermagem pediátrica; Criança hospitalizada; Adolescente; Tempo de internação; Hospitalização/estatística & dados numéricos

Submitted
September 2, 2014
Accepted
October 29, 2014
Introduction

Pneumonia is an important topic because it constitutes the main cause of death among children worldwide. Approximately 90% of deaths from pneumonia occur in developing countries, and half of these deaths occur in Africa.\(^1\) In developed countries mortality rates from pneumonia are low, but the morbidity related to pneumonia remains high.\(^1\)

For this reason, different interventions have been implemented to reduce the incidence of bacterial pneumonia, particularly among children up to five years of age. Healthy feeding, maintenance of an unpolluted environment and adequate immunization are factors that can protect children against bacterial pneumonia.\(^2,3\)

Bacterial pneumonia is considered a condition handled under primary health care (PHC) services; therefore, effective actions at this level of care - prevention, early diagnosis and follow-up of population health conditions - should help avoid hospitalization, especially among children.\(^4\) PHC is applied in Brazil throughout the Family Health Strategy (FHS) Program, is based mainly on universal and continuous access in a system characterized by a close relationship between the health team and a specific population, and provides value in both the care provided by the health professionals and systematic follow-up. Thus, increasing FHS coverage to a broader population should decrease morbidity and mortality for such primary care conditions as bacterial pneumonia.

Brazil lacks consistent epidemiological data on respiratory morbidity of children and adolescents. This leads to difficulties in planning and executing effective actions for prevention and health promotion. Age is a risk factor inversely proportional to development of respiratory disease; i.e., younger people have a higher risk for respiratory problems, and a higher incidence is seen between ages six and 24 months.\(^5\)

Studies on admission rates, in addition to describing the disease profile, support planning of health services and help sensitize health professionals. On the basis of these assumptions, the objective of this study was to analyze distribution and tendency of admission rates for bacterial pneumonia in children and adolescents.

Methods

This ecological, descriptive and time series study, conducted from 2000 to 2001, addressed hospital admission due to bacterial pneumonia in children and adolescents from the Paraná State.

Paraná is in the southern region of Brazil and has 399 municipalities divided into six administrative groups called health macro-regions (MRS, acronym in Portuguese). These regions have the responsibility to develop, incentive and support municipality strategies, as well as plan actions to improve quality of population health. The population of Paraná is estimated at 10,444,526 inhabitants. Of these, 14.2% are children (0 to 9 years old) and 17.6% are adolescents (10 to 19 years old) according to census and population estimations.

Data were collected from the Hospital Information System (SIH, acronym in Portuguese) of the SUS Department of Informatics (Datasus), which provides information on admissions to public hospitals and health services affiliated with SUS. We included cases in which bacterial pneumonia appeared as the main cause of admission and were considered type 1 authorizations for hospital admission (ie, initial hospitalization).

We collected data on admissions, census and population estimations related to age range, sex, municipality of occurrence and year of hospitalization for bacterial pneumonia, based on International Classification of Diseases - 10 edition (ICD-10), using the codes J13-J14, J15.3-J15.4, J15.8-J15.9, and J18.1. Hospital admissions, according to municipalities, were grouped according to division in MRS (East, Campos Gerais, West, South Central, Northeast and North).

Age ranges were categorized according to Datasus as younger than one year, one to four years, five to nine years, ten to 14 years, and 15 to 19 years. Years of occurrence of hospitalizations were grouped in four triennials (2000 to 2002, 2003 to 2005,
Tendency analysis of admission rates for bacterial pneumonia in children and adolescents

From 2006 to 2008 and 2009 to 2011). Data on admission for bacterial pneumonia were presented as absolute frequency of admission measured by 10,000 inhabitants for each age, sex and MRS group.

To estimate tendency, we used analysis via models of polynomial regression given the large statistical power and ease of elaboration and interpretation with this model. Hospital admission rates were considered as a dependant variable (Y) and time (in years) was considered an independent variable (X). To reduce collinearity between terms of equation of regression, we transformed the variable “year” in “year – centralized” (year less than the midpoint of the study year); therefore, 2005 was considered the midpoint of the historical year (year-2005).

In the beginning, we created dispersive flow-charts of admission rates based on years, which led to our choosing a function with a high explanation power. As a reference for choosing a model, we also used statistical significance associated with regression coefficients, including stationary tendency (p>0.05), descending (p<0.05 and negative regression coefficient) or ascending (p<0.05 and positive regression coefficient); and coefficient of determination (r²) as the measure of the precision model (r² closer to 1, with additional adjustment).

The first model tested was simple linear regression (Y=β₀ + β₁x), in which Y = hospital admission rate, β₀ = mean rate of the period, β₁ = increment of annual mean and x = year-2005. When necessary, we tested models of second degree (Y=β₀ + β₁X + β₂X²). When two models were similar, the simplest model was chosen (or of least degree) for a specific observation. We used Microsoft Excel to calculate hospital admission rates and used SPSS software, version 18.0, to analyze tendencies.

Development of this study followed national and international ethical standards for research on human subjects.

Results

Between 200 and 2011, 2,295,780 hospital admissions among children and adolescents occurred; of these 59,028 (2.57%) were for bacterial pneumonia.

Table 1 shows that East MRS had a higher hospitalization rate, with the exception of the first triennial, as well as a gradual increase in rates throughout the period. The Campos Gerais MRS had the lowest rates in the first triennial but also showed a gradual increase of hospital admission rates.

Table 2 shows that during the 12 years of follow-up, the hospital admission rate was higher among children one to four years of age and among male children.

In the analysis of tendency, we found that, in general, hospital admission rates remained stable throughout the period and that mean coefficients were substantially higher among children age one to four years (B₀ = 42.223). However, the only age range that presented a growing tendency of admissions was the group younger than one year (p<0.002); according to the linear model adopted, the precision was 73% (r² = 0.73). For both sexes, we verified stability in the behavior of hospital admissions throughout the series (Table 3).

Table 1. Hospital admissions and hospitalization rates for bacterial pneumonia in four triennial periods

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hospital admission</td>
<td>Admission rate</td>
<td>Hospital admission</td>
<td>Admission rate</td>
</tr>
<tr>
<td>East</td>
<td>2703</td>
<td>2.22</td>
<td>3475</td>
<td>2.60</td>
</tr>
<tr>
<td>General field</td>
<td>557</td>
<td>1.35</td>
<td>771</td>
<td>1.79</td>
</tr>
<tr>
<td>Central-South</td>
<td>1475</td>
<td>5.09</td>
<td>2135</td>
<td>7.19</td>
</tr>
<tr>
<td>West</td>
<td>2489</td>
<td>4.09</td>
<td>5483</td>
<td>8.73</td>
</tr>
<tr>
<td>Northeast</td>
<td>1624</td>
<td>2.72</td>
<td>2612</td>
<td>4.33</td>
</tr>
<tr>
<td>North</td>
<td>2671</td>
<td>4.04</td>
<td>5242</td>
<td>7.79</td>
</tr>
</tbody>
</table>

Source: SIH-SUS/Datasus (Ministry of Health)
For all children and adolescents, hospital admission rates in general ranged from 7.75 to 16.46 per 10,000 inhabitants; however, we did not identify this tendency in admissions ($p = 0.46; r^2 = 0.0006$), as observed in Table 3. When age ranges were stratified, except for the group less than one year, even with oscillations, we found a significant increase in admission; the remaining ranges continued to be stable in relation to hospitalization for bacterial pneumonia ($p>0.05$). Despite the tendency toward being stationary, admission rates for bacterial pneumonia among children aged one to four years remained the highest during the period, and reached 59.74 per 10,000 inhabitants in 2003.

### Table 2. Hospital admissions and hospitalization rates for bacterial pneumonia according to characteristics of children and adolescents

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hospital admission</td>
<td>Admission rate</td>
<td>Hospital admission</td>
<td>Admission rate</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>42</td>
<td>0.24</td>
<td>84</td>
<td>0.45</td>
</tr>
<tr>
<td>1 to 4 years</td>
<td>6223</td>
<td>8.50</td>
<td>11188</td>
<td>14.55</td>
</tr>
<tr>
<td>5 to 9 years</td>
<td>2927</td>
<td>3.09</td>
<td>5223</td>
<td>5.26</td>
</tr>
<tr>
<td>10 to 14 years</td>
<td>1384</td>
<td>1.44</td>
<td>2283</td>
<td>2.28</td>
</tr>
<tr>
<td>15 to 19 years</td>
<td>943</td>
<td>0.97</td>
<td>940</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6275</td>
<td>3.26</td>
<td>10758</td>
<td>5.33</td>
</tr>
<tr>
<td>Female</td>
<td>5244</td>
<td>2.82</td>
<td>8060</td>
<td>4.59</td>
</tr>
</tbody>
</table>

Source: SIH-SUS/Datasus (Ministry of Health); Int – Hospital Admission; TX – Admission Rate.

### Table 3. Tendency of admission rates of children and adolescents by bacterial pneumonia, according to age range and sex

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model*</th>
<th>$r^2$</th>
<th>p-value</th>
<th>Tendency</th>
</tr>
</thead>
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<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 1 year</td>
<td>$y=1.532+0.104x$</td>
<td>0.73</td>
<td>0.002</td>
<td>Growing</td>
</tr>
<tr>
<td>1-4 years</td>
<td>$y=42.223-0.173x$</td>
<td>0.007</td>
<td>0.82</td>
<td>Stable</td>
</tr>
<tr>
<td>5-9 years</td>
<td>$y=14.730-0.194x$</td>
<td>0.056</td>
<td>0.51</td>
<td>Stable</td>
</tr>
<tr>
<td>10-14 years</td>
<td>$y=6.465-0.112x$</td>
<td>0.11</td>
<td>0.34</td>
<td>Stable</td>
</tr>
<tr>
<td>15-19 years</td>
<td>$y=3.139+0.11x$</td>
<td>0.016</td>
<td>0.72</td>
<td>Stable</td>
</tr>
<tr>
<td>&lt; 19 years</td>
<td>$y=14.180-0.183x$</td>
<td>0.006</td>
<td>0.49</td>
<td>Stable</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>$y=15.221-0.203x$</td>
<td>0.060</td>
<td>0.49</td>
<td>Stable</td>
</tr>
<tr>
<td>Female</td>
<td>$y=13.153-0.192x$</td>
<td>0.070</td>
<td>0.46</td>
<td>Stable</td>
</tr>
</tbody>
</table>

*Model: $y=$hospital admission rate; $x=$ year – 2005; $r^2 =$ coefficient of determination

### Discussion

This study enabled us to understand the distribution and tendencies of hospital admissions for bacterial pneumonia in children and adolescents in the Paraná State. The descriptive analysis of data in this study precludes the ability to establish causality. In addition, the use of secondary data of SIH/SUS is subjected to errors in recording and processing of information, which represents a risk for incongruity between the system and the reality; in addition the study did not consider the use of affiliated or private health care network and cases of readmissions.

Information systems have been used as a data source for ecological studies. Such use helps enhance the quality of health systems, the applicability of data generated by them, health surveillance actions, and, above all, as proposed in our study, the analysis of avoidable illness caused by care delivery at the PHC level. Therefore, such studies can also help improve nursing actions toward groups in which hospital admission rates for bacterial pneumonia are high or showed a growing tendency.

Despite the availability of a vaccine, the morbidity and mortality for bacterial pneumonia remain a health concern worldwide because the number of children affected by this disease remains high. In 2010, 120 million episodes of pneumonia by *Streptococcus pneumoniae* was recorded, and 14 million cases were severe cases (mainly in children younger than five years of age). In Brazil, a continental country with wide cultural, social, economic and environmental diversity, pneumonia is always one of the main causes of hospitalizations. For this reason, it is important to consider environmental and climate influences in the hospital morbidity profile of this problem. A study conducted in the...
United States observed higher rates of outpatient services (between 32.3 and 46.9 per 1,000) for bacterial pneumonia among children younger than five years. A study of refugee children in 16 African and Asian countries reported that bacterial pneumonia was responsible for 17% of hospital morbidity among children younger than five years, and also demonstrated expressive incidence rates of this disease in Africa (59.2 per 1,000) and Asia (254.5 per 1,000).

Although our study did not investigate the relation of hospital admissions with climate of each macro-region, an interesting finding is that the East MRS, which typically has a cold climate, had a higher absolute frequency of admission for bacterial pneumonia in the second and forth triennial periods. The same MRS also had higher hospital admission rates, with an increase of roughly 158%, between the beginning and end of the period. However, the North MRS, despite its hot climate, presented a higher admission rate in the second and third triennial periods.

These findings suggest that not only climate can influence the increase of hospital admission for bacterial pneumonia; other factors, among them, the quality of health care delivered and the region of the state, can determine the differences in hospital admissions of children and adolescents throughout the time periods studied. A study carried out in the United Kingdom showed great spatial variation in hospitalization rates for pneumonia among individuals up to 14 years of age.

Although the coverage of FHS has increased in Paraná (from 23% in 2000 to 60.2% in 2011), care quality is not uniform; in addition, the relation to causes considered sensible to primary care, such as bacterial pneumonias, is questioned if that level of care is less organized to respond to these diagnoses.

In relation to age range, the results corroborate a study of main causes of admissions by respiratory disease in children and adolescents in São Paulo. That study found that the frequency of hospital admission for pneumonia was higher in children younger than five years. A study in Denmark observed that tendency of hospital admission due to pneumonia in children younger than age five years decreased until 2009, but began increasing from the same year even with an increase in population vaccination.

Results of a study carried out in the United States showed a substantial improvement in vaccination coverage against pneumonia, started in 2000, led to a decrease in hospital admission for pneumonia in children through 2004; this decrease was sustained until 2009. This result can be attributed to improved access to health service, adoption of prevention measures (mainly the incorporation of pneumococcal vaccine), and the provision of adequate and opportune treatment.

In relation to gender, it is important to highlight the possible biological vulnerability of males for several causes of pneumonia during the fetal and neonatal periods, as pointed out in a retrospective study from Australia that investigated hospital admissions among male children in intensive neonatal care units. This vulnerability can result in neurological complications, increase hospital mortality, trigger functional incapacity and affect the development of males throughout life (if the individual survives), presenting a predisposition for the development of certain pathological conditions.

The literature show that bacterial pneumonia can be prevented through other factors we did not study, including breastfeeding. A cohort study performed in a municipality of the South region of Brazil showed that longer duration of breastfeeding was associated with an overall reduction in hospital admissions for pneumonia among children breastfeed exclusively for more than three months. The same study reported that effects of accommodation on decrease of hospital admissions by pneumonia, depend directly of maintenance of breastfeeding.

This finding indicates a strategy that health professionals can use to reduce hospital admissions for this population and for this problem. Therefore, the nurse, as a member of the health team must encourage mother-child bonding by accommodation and stress the importance of continuing breastfeeding for up to first two years of life.
Hospital admission rates for bacterial pneumonia in the age ranges studied, except among children younger than one year of age, remained stable during all periods. This finding is a concern because bacterial pneumonia is a disease easily treated with antibiotics when diagnosed in the appropriate timeframe. Although FHS coverage had increased in the last years of the study, the high rates of admissions for this cause or even the stability of this rate can indicate difficulty in access to or lower quality of PHC.\(^{(4)}\)

A study of hospital admission rates for bacterial pneumonia between 1998 and 2007 in Australia showed that implementation of pneumococcal vaccination use by national financing and increase of access to vaccination contributed significantly to reduced admission for pneumonia in children aged zero to four years.\(^{(16)}\) This study showed given suggestion on what should be done to promote actions to prevent hospital admissions for bacterial pneumonia among children.

For this reason, results of our study show the need to activate mechanisms to improve the epidemiological profile of admissions due to bacterial pneumonia because prevention, diagnosis, treatment of acute disease and follow-up of chronic disease can all help reduce hospital admission for PHC conditions.\(^{(4)}\)

In this sense, in 2010 the National Immunization Program included in the vaccination schedule 10-valent pneumococcal conjugate vaccine, which represented an important advance in Brazilian public health concerning prevention of invasive disease and other disease caused by *S. pneumoniae*.\(^{(17)}\) However, it is worth to emphasizing that our study delineated tendencies of hospital morbidity related to bacterial pneumonia in 2000 to 2011, which did not permit to assess the effects of vaccination, from the two first months of life, throughout time series studies.

In the future, local studies will be needed to explore nuances of this phenomenon and its temporal progress, with the purpose of obtaining detailed evidences on the behavior of bacterial pneumonia in children and adolescents. In this sense, managers and health professionals can, together, define strategies to strengthen actions of primary care.

**Conclusion**

Hospital admission for bacterial pneumonia in children and adolescents differed by health macro-region, age and sex. This rate was high in the East region and in male children aged one to four years old. Hospital admission for bacterial pneumonia tends to increase among children younger than one year of age.

**Collaborations**

Hatisuka MFB; Arruda GO; Fernandes CAM and Marcon SS contributed to the conception of the project, analysis and interpretation of data, critical review relevant for intellectual content and approval of final version of the manuscript to be published.

**References**


Consumption of alcohol among nursing students
Consumo de bebidas alcóolicas entre estudantes de enfermagem

Cláudia Geovana da Silva Pires¹
Fernanda Carneiro Mussi¹
Raisa Correia de Souza¹
Diorlene Oliveira da Silva¹
Carlos Antonio de Souza Teles Santos¹

Abstract
Objective: To compare the consumption of alcohol among freshmen and senior nursing students of an undergraduate course.

Methods: Cross-sectional study with 154 nursing students. The research instrument was a questionnaire with socio-demographic data and academic life and the Alcohol Use Disorders Identification Test (AUDIT). In the data analysis, we used descriptive statistics, Pearson chi-square test, Fisher’s exact test and linear trend. A statistical significance of 5% was adopted.

Results: Most participants were female, aged 20-24 years old, single, who were black and from the C socioeconomic class. A total of 57.1% of the sample consumed alcohol. We found a higher frequency of consumption and alcohol doses for undergraduate students and greater proportion of these in AUDIT risk level zone II, III and IV. There was no statistically significant difference in analysis between zone and year of study.

Conclusion: Senior students had higher harmful alcohol consumption.

Keywords
Alcohol drinking; Alcoholism; Students, nursing; Education, nursing; Risk factors

Descritores
Consumo de bebidas alcóolicas; Alcoolismo; Estudantes de Enfermagem; Educação em Enfermagem; Fatores de risco

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Corresponding author
Cláudia Geovana da Silva Pires
Doutor Augusto Viana Filho Avenue, unnumbered, Campus Canela, Canela, BA, Brazil. Zip Code 40110-16
cgspires@uol.com.br

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¹Escola de Enfermagem, Universidade Federal da Bahia, Salvador, BA, Brazil.
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**Introduction**

The consumption of alcohol has ancient character in different cultures and societies. The legalization of its use and availability for affordable prices facilitates and contributes to the indiscriminate and bani-

nalized consumption among different age groups, which has become a serious public health problem affecting more vulnerable social groups such as young people and university students.\(^1\)

The abuse of alcohol leads to functional, social and psychological limitations to the individual; it affects health and quality of life of family members and increases the rates of urban, domestic and intra-family violence, and automobile accidents.\(^2\) In addition, alcohol consumption leads to the death of 2.5 million people per year worldwide and 320,000 deaths, between 15 and 29 years old, are related to such consumption - which represents 9\% of total.\(^3\)

Youth is one of the stages of human development cycle, in which the individual is faced with the need to make decisions that will outline her/his future, as well as being exposed to a world of new discoveries and experiences, and the formation of new bonds. The opportunity to experience the “unknown” makes this public a potential consumer of alcohol and thus, they become an advertising target for manipulation. At this condition, we can add access to university as a passport to individual freedom from the family, particularly for students moving to larger centers and away from their home communities.\(^2\)

In a literature review, from the last 10 years, in the databases of the Virtual Health Library, Portal Capes, CINAHL, EMBASE and SciSearch, using the keywords “alcohol consumption” and “Nursing students” only a few researches relating to university students in that area were found.

For nursing students, consumption of alcohol in the academic circle occurs for recreational purposes,\(^1,2,4\) as an alternative to relaxation and to carry the overload, pressures and exhaustion of the university activities, besides that, their consumption may also be related to acceptability in social and cultural contexts.\(^2\)

The increase number of research on alcohol consumption with Nursing university students can guide effective measures to prevent and control damage to a social group that is supposed to promote individual and collective health. Nurses should work in identifying risk groups to propose practices of care in health/Nursing that help individuals to think of new ways of being and living, in order to improve quality of life. Given the above, the objective of this study was to compare the consumption of alcohol among freshmen and senior nursing students of the undergraduate course.

**Methods**

This is a cross-sectional study carried out at a Nursing school from a public university in Salvador, the state capital of Bahia, in northeastern Brazil. In the period of data collection, held in the second semester of 2011, 55 students were enrolled in the first semester and 51 in the second semester (of the first year), 42 in the eighth semester and 39 in the ninth semester (of the final year).

The 187 students enrolled were addressed in the classroom, with previously scheduled time at the collegiate of the Nursing undergraduate course, with the introduction of the researchers, an awareness of the importance of the research and the explanation of the objectives. Of these students, 154 agreed to participate, constituting the sample: 48 were from the first semester and 43 from the second semester (first year of the course/freshmen), 31 were from the eighth semester and 32 were from the ninth semester (final year/senior students). All participants met the following inclusion criteria: minimum age of 18 years, both genders, enrolled and attending the first two or the last two semesters of the undergraduate course.

Three instruments for data collection were used. For socio-demographic data, a questionnaire was used, the first part included closed and semi-structured questions about age in years, gen-
order, self-declared skin color/ethnicity, marital status, family income, monthly personal expenditures and socioeconomic status. For data collection of academic life, the form included closed questions such as, current semester, type of school where she/he had finished high school, how they were enrolled in the university, study workload during the semester they were at, the number of days per week and shifts in school, and extracurricular activity. The Alcohol Use Disorders Identification Test (AUDIT) instrument was used to identify the consumption of alcoholic beverages.

The AUDIT was created to identify problems related to alcohol consumption in primary health care. It allows identifying the dependence on alcohol, especially in the last 12 months. It consists of ten questions, each with scores ranging from zero to four, totaling a maximum of 40 points, according to the scores of the results the intervention will be defined.

The data were coded, entered into SPSS and exported to STATA statistical software version 12.0 for Windows platform for the generation of results. Data analysis consisted of descriptive study and exploratory of socio-demographic characteristics of students. Univariate and bivariate frequency distributions were used for qualitative variables, and means and standard deviation were used for quantitative variables. The bivariate analyzes were performed in order to describe and verify proportional differences between freshmen and senior students, as well as the characteristics of interest of the study, by applying the Pearson Chi-square test and Fisher exact test. To check proportional trends between the variables of the ordinal type and groups, we used chi-square test for linear trend. We adopted the level of significance of 5% (p≤0.05). The power of this study was estimated for an average prevalence of alcohol consumption of 35%, and adopted a mean difference in prevalence between the groups (first and last year) of 10%. The significance level was 5% and the study power of 94%.

The development of the study followed national and international standards of ethics in research involving humans and animals.

Results

The sample consisted of 154 nursing undergraduate students who agreed to participate in the study, as shown in table 1. Among them, 59.1% were enrolled in the first year and 40.9% in the last year of the course; 89.6% were female, and the proportional distribution by gender was similar to the overall ongoing for years.

The mean age was 22.4 ± 4.5 years, with predominance of the age group 20-24 years (52.6%), both for freshmen and senior students. The groups had statistically significant proportional differences in age and the year of study, with a predominance of final year students at older ages.

Predominantly, students self-reported as being brown (56.1%), followed by black (21.4%), with the highest percentage of brown skin color for both groups. There was no proportional association between skin color and year of study. Married people were less frequent (6.5%) and there was a predominance of singles (51.3%) and without a permanent partner (42.2%) in senior students. The groups presented statistically significant proportional differences in marital status and the year of study.

A higher proportion of students belonged to C socioeconomic class (45.5%), with similar distribution in both groups. The monthly family income with greater proportion of the sample was of up to five minimum wages (p=0.997). The monthly expense of the student identified with greater proportion was up to one minimum wage (50.0%). However, in the group of first year students, personal expenses of less than one minimum wage (57.1%) was more frequent than in the last year group.

It was found for the sample, the prevalence of students from public high schools (52.6%), as verified for the semesters in progress. Most students were enrolled in the course through the university admission exam (96.1%), the same was observed for senior students. A higher proportion of students in the first and last years attended the course between 5-6 days (79.2%). However, a higher percentage of first-year students (97.8%) remained more days in school compared to last year (52.4%).
Consumption of alcohol among nursing students

Students devoted to the academic activities predominantly in two shifts at school (55.9%). However, there was a reversal in this ratio between senior students because a higher percentage of first-year students (68.1%) attended two shifts and a higher percentage of last year (61.9%), only one. It was found a predominance of conducting extracurricular activity in the sample (94.2%) for the first year group (95.6%) and last year (92.1%). As for the distribution of workload in the semester, ≥ 400 hours predominated in the sample (78.6%) and for the years in progress.

Regarding the pattern of alcohol consumption, as shown in table 2, it was observed that, out of the 154 undergraduates, 42.9% had never drunk this type of beverage and 57.1% reported alcohol consumption. The higher frequency of consumption was observed for the group from the last year compared to the first year (p=0.01).

As the number of doses consumed, predominated for both the freshmen and senior students, consumption of one or two, and three or four doses. However, comparison of the number of doses of the senior students showed high proportions of one or two, and three or four doses for freshmen students and a greater proportion of five or six doses and seven or more doses for students in the last year (p=0.36).

There was a highest percentage of first-year students who had never consumed six or more doses on one occasion (47.8%) compared to last year (23.8%). This pattern was higher among senior students that in less than once per month and once a week. Among freshmen, in a greater proportion the frequency was once per month. These data showed an increasing trend in the frequency of consumption of six or more doses on one occasion for the last year.

In table 3, we observed that both the freshmen and senior students, there was a higher proportion of students who never perceived inability to control alcohol consumption, never missed commitments due to drinking and have never had a need to drink in the morning to feel better after excessive consumption. There were no statistically significant proportional increase or decrease trends in frequency of dependence symptoms by alcohol consumption between groups.

As for the recent problems in life and related to alcohol consumption, it was found that 84.8% of students in the first and 73.8% of the last year did not feel guilt or remorse after consuming alcohol. However, in 2.2% of first-year students, this feeling was present in all or almost every day. Half of the sample (52.2% freshmen and 47.6% senior students) never suffered the lack of memory of what happened the night before because of alcohol.

It was found that 91.2% of students in the first and 79.4% of the last year reported not to having suffered losses in personal life or another person due to alcohol consumption. Among those who reported impairment, the same occurred more frequently in the last year. It was also found in 91.2% of students in the first and 79.4% from...
last year, lack of concern or request to stop drinking by relative, friend, physician or other health professional.

As for the risk levels and their respective interventions, obtained from the results of the AUDIT, it was found for those who consumed alcoholic beverage (n=88), a higher proportion in Zones I (65.9%) and II (25.1%). We found a greater proportion of senior students when compared to first year students in Zones II (28.6% versus 21.7%) and III (11.9% versus 4.4%), and 2.4% in Zone IV for senior students. However, these differences were not statistically significant.

Considering that excessive consumption of alcohol is not well accepted socially, a limitation of the study may have been the omission of information from the students on that consumption, due to fear of reprisals in the training course in health and they could be publicly exposed to the dissemination of research results. Another limitation may be related to the fact of having used a convenience sample, which suggests caution in generalizing the results.

Focusing on the consumption of alcohol among freshmen and senior students of the Nursing

### Table 2. Pattern of alcohol consumption

<table>
<thead>
<tr>
<th>Pattern of alcohol consumption</th>
<th>Total (n=154)</th>
<th>Freshmen (n=46)</th>
<th>Seniors (n=42)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do you take alcoholic beverages? (n=154)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>66(42.9)</td>
<td>45(93.5)</td>
<td>21(33.3)</td>
<td>0.01</td>
</tr>
<tr>
<td>Once/ per month</td>
<td>40(26.0)</td>
<td>23(50.0)</td>
<td>7(29.4)</td>
<td></td>
</tr>
<tr>
<td>2-4 times/ per month</td>
<td>39(25.3)</td>
<td>21(45.8)</td>
<td>18(42.9)</td>
<td></td>
</tr>
<tr>
<td>1-3 times/ per week</td>
<td>9(5.8)</td>
<td>2(4.4)</td>
<td>7(17.1)</td>
<td></td>
</tr>
<tr>
<td>Number of doses, cups or bottles you normally take (n=88)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td>34(38.6)</td>
<td>19(39.1)</td>
<td>16(38.1)</td>
<td>0.36</td>
</tr>
<tr>
<td>3-4</td>
<td>31(35.2)</td>
<td>19(41.3)</td>
<td>12(28.6)</td>
<td></td>
</tr>
<tr>
<td>5-6</td>
<td>18(20.5)</td>
<td>7(15.2)</td>
<td>11(26.2)</td>
<td></td>
</tr>
<tr>
<td>7 or more</td>
<td>5(5.7)</td>
<td>2(4.4)</td>
<td>3(7.1)</td>
<td></td>
</tr>
<tr>
<td>Consumption frequency of 6 or more drinks on one occasion (n=88)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>32(36.4)</td>
<td>22(47.8)</td>
<td>10(23.8)</td>
<td>0.01</td>
</tr>
<tr>
<td>Less than once a month</td>
<td>36(40.9)</td>
<td>16(34.8)</td>
<td>20(47.6)</td>
<td></td>
</tr>
<tr>
<td>Once/ per month</td>
<td>14(15.9)</td>
<td>8(17.4)</td>
<td>6(14.3)</td>
<td></td>
</tr>
<tr>
<td>Once/ per week</td>
<td>6(6.8)</td>
<td>0(0.0)</td>
<td>6(14.3)</td>
<td></td>
</tr>
</tbody>
</table>

*Chi-square test for linear trend

### Table 3. Symptoms of dependence (n=88)

<table>
<thead>
<tr>
<th>Symptoms of dependence</th>
<th>Total (n=88)</th>
<th>Freshmen (n=46)</th>
<th>Seniors (n=42)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of perceived inability to control alcohol consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>78(88.6)</td>
<td>42(91.3)</td>
<td>36(85.7)</td>
<td>0.56</td>
</tr>
<tr>
<td>Less than once/ per month</td>
<td>6(6.8)</td>
<td>2(4.4)</td>
<td>4(9.5)</td>
<td></td>
</tr>
<tr>
<td>Once/ per month</td>
<td>4(4.6)</td>
<td>2(4.4)</td>
<td>2(4.8)</td>
<td></td>
</tr>
<tr>
<td>Missed commitments due to drinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>82(93.2)</td>
<td>43(93.5)</td>
<td>39(92.9)</td>
<td>0.82</td>
</tr>
<tr>
<td>Less than once/ per month</td>
<td>5(5.7)</td>
<td>2(4.4)</td>
<td>3(7.1)</td>
<td></td>
</tr>
<tr>
<td>Once/ per month</td>
<td>1(1.1)</td>
<td>1(2.1)</td>
<td>0(0)</td>
<td></td>
</tr>
<tr>
<td>Frequency of the need to drink in the morning after excessive drinking to feel better</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>85(96.6)</td>
<td>46(100)</td>
<td>39(92.9)</td>
<td>0.07</td>
</tr>
<tr>
<td>Less than once/ per month</td>
<td>3(3.4)</td>
<td>0(0)</td>
<td>3(7.1)</td>
<td></td>
</tr>
<tr>
<td>Once/ per month</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

*Chi-square test for linear trend
Consumption of alcohol among nursing students

As observed, the sample was predominantly female, self-declared brown skin color and class C. The presence of women in the Nursing undergraduate, even after the introduction of men in the profession, is still predominant. Other groups with different gender distribution may present different results observed in the study.

The study group was also consisted mostly of single students who were black, which is justified as the study was conducted in Salvador.

The prevalence of income was three to five minimum wages and the socioeconomic status was C. In other studies students who reported higher income consumed more alcohol.

In this study, more than half of the students of the first and last year finished elementary school in public schools. The fact that students get to enroll in a public university by the university admission exam corresponds to a selection process. When entering the course, students need to adapt to the new condition of life - being in university, which leads to the hypothesis that students of last year’s group could be more exposed to abusive alcohol consumption in relation to group in the first year. It is in this period that the group meetings are intensified and the consumption of alcohol increases, reaching the abuse. Adolescents and young adults are the population most at risk for alcohol consumption. Study with 1060 nursing students in Spain showed evidence of hazardous alcohol consumption with no gender differences and that the proportion of risk consumers was higher among younger smokers and people living outside the household. Although 42.9% of students never consumed alcohol in the last 12 months, 57.1% used to drink, we noted a statistically significant increase trend in the consumption of freshmen to senior. This finding was in agreement with other studies that found a higher percentage of excessive alcohol consumption in senior students from the health area and Nursing. Such behavior was justified by expectations before the entrance in the labor market, future plans, feelings of frustration and anxiety. Therefore, it is important to work with health promotion and the prevention of alcohol abuse with the group of students investigated.

There was, predominantly, no dependence symptoms in alcohol consumption between the groups, showing protection. The recent problems in life related to alcohol consumption did not reach most of them in their years in progress. However, when present, were more frequent in senior students, showing damage due to its use at the final year of the course, with regard to guilt or remorse after drinking, or missing commitments due to drinking, losses in personal life and concern on the part of the social group. The alcohol abuse is undeniably considered an aggravating factor in the imbalance of personal, family and professional life.

The predominant classification of the AUDIT in Zones I and II, both for the group of the first year as to the group of the last year. However, senior students were closer to the higher risk zones for alcohol consumption (Zones III and IV). Although one cannot identify the reasons that favored this consumption, we suppose that senior students are faced with greater stress overload, personal claim and anxiety, given the final period of the course and with the expectations of future employment. In a study conducted with Nurse students in the city of Sao Paulo (SP), the proportion was between 43-47% for moderate alcohol consumption. Study with 52,150 Chinese students, excessive alcohol consumption was 23.5%. A study conducted at the University of Castilla - La Mancha, the prevalence of students exposed to problematic alcohol consumption was 17.9%. In the present study, these percentages were higher, with 34.1% for the sample, 42.9% for senior students and 26.1% for freshmen, demonstrating the propensity for increased problematic consumption for the final year group.

The results indicate that students classified as Zone II require advice on the consumption of alcohol; those in Zone III, advice on alcohol consumption and continuous monitoring; and those in Zone IV, referral to specialists for diagnosis, evaluation and treatment. In this sense, in order to prevent so that these behaviors are perpetuated, the development of specific preventive strategies must happen in the locus of research and in other higher education institutions of Nursing, in order to avoid the
consequences of abuse, like diseases, individual and collective limitations, such as increased rates of absenteeism, violence, traffic accidents and other negative impacts on the personal interaction - being it personal or professional.

Education for responsible use of alcohol associated to government policies that limit access and supply of alcoholic beverages at parties such as open-bar in university events and on campus, can be an important strategy to reduce the problematic use of alcohol among young university students, preventing future problems.\(^{(4,5,7)}\)

**Conclusion**

We found a higher frequency of consumption and alcohol doses in the final year students of the Nursing course compared to the first year, and a higher proportion of senior students in Zones II, III and IV were found according to the AUDIT; however, the analysis between zones and year did not show statistically significant proportional differences. Educational interventions may prevent continuous and problematic alcohol consumption in nursing students.

**Collaborations**

Pires CGS and Mussi FC contributed to the project design, analysis and interpretation of data, drafting the manuscript, adaptation to the journal’s guidelines and approval of the final version to be published. Souza RC contributed in data collection, analysis and interpretation of data and approval of the final version to be published. Santos CAST and Silva DO collaborated in the analysis plan, data interpretation and approval of the final version to be published.

**References**

Professional competency profile of nurses working in emergency services

Perfil de competência profissional do enfermeiro em emergências

Flávia Lilalva de Holanda¹
Celina Castagnari Marra¹
Isabel Cristina Kowal Olm Cunha¹

Objective: To develop the professional competency profile for the nurse working in emergency services.

Methods: A descriptive exploratory study based on a Brazilian Competency Matrix, aligned to the market trends, to the particularities of emergency nursing, previous studies and the opinion of experts who determined whether the actions were appropriate for satisfactory performance of nurses in the mentioned area.

Results: Based on the basic skills and their associated competences, as indicated in the Matrix, we described 56 attitudes/behaviors represented by actions that identified a satisfactory performance of emergency. These attitudes/behaviors, designated as identifying issues, generated the Professional Competency profile that was assessed as appropriate for nurses.

Conclusion: The Competency Profile that should be expressed by nurses working in emergency services allows describing their level of competence and helps them achieve the desired excellence with a high-level practice. The psychometric phase is related to assessing behaviors and focuses the principles to be observed in relation to the theoretical procedures.

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Emergency nursing; Professional competence; Clinical competence; Evidence-based nursing; Nursing administration research

Descritores
Enfermagem em emergência; Competência profissional; Competência clínica; Enfermagem baseada em evidências; Pesquisa em administração de enfermagem

Abstract

Resumo

Corresponding author
Flávia Lilalva de Holanda
Napoleão de Barros street, 754, São Paulo, SP, Brazil. Zip Code: 04024002
flavia.lilalva@unifesp.br

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¹Escola Paulista de Enfermagem, Universidade Federal de São Paulo, São Paulo, Brasil.
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Introduction

Among the various professionals working in emergencies, the nurse is one who must be ready to face new challenges and deliver the needed and expected care to patients and institutions, in a timely manner, in order to ensure high-quality service with proper competence.

Brazilian authors, considering these issues, developed a “Professional Competency Matrix of the nurse in emergency services” with eight basic competencies and 31 associated competencies.(1) In this matrix, the basic competencies refer to the ability of the nurse who is performing the work, and it is supported by a set of general and specific knowledge, reflected in competencies and attitudes that are capable of adding professional and social value to his/her actions, distinguishing them from the reality in which he/she operates. The associated competencies, on their part, are concerned with the minimum support necessary for the development of each basic skill for quality nursing performance.

For the relationship among skills to be consistent in this proposal, the Matrix defined each competency to clarify its meaning and justify the interdependencies allocated to each of the items. As the Matrix developed a model that meant to be reproduced in emergency nursing practice, it became necessary to establish a Professional Competency Profile. Thus, we understood this profile to be a set of essential attitudes/behaviors inherent to the skills needed for professional practice.

Therefore, this study questioned: Is the Professional Competency Profile for nurses working in emergency services, as proposed from a Brazilian Matrix, adapted to the current reality that aims for effective care for patients with a predetermined level of quality? To find answers to this question, we defined as objectives the proposal for the Professional Competency Profile for nurses working in emergency services, the description of the attitudes and behaviors in professional practice during emergencies; the evaluation of the profile’s content with experts on the subject; and the adjustment of the content by incorporating the suggestions of the consulted experts.

Methods

This was an exploratory study developed at a public university in São Paulo during the year of 2013, aiming to define content able to express attitudes/behaviors of competent emergency nurses in daily professional practice. The framework used was the Professional Competency Matrix previously developed by the authors.(1)

To define the object of this study, in addition to the Matrix, we used experience and deductive reasoning aligned to the following subjects:

• Brazilian market trends for emergency nurses;
• Special features of professional emergency nurses;
• Professional trajectory, through the grouping of functions and responsibilities;
• Focus on patients and delivery of care capable of valuing the business, the professional and the patient.

Thus, for the development of the Professional Competency Profile content in emergencies, we described essential attitudes/behaviors related to a nursing practice of excellence, based on the concepts of basic skills and their respective associated competencies, giving them the definition of Competency Identifying Issues. It should be noted that, despite the assignment of associated competencies to more than one basic competency, the content of the identifying issues does not repeat. Thus, this issue represented the type of action that nurses should express in order to manifest the considered competencies.

To relate the basic skill to its associated competencies, and to the identifying issues, we employed Arabic numerals. The basic and associated competencies were identified by whole
Professional competency profile of nurses working in emergency services

A total of 56 identifying issues were formed to establish a profile resulting from the concepts of the eight basic skills and the 31 associated competencies.

With regard to the associated competencies, 14 were indicated only once and 17 were repeated two to four times, as they were indispensable support for development of the basic competencies.

The content analysis occurred in two steps with the participation of six experts, two in the first phase and four during the second phase. In the first step, two experts considered that the content was relevant, clear and achieved the expected objective. To improve the objectivity of the text and reduce the time for the assessment of each question, they suggested a more concise description of the identifying issues. In the next step, four other experts reviewed the text with the incorporated suggestions, and found that it met its objectives.

The developed and evaluated profile was comprised of eight basic competencies and their concepts, 56 associated competencies, and 56 identifying issues, as presented in chart 1.

Discussion

In this exploratory, descriptive study, the Professional competency profile of the emergency nurses allowed for the identification of three main strategies that justified it: operational excellence, a patient-centered approach, and assistance capable of valuing the delivered service, the professional and the patient him/herself. Within these limits, the Competency Identifying Issues were able to recognize the Brazilian reality, by considering the grouping of emergency nurses’ attributions and responsibilities, respecting Brazilian nursing specificities, and aligning the market’s tendency, focused at its better comprehension and utilization.

During the research development process, we found dozens of national studies addressing the aforementioned elements. However, there are few studies published in journals dealing specifically with professional competence of emergency nurses, since most publications discussed skills without the desired specificity or exclusive use for the management area.

This lack of studies on emergency nurses’ competencies was supported by the international literature. The few references identified, despite their relevance, should be analyzed with reservation due to their focus on different dimen-
### Chart 1. Professional competency profile of emergency nurses

1. **Basic Skill CARE PERFORMANCE - Ability of the nurse to provide care individualized to the needs and expectations of clients in order to ensure a care modeled on his own scientific knowledge and in technical procedures essential for a quality result.**

<table>
<thead>
<tr>
<th>Identifying Issues - Care Performance I</th>
<th>Associated Competency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attention</td>
<td>1.1 Attention</td>
</tr>
<tr>
<td>1.2. Control of risk</td>
<td>1.2.1 Control of risk</td>
</tr>
<tr>
<td>1.3. Resolvability</td>
<td>1.3.1 Resolvability</td>
</tr>
<tr>
<td>1.4 Responsibility</td>
<td>1.4.1 Responsibility</td>
</tr>
<tr>
<td>1.5 Sense of readiness</td>
<td>1.5.1 Sense of readiness</td>
</tr>
<tr>
<td>1.6 Sense of urgency</td>
<td>1.6.1 Sense of urgency</td>
</tr>
<tr>
<td>1.7 Technical execution</td>
<td>1.7 Technical execution</td>
</tr>
</tbody>
</table>

2. **Basic Skill TEAMWORK - Ability to develop coordinated actions in the working group for the execution of work activities to achieve common objectives with an evident cooperative spirit.**

<table>
<thead>
<tr>
<th>Identifying Issues - Teamwork</th>
<th>Associated Competency</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Cooperation</td>
<td>2.1.1 Cooperation</td>
</tr>
<tr>
<td>2.2 Communication</td>
<td>2.2.1 Communication</td>
</tr>
<tr>
<td>2.3 Discernment</td>
<td>2.3.1 Discernment</td>
</tr>
<tr>
<td>2.4 Efficacy</td>
<td>2.4.1 Efficacy</td>
</tr>
<tr>
<td>2.5 Efficiency</td>
<td>2.5.1 Efficiency</td>
</tr>
<tr>
<td>2.6 Emotional balance</td>
<td>2.6.1 Emotional balance</td>
</tr>
<tr>
<td>2.7 Respect</td>
<td>2.7.1 Respect</td>
</tr>
</tbody>
</table>

3. **Basic Skill LEADERSHIP - Ability to influence the attitudes and behaviors of people for the execution of work tasks in a particular plan of action, with the best use of the proposed strategy to achieve business objectives.**

<table>
<thead>
<tr>
<th>Identifying Issues - Leadership</th>
<th>Competency Associated</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Autonomy</td>
<td>3.1.1 Autonomy</td>
</tr>
<tr>
<td>3.2 Reliability/Credibility</td>
<td>3.2.1 Reliability/Credibility</td>
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<tr>
<td>3.3 Communication</td>
<td>3.3.1 Communication</td>
</tr>
<tr>
<td>3.4 Emotional control</td>
<td>3.4.1 Emotional control</td>
</tr>
<tr>
<td>3.5 Flexibility</td>
<td>3.5.1 Flexibility</td>
</tr>
<tr>
<td>3.6 Persuasion</td>
<td>3.6.1 Persuasion</td>
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<tr>
<td>3.7 Potential Negotiator</td>
<td>3.7 Potential Negotiator</td>
</tr>
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continue..
### Professional competency profile of nurses working in emergency services

3.7.1 He/she obtains agreement through dialogue between the parties so that there is balance in meeting the legitimate interests of those involved, creating credibility of those who are engaged in the work, improving personal and professional relationships.

<table>
<thead>
<tr>
<th>Competency Associated</th>
<th>Identifying Issues - Humanization</th>
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<tbody>
<tr>
<td>4.1 Welcoming</td>
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<td>4.2 Communication</td>
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<td>4.3 Dialogue</td>
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<td>4.4 Resolubility</td>
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<td>4.5 Respect</td>
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<tr>
<td>4.6 Listening</td>
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</tbody>
</table>

4. Basic Skill HUMANIZATION - Ability to give dignified attention to people in accordance with their culture, values and beliefs, in an environment with minimal conditions of attention and work.

4.1.1 He/she overcomes obstacles at work so as to deliver adequate care to patients and staff, showing that it is possible to seek appropriate solutions to situations that impact the environment around them.

4.2.1 He/she uses a communicative approach, supported by clarity of the message, and is open to patient and team member perceptions about patient vulnerabilities, individualizing the contact.

4.3.1 He/she exchanges ideas and shares meanings with the team and the patients in an environment favorable to this relationship, contributing to harmonious connection between them.

4.4.1 He/she finds appropriate solutions to patient and team problems, using actions which decrease the time to obtain solutions.

5. Basic Skill INTERPERSONAL RELATIONSHIP - Ability to interact with people on a daily basis, considering their needs and expectations and adding value to this relationship. It involves courteous, empathetic and professional contact.

5.1.1 He/she demonstrates credibility for transparency of the behavior, providing interaction with patients and staff in a friendly manner.

5.2.1 He/she recognizes the role of the exchange of ideas for effective communication in patient and team relationships.

5.3.1 He/she reacts to adversity in the interaction with patients and teams, managing emotions for achieving empathetic and professional relationships

5.4.1 He/she clearly and quickly recognizes there is an interaction between the surrounding environment and patients and work teams, and separates truth from error as way of minimizing conflicts.

5.5.1 He/she interacts cordially with patients and work teams, being open to their needs and expectations, according to their individuality, and consolidating the ties that bind the everyday relationships.

5.6.1 He/she is aware that learning to listen and understand patients and work teams is an essential factor for healthy connection, adding value to the relationship.

6. Basic Skill DECISION-MAKING - Ability to choose a course of action among several reasonable alternatives for action in daily situations/conditions, considering knowledge, practices, limits and risks involved in the decision-making process.

6.1.1 He/she makes rational choices, considering the alternatives to the team’s daily work activities, using his/her freedom of action within the current professional legal provisions.

6.2.1 He/she is consistent with his/her principles when facing difficulty in determining individual and team actions, assuming the consequences of his/her actions, asking for help in complex situations, and correcting deviations from the resulting decisions.

6.3.1 He/she determines his/her own everyday action plans, using a sensible and clear perception of the team’s potential and limits, with certainty as guideline.

6.4.1 He/she avoids behaviors conflicting with the team when making decisions, adjusting quickly to the unexpected events at work, and valuing his/her physical and emotional limits.

6.5.1 He/she exposes impersonal ideas or positions based on reality and supported by knowledge, practices and research findings, improving team’s acceptance of this decisions.

6.6.1 He/she uses the resolute action as a strategy in choosing the most legitimate options to make decisions, so that the team finishes the work and achieves patient satisfaction.

6.7.1 He/she considers the best possible alternative in choosing a course of action when planning, promptly correcting deviations and leading the team to do activities at the right time.

7. Basic Skill OUTCOMES ORIENTATION - Ability to perform the work focused on the outcomes and supported by action plans in which the objectives, tasks and responsibilities are previously defined and aligned to the availability of sufficient resources.

7.1.1 He/she accepts the culture, values and beliefs of patients and staff with attitudes and behaviors that manifest this acceptance, ensuring the expression of the will of each person.

6.6.1 He/she knows how to listen to patients and to the work team without prejudging their ideas and positions, paying attention to what is said to understand them and avoiding interruptions with phrases supplementing what is being said.
work with excellence at any level of emergency care. Still, it should be noted that there are limitations to the research because it was evaluated only by a small group of experts. Although all of them indicated that the profile is suitable for emergency nurses, it is necessary to check its validity and its reliability.

The practical applicability of the outcomes focused mainly on allowing managers and nurses to feel informed about which professional skills can be identified and which can be developed in short and medium terms for qualified emergency care performance. Furthermore, institutions and professional services could be supported by this information to direct resources, meet expectations and even develop career plans.

sions and specific realities. (2,6) These studies raised aspects related to the context of professional practice standards in Brazil. (2,6)

As it can be seen from the context of this discussion, no similar studies exist in the literature with the same perspective of relating attitudes/behaviors with competencies, so that the authors of this study proposed this profile based on theoretical knowledge, practice and extensive professional experience.

Therefore, the proposal aimed to provide a different perspective from what was previously studied about the theme of emergency nurse competencies, in order to be embracing and comprehensive. Thus, the study exposed a Competency Profile for nurses to work with excellence at any level of emergency care. Still, it should be noted that there are limitations to the research because it was evaluated only by a small group of experts. Although all of them indicated that the profile is suitable for emergency nurses, it is necessary to check its validity and its reliability.

The practical applicability of the outcomes focused mainly on allowing managers and nurses to feel informed about which professional skills can be identified and which can be developed in short and medium terms for qualified emergency care performance. Furthermore, institutions and professional services could be supported by this information to direct resources, meet expectations and even develop career plans.
Conclusion

The Professional Competency Profile of nurses working in emergency services was developed based on a Brazilian Matrix. Our findings contributed to exposure, in a clear and objective way, of the attitudes/behaviors capable of expressing the desired excellence in nursing practice.

Acknowledgements

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Collaborations

Holanda FL; Marra CC and Cunha ICKO declare their contribution to the development of the Competency Matrix; manuscript drafting; critical revision of the intellectual content; and, final approval of the version to be published.

References

Adherence to diabetes mellitus treatment and sociodemographic, clinical and metabolic control variables

Clarissa Cordeiro Alves Arrelias¹
Heloisra Turcato Gimenes Faria²
Carla Regina de Souza Teixeira¹
Manoel Antônio dos Santos³
Maria Lucia Zanetti¹

Abstract

Objective: To investigate the association between adherence to type 2 diabetes mellitus treatment and sociodemographic, clinical and metabolic control variables.

Methods: Cross-sectional study that included 417 diabetes mellitus patients. The research instrument was a questionnaire with the study variables; Treatment Adherence Measure; Food Consumption Frequency Questionnaire and International Physical Exercise Questionnaire. Fisher’s Exact Test was used to analyze the data.

Results: About 98.3% showed non adherence to the diet, 41.9% to physical exercise and 15.8% to the medication treatment.

Conclusion: No association was found between adherence to type 2 diabetes mellitus treatment and sex, age, years of education, length of diagnosis and metabolic control variables.

Keywords
Patient compliance; Diabetes mellitus/nursing; Nursing care; Primary care nursing; Primary health care

Descritores
Adesão à medicação; Diabetes mellitus/enfermagem; Cuidados de enfermagem; Enfermagem de atenção primária; Atenção primária à saúde

Submitted
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Conflicts of interest: none to declare.
Introduction

Patients, family members and health professionals have increasingly assumed active roles in the management of diabetes mellitus in response to the care demands. To manage the disease, the patients’ engagement, the health professionals’ training and family and social support are recommended. When the patients face difficulties to assume self-care in the management of their disease, the possibility of not adhering to the recommended treatment is considered.

In this study, non-adherence was considered when the patient’s behavior - taking medication, following the diet and making the required lifestyle changes - do not correspond to the recommendations agreed upon with the health professional.

Non-adherence to the treatment of diabetes mellitus is a problem whose dimensions are renowned in the international and Brazilian contexts, contributes to the low efficiency level of the treatment with complications in the medium and long-term and, consequently, increases the demand for high-complexity health services.

The prevalence of non-adherence shows great variation depending on the study design, research population and measuring method. In the literature, the rates vary between 17% and 86% for medication treatment, 62% to 71% for the diet and 47% to 80% for physical exercise.

The evidences show that patients with DM adhere less to the diet and physical exercise than to the medication treatment. On the other hand, studies related to non-adherence to the diet and physical exercise remain scarce, as most studies relate to adherence to the medication treatment. Studies that investigated the aspects of treatment adherence appoint that cases of non-adherence prevail over adherence cases.

In a cross-sectional study undertaken in 2010 to investigate adherence and metabolic control in DM patients, out of 423 patients with type 2 DM enrolled in 17 Family Health Services (FHS), only six presented adherence to the three recommended treatment pillars - medication, exercise and diet. Based on this study, other research questions emerged, such as: what are the sociodemographic, clinical and metabolic control characteristics of patients who did not adhere to the treatment? Is there a relation between the variables sex, age, education, length of diagnosis and metabolic control and non-adherence?

In view of the complexity of the treatment, the stakeholders in the disease management face a continuing challenge due to the countless variables involved in the treatment adherence. Knowledge about the variables can support the search for innovative and specific strategies in care delivery to DM patients who do not adhere to the established treatment, as well as enhance the efficacy of the treatment and reduce the demand for high-complexity health services.

The objective in this study was to investigate the association between adherence to type 2 diabetes mellitus treatment and sociodemographic, clinical and metabolic control variables.

Methods

A cross-sectional and exploratory study was carried out, involving 417 type 2 diabetes mellitus patients, selected through a stratified random sample, in the Southeast of Brazil. Adherence to the three recommended treatment pillars - medication, diet and exercise - was considered. Among the 417 patients, 39 had no body mass index (BMI) records, 33 no abdominal circumference (AC) records, 28 no blood pressure (BP), glycated hemoglobin (HbA1c), total cholesterol (TC), triglyceride (TG) and high-density lipoprotein (HDL) cholesterol records and 56 no low-density lipoprotein cholesterol records.

Four data collection instruments were used: a questionnaire with sociodemographic, clinical and metabolic control variables; the Treatment Adherence Measure (TAM), consisting of seven items to assess the patient’s behavior regarding the daily intake of the prescribed medication, on a six-point Likert scale, from 1 (always) to 6 (never); the Food Consumption Frequency
A questionnaire (FCFQ) to assess the consumption of ten food groups according to the number of times the food was consumed in days, weeks, and months, and the size of the portions consumed; the International Physical Activity Questionnaire (IPAQ) - short version, consisting of eight questions that assess the level of habitual physical activity, based on information about the frequency, duration of physical activity, as well as the time spent sitting in the week before the interview.\(^9\)\(^-\)\(^{13}\)

To analyze the data, the sociodemographic (age, sex, years of education), clinical (length of diagnosis, body mass index, abdominal circumference, blood pressure, oral antidiabetics, food consumption and physical activity level) and metabolic control variables (glycated hemoglobin, total cholesterol, triglycerides, high-density lipoprotein cholesterol and low-density lipoprotein cholesterol), as well as the MAT and QFCA scores and IPAQ classification.

The reference scores for the analysis were: BMI below 25 kg/m², AC below or equal to 88 cm for women and below or equal to 102 cm for men, systolic blood pressure (SBP) below 130 mmHg and diastolic blood pressure (DBP) below 85 mmHg, glycated hemoglobin (HbA1c) equal or inferior to 6.5%, total cholesterol (TC) inferior to 200mg/dl, triglycerides (TG) inferior to 150mg/dl, high-density lipoprotein cholesterol (HDL) superior to 45mg/dl and low-density lipoprotein cholesterol (LDL) inferior to 100 mg/dl.\(^{12}\)\(^-\)\(^{16}\) Concerning the dietary consumption, the dietary consumption of 45 to 60% of carbohydrates, saturated fat inferior to 7%, cholesterol inferior to 300mg, protein between 15 and 20%, dietary fibers equal or superior to 20 grams, number of daily meals equal or superior to five was considered appropriate.\(^{16}\)

To analyze the data from the MAT questionnaire, the scores on each item were added up and divided by the number of items. Scores under five were considered as non-adherence.\(^{11}\) For the data obtained on the QFCA, the software Dietsys, version 4.0, was used to obtain the values related to the quantity of fibers and cholesterol in milligrams and the percentage of carbohydrates, proteins, total fat and saturated fat consumed. Non-adherence was considered as non-compliance with three out of six nutritional recommendations for the nutritional treatment recommended by the American Diabetes Association, which are: daily consumption of total carbohydrates (45 to 60%), dietary fiber (20g or more) and meal fractioning (five to six meals).\(^{12}\)\(^-\)\(^{16}\) For the IPAQ, the individuals were categorized as: sedentary, insufficiently active, moderately active and highly active. For non-adherence, the patients were categorized as sedentary and insufficiently active.

To describe the sociodemographic, clinical and metabolic control data and the prevalence of non-adherence to the treatment, descriptive analysis was used. To investigate the association between non-adherence to treatment and the variables sex, age, years of education, length of diagnosis and the metabolic control variables, the data were submitted to Fisher’s Exact Test. The statistical analyses were developed using the statistical software Statistical Analysis System® 9.0 (SAS). P-values inferior to 0.05 were considered significant.

The study development complied with the Brazilian and international ethical standards for research involving human beings.

**Results**

Among the 417 (100%) DM2 patients, the women were predominant (66.2%). The mean age was 62.5 (standard error 11.7 years) and the mean length of education 4.2 (standard error 3.5 years). The mean length of diagnosis was 9.0±6.6 years. The majority was overweight, with a mean BMI of 29.3 (standard error 5.3 kg/m²). Most patients (76.3%) presented an altered AC, 77.1% of them women. The mean SBP and DBP were 146.1 (standard error 25.1) and 83.3 (standard error 12.5 mmHg), respectively (Table 1); 69.1% presented altered values, that is, SBP and DBP superior to the reference values.

As regards the medication treatment, 74.6% of the patients used biguanides, 67.6%, sulfonylureas
and 4.1 drugs from other classes. Concerning the diet, most patients consumed appropriate quantities of carbohydrates, cholesterol and proteins. Saturated fat consumption exceeded recommendations while dietary fiber remained inferior to the recommended levels. The mean number of daily meals was 3.9 (standard error 0.9). Most patients were classified as moderately active (30%) and highly active (28.1). What the metabolic control is concerned, the majority showed altered values for HbA1c, TG, HDL and LDL (Table 1).

Among the 417 patients investigated, 98.3% did not adhere to the diet, 41.9% to physical exercise and 15.8% to the medication treatment. In the total group of patients investigated, 6.2% did not adhere to the three treatment pillars, 43.6% to two pillars and 34.5% of the patients did not adhere to the diet and physical exercise. In addition, 50.1% did not adhere to a single treatment pillar and 48.4% of the patients did not adhere to the diet.

No association was found between non-adherence to the treatment and the variables sex, age, years of education, length of diagnosis and metabolic control (Tables 2 and 3).

**Discussion**

The study design did not permit the establishment of causal relations, but the results are relevant from the clinical viewpoint and can contribute to the identification of individual characteristics and clinical aspects of patients refractory to the treatment. The understanding of the phenomenon of non-adherence can sensitize the health professionals regarding what variables are relevant when approaching patients with difficulties to adhere to the treatment. In that sense, these patients demand continuing support to achieve the established disease control targets from the perspective of diabetes education.

In this study, no statistically significant difference was found between the sociodemographic variables and non-adherence to the three treatment pillars. In terms of sex, the results found are in line...
with the literature, indicating a higher prevalence of women who do not adhere to the medication treatment and physical activity than men, although without significant evidence. (7,8,17) Concerning sex and diet, the results found add evidence to the literature, considering the lack of studies that established this link. (10)

It can be inferred that the predictive variables of non-adherence can take different forms in men and women. Characteristics like low quality of life and socioeconomic level, problems to cope with the disease and higher prevalence of negative feelings are frequently found in women. These factors can represent predictive variables of non-adherence to the treatment.

In terms of age, the studies available in the literature sustain the results found in this research. (10,17) Elderly people display particularities in terms of age that can favor the non-adherence to the treatment. Polypharmacy, related to cognitive problems like forgetting, and physical limitations like visual problems, and even low education and knowledge about the disease are strong predictors of non-adherence to the medication. (3,7)

Despite the countless aggravating factors related to age that can interfere in the non-adherence to the treatment, there is still a lack of studies on the relation between age and physical exercise and diet. The comparative analysis of age and medication adherence available in the literature may not reveal
the extent of the problem. Therefore, future studies can establish the relation between age and adherence to the three treatment pillars, also considering differences in treatment adherence depending on the lifecycle phase. Nevertheless, it should be taken into account that each treatment modality presents peculiarities that can impose different barriers for each age range.

Concerning education, the results found are in line with studies that did not find evidence either based on which the association between education and non-adherence to treatment can be affirmed.\(^{17,18}\) Education demands attention from researchers and health professionals though. Establishing this link can contribute to the assessment of health service users and to the planning of educative activities in view of the particularities of each learning phase in the lifecycle. If they understand and know about the disease and the treatment, the users will be better able to understand the importance of the recommendations and adhere to the activities the multiprofessional health team has programmed.

What the length of the diagnosis is concerned, as opposed to the results found, other studies show that patients with a shorter length of diagnosis and in the initial phase of the treatment are less adherent to the medication treatment and to self-care in diabetes.\(^{19,20}\) On the other hand, patients with a longer length of diagnosis may have further information on the disease, making them feel safer and more self-confident towards the proposed treatment.\(^{21}\)

Over time, treatment compliance can be neglected due to a lack of motivation and perception of effective results, lack of time, absence of family support, comorbidities, cultural issues, among others.\(^{21}\)

In that sense, health professionals need to double their attention to newly diagnoses patients, with a view to providing them with clarifications about the chronic nature of the disease and the importance of following the treatment regularly. In addition, possible perceptions and beliefs that can compromise treatment compliance and adherence to the health team’s recommendations need to be investigated. For patient with a longer length of the diagnosis, the level of motivation and possible limitations that can hamper the adherence to the proposed treatment also need to be assessed.

The analysis of the relation between the metabolic control variables and the non-adherence to the medication treatment, diet and physical activity showed that most non-adherence patients show inappropriate levels of HbA1c, triglycerides, HDL-C and LDL-C. The literature shows that non-adherence to the medication treatment is related to high levels of HbA1c.\(^{20-22}\) A ten-percent increase in adherence to oral anti-diabetics can lead to an 0.1% drop in HbA1c levels.\(^{23}\)

Except for randomized clinical trials, lifestyle interventions involving diet and physical activity are complex investigations due to the multiple factors that can interfere in the analysis of the results. A lifestyle intervention study that monitored diabetic users in primary care over 12 months did not find a significant difference in the lipid profile, including triglyceride levels.\(^{23}\)

Keeping the lipid profile within normal levels is important to prevent the cardiovascular risk. Non-adherence to the treatment does not necessarily represent worse metabolic control. Dyslipidemia results from a complex set of factors that interact mutually and vary depending on the study design, population characteristics, among others.\(^{23}\)

It can be inferred that the relation between non-adherence to the diet and physical activity and triglyceride levels, as well as the levels of the other lipid variables, need to assessed with caution, considering interference from other factors like the monitoring period, disease stage, complications and comorbidities, other drugs and therapies used in combination, the veracity of self-reporting, among others.\(^{24}\)

Knowing the population characteristics can provide support in terms of the possible factors that lead DM users to non-adherence behaviors. The factors related to non-adherence differ and take various forms depending on the treatment component and the research population. Studies
with other designs are needed to better understand this theme.

The researchers expect that these study results can contribute to the situational diagnosis of DM users and to the search for innovative strategies to cope with the weaknesses regarding the non-adherence to the three diabetes treatment pillars. This assessment can also constitute a valuable tool to permanently measure the impact of the interventions put in practice.

**Conclusion**

No statistically significant association was found between non-adherence to the treatment and sex, age, years of education, length of diagnosis and metabolic control variables.

**Acknowledgements**

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**Collaborations**

Arrelias CCA and Zanetti ML declare that they contributed to the conception of the project, analysis and interpretation of the data. Arrelias CCA; Faria HTG; Teixeira CRS; Santos MA and Zanetti ML declare that they contributed to the writing of the article and relevant critical review of the intellectual content. Santos MA and Zanetti ML declare that they contributed to the final approval of the version for publication.

**References**


Prevalence and factors associated with the cooperation of arterial hypertension patients

Prevalência e fatores associados a cooperação do paciente portador de hipertensão arterial

Marília Gabrielle Santos Nunes¹
Amanda Rosineide da Silva ¹
Amanda de Oliveira Bernardino¹
Bruno de Luna Oliveira¹
Augusto César Barreto Neto¹

Abstract

Objective: To analyze the prevalence and factors associated with the cooperation of arterial hypertension patients in primary health care.

Methods: Cross-sectional study that included 458 hypertensive patients, randomly selected among primary care users. The study variables were socioeconomic, demographic and clinical and the research instruments used were validated. The logistic regression model was used for multivariate statistical analysis.

Results: The prevalence rates found for patient cooperation corresponded to 26.6%, 16.6% and 85.6% on the Morisky-Green, Batalla and Haynes-Sackett tests, respectively. The adjusted logistic regression analysis showed economic class and smoking as the independent predictors of hypertensive patients’ cooperation.

Conclusion: The prevalence of treatment adherence varied according to the assessment instrument used. The factors associated with treatment adherence were: high socioeconomic class, living with a partner and being eutrophic.

Resumo

Objetivo: Analisar a prevalência e os fatores associados a cooperação do paciente portador de hipertensão arterial na atenção primária.

Métodos: Estudo transversal que incluiu 458 hipertensos selecionados aleatoriamente entre os usuários na assistência primária. As variáveis de estudo foram socioeconômicas, demográficas e clínicas e os instrumentos de pesquisa utilizados eram validados. Foi utilizado o modelo de regressão logística para análise estatística multivariada.

Resultados: As prevalências encontradas para cooperação do paciente foram 26.6%, 16.6% e 85.6% para os testes de Morisky-Green, Batalla e Haynes-Sackett, respectivamente. Análise de regressão logística ajustada mostrou classe econômica e fumo como os preditores independentes para a cooperação do paciente portador de hipertensão arterial.

Conclusão: A prevalência de adesão ao tratamento variou de acordo com o instrumento de avaliação utilizado. Os fatores associados à adesão ao tratamento foram: classe socioeconômica elevada, morar com companheiro e estar eutrófico.

Keywords
Public health nursing; Hypertension; Education, nursing; Patient compliance; Patient acceptance of health care

Descritores
Enfermagem em saúde pública; Hipertensão; Prevalência; Cooperação do paciente; Aceitação do paciente de cuidados de saúde

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¹Universidade Federal de Pernambuco, Vitória de Santo Antão, PE, Brazil.
Conflicts of interest: no conflicts of interest to declare.
Introduction

Systemic arterial hypertension is a chronic multifactorial phenomenon characterized by the presence of high tension levels, associated with metabolic and hormonal alterations and trophic phenomena, which consist in cardiac and vascular hypertrophy. Mortality due to cardiovascular disease increases progressively with the rise in blood pressure levels as from 115/75mmHg, in a linear, continuous and independent manner.\(^1\)

Understanding the burden of hypertension as a preventable disease and the associated risk factors through the active search of the population is the first step to plan all effective prevention programs. The hypertension programs intend to reduce the prevalence of the hypertensive disease; increase the population’s knowledge level about the importance of blood pressure control; guarantee the access to primary health care services and medication for hypertensive patients; and encourage community-based programs.\(^2\) A study undertaken in China proved that the prevalence of hypertension also increases when the age advances. The prevalence in Chinese patients aged 60 years or older corresponds to 59.4%, while the prevalence of Chinese hypertensive people aged 75 years equals 72.8%. This means a growing social and economic burden in that country.\(^3\)

Given the high prevalence and high complication rates, various factors have shown to be associated with the disease control, such as lack of knowledge and awareness on different aspects of hypertension, undiagnosed hypertension and inappropriate or insufficient medication. In addition, most hypertensive patients believe that this disease is not severe, and that the medication should only be taken when the hypertensive symptoms appear.\(^4\)

Although most diagnoses of systemic arterial hypertension are only reached in patients of advanced age, different studies indicate that the disease starts in childhood or adolescence. High blood pressure in childhood commonly leads to hypertension in adult life, consequently representing the main cause of premature death around the world.\(^5\)

Treatment adherence is defined as “the extent to which the patient follows the instructions given for the prescribed treatments”, and is essential for the success of the treatment. In that sense, adherence to anti-hypertensive treatment is fundamental to control the risk factors and, without these factors, the disease can result in more complex problems. Non-adherence is identified as the main cause of uncontrolled blood pressure, representing a significant risk of cardiovascular events.\(^6\)

The burden of cardiovascular diseases adds up to 17 million deaths per year, that is, almost one third of all deaths. Among these, complications due to hypertension correspond to 9.4 million deaths around the world each year.\(^7\) The prevalence of hypertension is almost the same among men and women. Afro-American women show one of the highest hypertension rates around the world: around 44%. Among hypertensive adults, approximately 80% are aware of their condition, 71% are taking anti-hypertensive medication and only 48% of hypertensive patients have their disease under control.\(^8\) Knowing the detection rate, treatment and control of hypertension is essential to outline promotion and prevention strategies at all levels.\(^9\)

The nurses should incorporate specific competences for delivering health promotion care to arterial hypertension patients. The development and elaboration of strategies aimed at hypertension patients are still scarce. Nurses play a fundamental role in care for these users, as the interventions to promote and control the disease are fundamental for the purpose of treatment, preventing complications and acting to improve the patients’ quality of life.\(^10\)

Therefore, the objective in this study was to analyze the prevalence and factors associated with the adherence to arterial hypertension treatment among the users registered in the Hiperdia Program at Primary Health Care Units.
Methods

A cross-sectional study was undertaken between October 2013 and March 2014.

The population eligible for this study consisted of male and female arterial hypertension patients registered in the Primary Care Information System (Arterial Hypertension Control Program), coming from the urban and rural areas of Vitória de Santo Antão, in the state of Pernambuco, in the Northeast of Brazil. Patients with mental illnesses (as reported by families or self-reported), physical conditions (physical impairment that impeded the anthropometric assessment), clinical diseases (systemic lupus erythematosus, diabetes and AIDS) and pregnancy (self-reported) were excluded from the sample.

To estimate the sample size, the software SampleXS (Brixton Health, Brixton, UK12, United Kingdom) was used, which adopts the formula: n = A/(E*E+(A/N)), in which n corresponds to the sample size; A=3.8416PQW, P is the percentage prevalence of the population; Q=(100–P); E is the maximum error of the acceptable sample; w corresponds to the probable design effect; N is the population size. Therefore, the following criteria were adopted: (a) target population of 10,088 hypertensive patients (defined by the city’s Secretary of Health); (b) adherence prevalence corresponding to 51%; (c) 95% confidence interval; (d) 5% sampling error and (e) study design effect equal to 1. The minimum sample size was set at 391 hypertensive patients (adding 10% for possible losses, n=435 users). In this study, 8 users refused to participate in the research and, after the collection, the final sample consisted of 457 analyzed users.

With a view to imprinting the proportionality needed in a stratified sample, the samples were organized by proportional sharing for each Primary Health Care Unit and randomly selected by means of a random drawing table, created in the software Randomizer (Social Psychology Network Association, Middletown, Connecticut, United States). The data were collected by means of a questionnaire applied to the hypertensive patients, mainly based on adherence to the pharmacological and non-pharmacological treatment of arterial hypertension, and focusing on the activities developed in the Hiperdia Program.

The users’ adherence was assessed by means of three standardized tests: Batalla, Haynes-Sackett and Morisky-Green.(11-13) The Batalla test consists of three questions and measures the adherence through the users’ knowledge about their disease. Differently, the Morisky-Green test consists of four questions and measures adherence through the user’s attitudes towards medication use. Both tests consider users as adherent if the correctly answer all questions. In the Haynes-Sackett test, the users self-report their treatment adherence by means of one question, whose affirmative response classifies the individual as non-adherent. As a clinical outcome, the blood pressure was measured, considering anyone with a systolic blood pressure ≥140mmHg and diastolic blood pressure of 90mmHg as non-adherent.

The data were processed in the software Excel and analyzed with the help of the software Statistical Package for the Social Sciences, version 17.0. (SPSS Inc., Chicago, Illinois, United States).

In the description of the proportions, the binomial distribution approached the normal distribution with a 95% confidence interval. When comparing the proportions, the Mantel-Haenszel test and Pearson’s chi-square or linear trend test were used.

The multivariate analysis was used to estimate the independent contribution of each variable to the chance of adhering to the hypertension treatment. To construct the model, the bivariate analysis variables were tested with 20% probabilities. Therefore, binary logistic regression was employed using the backward method. For the sake of interpretation, the type I error limit was up to 5% (p≤0.05).

The study developed complied with the Brazilian and international standards for ethics in research involving human beings.
Results

All users answered the three research instruments. The prevalence rates found for adherence to the antihypertensive treatment were 26.6%, 16.6% and 85.6% for the Morisky-Green, Batalla and Haynes-Sackett tests, respectively.

In table 1, it was verified that most of the users who adhered to the treatment had concluded their primary education, showing significance with $p=0.03$. When asked about whether they added salt to their food, most of the interviewees who adhered to the treatment answered that they did not use to add additional salt to the dish ($p=0.010$). As regards physical exercise, most of the interviewees who adhered to the treatment answered that they were active ($p=0.001$).

Table 2 shows an association between the interviewees in economic class E and treatment adherence ($p<0.001$). In addition, a statistically significant association was observed between the hypertensive patients who adhered and who lived with partners and between the hypertensive patients who adhered and who lived with relatives ($p=0.020$), and also among the hypertensive patients who had taken Primary Education ($p=0.010$). Most interviewees manifested obesity when assessed through the body mass index and waist circumference, showing an association with adherence to anti-hypertensive treatment ($p<0.050$).

In the multivariate analysis of the logistic regression in combination with the Morisky-Green test (Table 3), economic class (odds ratio 3.574; 95% confidence interval between 1.012-12.624) and smoking (odds ratio 0.427; 95% confidence interval between 0.161-1.134) were maintained as independent risk factors for adherence to arterial hypertension treatment. The independent risk factors for adherence to arterial hypertension treatment were economic class (odds ratio 0.055; 95% confidence interval between 0.013-0.230), marital situation (odds ratio 2.454; 95% confidence interval between 1.184-5.088) and body mass index (odds ratio 4.118; 95% confidence interval 2.088-8.120).

### Table 1. Socioeconomic and behavioral variables and anthropometric parameters according to the Morisky-Green test (MGT)

<table>
<thead>
<tr>
<th>Variables</th>
<th>With adherence</th>
<th>Without adherence</th>
<th>PR (95%CI)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>122 (32.6)</td>
<td>335 (67.4)</td>
<td>1.29(0.91-1.82)</td>
<td>0.157</td>
</tr>
<tr>
<td>Female</td>
<td>93 (25.2)</td>
<td>278 (74.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>40 (31.2)</td>
<td>88 (68.8)</td>
<td>1.25(0.91-1.72)</td>
<td>0.164</td>
</tr>
<tr>
<td>Non White</td>
<td>83 (24.8)</td>
<td>248 (75.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>99 (27.1)</td>
<td>266 (72.9)</td>
<td>1.09(0.74-1.62)</td>
<td>0.641</td>
</tr>
<tr>
<td>Rural</td>
<td>23 (7.0)</td>
<td>270 (93.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social classes**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B/C</td>
<td>40 (26.3)</td>
<td>112 (73.7)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>77 (26.2)</td>
<td>217 (73.8)</td>
<td>1.00(0.72-1.39)</td>
<td>0.977</td>
</tr>
<tr>
<td>E</td>
<td>4(6.4)</td>
<td>7 (36.8)</td>
<td>0.72(0.31-1.65)</td>
<td>0.469</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>12 (21.8)</td>
<td>43 (78.2)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>With partner</td>
<td>19 (20.7)</td>
<td>73 (79.3)</td>
<td>1.05(0.55-2.0)</td>
<td>0.867</td>
</tr>
<tr>
<td>With relatives</td>
<td>91 (29.3)</td>
<td>220 (70.7)</td>
<td>0.74(0.43-1.26)</td>
<td>0.258</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>68 (31.1)</td>
<td>151 (68.9)</td>
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<td></td>
</tr>
<tr>
<td>Primary Education</td>
<td>44 (22.1)</td>
<td>156 (77.9)</td>
<td>1.40(1.01-1.94)</td>
<td>0.039</td>
</tr>
<tr>
<td>Secondary and Higher Education</td>
<td>10 (25)</td>
<td>30 (75)</td>
<td>1.24(0.70-2.20)</td>
<td>0.443</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Yes</td>
<td>12 (27.3)</td>
<td>32 (72.7)</td>
<td>1.02(0.61-1.70)</td>
<td>0.920</td>
</tr>
<tr>
<td>No</td>
<td>110 (26.6)</td>
<td>304 (73.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of cigarettes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>13 (37.1)</td>
<td>22 (62.9)</td>
<td>1.44(0.90-2.28)</td>
<td>0.143</td>
</tr>
<tr>
<td>No</td>
<td>109 (25.8)</td>
<td>314 (74.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of salt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>36 (25.7)</td>
<td>104 (74.3)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Little</td>
<td>85 (27.7)</td>
<td>222 (72.3)</td>
<td>0.92(0.66-1.29)</td>
<td>0.663</td>
</tr>
<tr>
<td>Salted</td>
<td>19 (1.1)</td>
<td>100 (90.9)</td>
<td>2.82(0.42-16.72)</td>
<td>0.218</td>
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<td>Salt shaker on the table</td>
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<tr>
<td>Yes</td>
<td>20 (35.1)</td>
<td>37 (64.9)</td>
<td>1.37(0.93-2.03)</td>
<td>0.123</td>
</tr>
<tr>
<td>No</td>
<td>102 (25.4)</td>
<td>299 (74.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addition of salt to food</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>36 (20.3)</td>
<td>141 (79.7)</td>
<td>0.66(0.47-0.93)</td>
<td>0.014</td>
</tr>
<tr>
<td>No</td>
<td>86 (30.7)</td>
<td>194 (69.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td>73 (28.5)</td>
<td>183 (71.5)</td>
<td>1.19(0.87-1.63)</td>
<td>0.265</td>
</tr>
<tr>
<td>No obesity</td>
<td>48 (23.9)</td>
<td>153 (76.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eutrophic</td>
<td>40 (30.1)</td>
<td>93 (69.9)</td>
<td>1.18(0.86-1.63)</td>
<td>0.395</td>
</tr>
<tr>
<td>Abdominal obesity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>82 (25.3)</td>
<td>242 (74.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CP****</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eutrophic</td>
<td>13 (36.5)</td>
<td>23 (63.5)</td>
<td>1.00(0.61-1.64)</td>
<td>0.992</td>
</tr>
<tr>
<td>Overweight</td>
<td>108 (26.5)</td>
<td>300 (73.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>49 (27.1)</td>
<td>132 (72.9)</td>
<td>1.02(0.75-1.40)</td>
<td>0.865</td>
</tr>
<tr>
<td>Hypertensive</td>
<td>73 (26.4)</td>
<td>204 (73.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>84 (23.0)</td>
<td>282 (77.0)</td>
<td>0.55(0.40-0.75)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Insufficient active</td>
<td>38 (41.3)</td>
<td>54 (58.7)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*pPearson’s Chi-square test; **classification criterion of Brazilian Association for Population Studies; ***P85 for overweight; II > P85 for obesity; III > 0.5 for obesity; ****CP>35.5cm for male; CP>32cm for female. PR - Prevalence Ratio; 95%CI - 95% confidence interval; BMI - body mass index; CC - arm circumference; CP - neck circumference.
The study presented limitations that should be taken into account when interpreting the results. That is so because this is a cross-sectional study, in which cause and effect relations cannot be determined; the population was highly homogeneous from the ethnical viewpoint, although the sample was carefully selected to exclude the confounding factors in the analysis; the fact that the interviews were held at the homes demanded more time to collect them, causing operational difficulties to obtain the sample. Another limitation was the fact that the Batalla test in the multivariate logistic regression analysis model came out inconclusive, probably due to some inconsistency in the data.

The applicability of these study results related to the planning for the creation of new public policies linked to the Hiperdia program and aimed at attending to the conditions for adherence to arterial hypertension treatment in Primary Care.

**Table 2. Socioeconomic, behavioral variables and anthropometric parameters according to Haynes-Sackett test**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Haynes-Sackett test</th>
<th>PR(95%CI)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adherence 392</td>
<td>No adherence 66</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>72(80.9)</td>
<td>17(19.1)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>320(86.7)</td>
<td>49(13.3)</td>
</tr>
<tr>
<td>Race</td>
<td>White</td>
<td>111(86.7)</td>
<td>17(11.3)</td>
</tr>
<tr>
<td></td>
<td>Non White</td>
<td>281(85.2)</td>
<td>49(14.8)</td>
</tr>
<tr>
<td>Residence</td>
<td>Urban</td>
<td>311(85.2)</td>
<td>54(14.8)</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>81(87.1)</td>
<td>12(12.9)</td>
</tr>
<tr>
<td>Social classes**</td>
<td>B/C</td>
<td>138(90.8)</td>
<td>14(9.2)</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>249(84.7)</td>
<td>45(15.3)</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>4(36.4)</td>
<td>7(63.6)</td>
</tr>
<tr>
<td>Marital status</td>
<td>Alone</td>
<td>41(74.5)</td>
<td>14(25.5)</td>
</tr>
<tr>
<td></td>
<td>With partner</td>
<td>82(89.1)</td>
<td>10(10.9)</td>
</tr>
<tr>
<td></td>
<td>With relatives</td>
<td>269(86.5)</td>
<td>42(13.5)</td>
</tr>
<tr>
<td>Education</td>
<td>Illiterate</td>
<td>178(81.3)</td>
<td>41(18.7)</td>
</tr>
<tr>
<td></td>
<td>Primary Education</td>
<td>178(89.4)</td>
<td>21(10.6)</td>
</tr>
<tr>
<td></td>
<td>Secondary and Higher Education</td>
<td>180(90.0)</td>
<td>20(10.0)</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>Yes</td>
<td>39(88.6)</td>
<td>5(11.4)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>353(85.3)</td>
<td>61(14.7)</td>
</tr>
<tr>
<td>Use of cigarettes</td>
<td>Yes</td>
<td>32(91.4)</td>
<td>3(8.6)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>360(85.1)</td>
<td>63(14.9)</td>
</tr>
<tr>
<td>Use of salt</td>
<td>Normal</td>
<td>121(86.4)</td>
<td>19(13.6)</td>
</tr>
<tr>
<td></td>
<td>Little</td>
<td>262(95.3)</td>
<td>21(14.7)</td>
</tr>
<tr>
<td></td>
<td>Salted</td>
<td>98(81.8)</td>
<td>21(18.2)</td>
</tr>
<tr>
<td></td>
<td>Salt shaker on the table</td>
<td>45(86.5)</td>
<td>7(13.5)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>5(100)</td>
<td>0(0)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>241(86.1)</td>
<td>39(13.9)</td>
</tr>
<tr>
<td>Bmi</td>
<td>Obesity</td>
<td>203(80.3)</td>
<td>50(20.7)</td>
</tr>
<tr>
<td></td>
<td>No obesity</td>
<td>188(80.5)</td>
<td>43(19.5)</td>
</tr>
<tr>
<td>CC***</td>
<td>Euthrophic</td>
<td>103(77.4)</td>
<td>30(22.6)</td>
</tr>
<tr>
<td></td>
<td>Abdominal obesity</td>
<td>288(98.9)</td>
<td>11(1.1)</td>
</tr>
<tr>
<td></td>
<td>Abdominal obesity abdominal</td>
<td>138(86.7)</td>
<td>21(13.3)</td>
</tr>
<tr>
<td></td>
<td>Hypertensive</td>
<td>357(87.5)</td>
<td>51(12.5)</td>
</tr>
<tr>
<td></td>
<td>Blood pressure</td>
<td>157(86.7)</td>
<td>24(13.3)</td>
</tr>
<tr>
<td>Physical exercise</td>
<td>Active</td>
<td>317(86.6)</td>
<td>49(13.4)</td>
</tr>
<tr>
<td></td>
<td>Insufficiently active</td>
<td>75(81.5)</td>
<td>17(18.5)</td>
</tr>
</tbody>
</table>

* Pearson’s chi-square test; ** classification criterion of Brazilian Association for Population Studies; *** 1 ≥ P0.85 for overweight; II ≥ P0.90 for obesity; III ≥0.5 for obesity; **** CP>35.5cm for male; CP>32cm for female.

**Table 3. Independent predictors for the cooperation of arterial hypertension patients through the Morisky-Green and Haynes-Sackett tests, according to the multivariate analysis of the logistic regression**

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Morisky-Green</th>
<th>Final model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic class ABEP</td>
<td>1</td>
<td>Ref</td>
</tr>
<tr>
<td>D</td>
<td>1.807</td>
<td>[1.121-2.912]</td>
</tr>
<tr>
<td>E</td>
<td>3.574</td>
<td>[1.012-12.624]</td>
</tr>
<tr>
<td>Smoking</td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>0.427</td>
<td>[0.161-1.134]</td>
</tr>
<tr>
<td>Haynes-Sackett</td>
<td>Economic class ABEP</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>0.726</td>
<td>[0.376-1.402]</td>
</tr>
<tr>
<td>E</td>
<td>0.055</td>
<td>[0.013-0.230]</td>
</tr>
<tr>
<td>Marital situation</td>
<td>Alone</td>
<td>1</td>
</tr>
<tr>
<td>With partner/relatives</td>
<td>2.454</td>
<td>[1.184-5.008]</td>
</tr>
<tr>
<td>BMI</td>
<td>Obese</td>
<td>1</td>
</tr>
<tr>
<td>Normal</td>
<td>4.118</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*Model adjusted for the variables: salt us, adding salt to dish, marital situation, level of physical exercise, race, waist circumference measure, body mass index and sex; ** likelihood ratio for heterogeneous proportions; OD - odds ratio; 95%CI: 95% confidence interval; ABEP - Brazilian Association of Population Studies; Ref: reference category; BMI - Body Mass Index
Among the positive points in this study, the collection of anthropometric and blood pressure measures through direct instead of self-referred measuring can be highlighted, as well as the geographical range of this study, which was undertaken at all health services distant from the metropolitan region. Another point that should be considered is the sample size, which was sufficient to guarantee prevalence estimates and able to identify factors associated with treatment adherence, including the use of the odds ratio, which was made possible through the multivariate logistic regression analysis. The fact that three instruments were used to measure the adherence permitted assessing different aspects of the adherence.

When using the Morisky-Green test, the prevalence of adherence corresponded to only 26.6% of the users. A study undertaken in Poland in 2013 showed a similar result with an adherence level of 32.4%.[14] In another study of hypertensive users, higher treatment adherence scores were used: approximately 85.7% of the patients indicated they adhered to the treatment.[15] This test is frequently used, but some problems can emerge related to self-information, such as omission, memory lapses and breakdowns in the communication process.[16]

Batalla’s test was used as a predictor of treatment adherence due to the strong correlation that exists between adherence and knowledge. In the verification of adherence through Batalla’s test, 83.2% of the users were considered as non-adherent to the treatment. An adherence rate of 76.6% was found in a similar study.[17] Based on the assessment using the Haynes-Sackett test, the adherence rate was higher when compared to the Morisky-Green and Batalla tests, in line with earlier findings.[1]

The comparison of the three tests used showed a difference between non-adherence estimated by the Batalla and Morisky-Green tests on the one hand and Haynes-Sackett on the other. That is so because the first two are tests that measure adherence indirectly, through questions related to the users’ knowledge or attitude, and the Haynes-Sackett test is a self-report of non-adherence, reducing the number of false cases of non-adherence. The low education level seemed to be related to non-adherence to the treatment,[18] which was not observed in this sample through the Morisky-Green test. The association between education and several other socioeconomic variables can explain this at least partially, which may have influenced this result.

The fact that the users do not add salt to their food is a factor that favors treatment adherence. Results from meta-analyses have demonstrated that reducing sodium has a small but significant effect on the blood pressure,[19] mainly in the elderly and in people with higher blood pressure levels.[20] A moderate reduction of salt in the diet is needed, as well as an increase in foods rich in potassium, not only as a first step in the treatment of hypertensive individuals, but also as a preventive measure to reduce the prevalence of arterial hypertension and its complications in the population.[21] The increase in the education level enhances the adherence to the hypertension treatment when Batalla’s instrument is used. The education level has been appointed as the most important socioeconomic factor in the health condition, mainly in cardiovascular health.[22]

When comparing overweight with normal-weight individuals, the risk of developing hypertension increases by 180%. In that sense, the incentive to reduce the weight should be considered a priority, as even small weight losses can result in a significant drop in the blood pressure. In addition, an important relation exists with non-adherence to anti-hypertension treatment in overweight individuals. The prevalence of non-adherence was significantly higher in users with a body mass index and waist circumference that indicate obesity, in line with data from a similar study.[23]

Adherence difficulties and disinterest in the treatment increased when the family was not involved in daily care for the patient and when the relationship among family members was conflicting. When the family serves as a caregiver, however, a satisfactory response is perceived in the disease control, as proven by the Haynes-Sackett analysis in this sample and in earlier studies.[24,25]

In the multivariate analysis using the Morisky-Green test, it was verified that people with a low social class adhere to the treatment more when compared to people from high social classes. This is justified as the
Morisky-Green test can be interpreted as hardly related to the socioeconomic conditions, losing its sensitivity when compared to the Haynes-Sackett test.

Concerning the multivariate analysis using the Haynes-Sackett test, individuals from low social classes show lower levels of adherence to the treatment. In that sense, some studies support a prevalence of non-adherence to the anti-hypertension therapy that is strongly associated with users from lower social classes.\(^{(25,26)}\)

As regards the marital status, the fact of living with the partner was identified as a risk factor for treatment adherence, as it was observed that hypertensive people who lived with someone showed a 145% increase in treatment adherence. In addition, in this study, being married or living with relatives was significant for treatment adherence in this study, as evidenced in the literature.\(^{(27)}\) The same was also observed in Ethiopia, where married participants were twice as prone to adhere to anti-hypertensive medication than divorced participants.\(^{(28)}\)

The association between arterial hypertension and obesity was proven in different studies.\(^{(29,30)}\)

In this sample, eutrophic people showed a 4.11 times higher probability of adhering to the treatment than obese participants. Obesity reduces the treatment adherence. This requires the adoption of measures offered as strategies that combine adherence, encouragement and orientations about the importance of physical exercise, and weight control, which are essential measures to reduce the pressure levels and, consequently, to promote health and reduce the incidence of cardiovascular events.\(^{(24)}\)

**Conclusion**

The prevalence of treatment adherence varied according to the assessment instrument used. The predictive factors associated with treatment adherence were: high socioeconomic class, living with a partner and being eutrophic.

**Collaborations**

Bernardino AO and Oliveira BL declare that they contributed to the writing of the article, relevant critical review of the intellectual content and final approval of the version for publication. Nunes MGS; Silva AR; Barreto Neto AC contributed to the conception of the study, analysis, interpretation of the data, writing of the article, relevant critical review of the intellectual content and final approval of the version for publication.

**References**


Prevalence of medication-related incidents in an intensive care unit

Prevalência de incidentes relacionados à medicação em unidade de terapia intensiva

Francino Machado de Azevedo Filho¹
Diana Lúcia Moura Pinho¹
Ana Lúcia Queiroz Bezerra²
Robson Tostes Amaral³
Mônica Eulália da Silva³

Abstract

Objective: To estimate the prevalence of medication-related incidents in an intensive care unit.

Methods: Cross-sectional study that included 116 records of hospitalizations within a 12-month period. The survey instrument was developed based on the study variables and was validated by two experts. The prevalence was calculated by considering the number of exposed hospitalizations as the numerator and the total of investigated hospitalizations as the denominator, calculating a 95% confidence interval. Fisher’s exact test assuming maximum significance level of 5% (p<0.05) was used to verify significant association.

Results: It was observed that 113 hospitalizations had been exposed to at least one type of incident, totaling 2,869 occurrences: 1,437 reportable circumstances, 1,418 no-harm incidents, nine near-miss incidents and five adverse events. The incidents occurred during the prescription stage (45.4%) and the absence of information on the actions taken by the health professionals in relation to the incidents was identified in 99% of the records.

Conclusion: Prevalence of 97.4% of medication-related incidents was estimated.

Resumo

Objetivo: Estimar a prevalência de incidentes relacionados à medicação em uma Unidade de Terapia Intensiva.

Métodos: Estudo transversal que incluiu 116 registros de internações hospitalares no período de 12 meses. O instrumento de pesquisa foi elaborado com base nas variáveis de estudo e validado por dois experts. A prevalência foi calculada considerando o número de internações expostas como numerador e o total de internações investigadas como denominador, calculando intervalo de confiança de 95%. Para a verificação de associação significativa entre as variáveis, utilizou-se o Teste Exato de Fisher, assumindo nível de significância máximo de 5% (p<0.05).

Resultados: Verificou-se que 113 internações foram expostas a pelo menos um tipo de incidente, totalizando 2,869 ocorrências, sendo 1,437 circunstâncias notificáveis, 1,418 incidentes sem dano, nove potenciais eventos adversos e cinco eventos adversos. Os incidentes aconteceram durante a fase da prescrição (45.4%) e a ausência de conduta dos profissionais de saúde frente aos incidentes foi identificada em 99% dos registros.

Conclusão: Estimou-se prevalência de 97,4% incidentes relacionados à medicação.
Introduction

Drug therapy is widely used in intensive care units. It is used twice as much as in other hospital units because of the nature of the care provided and critical patient profiles requiring complex, urgent interventions.\(^{(1)}\)

Incorrect use and absence of safety standards undermine the efficacy of drugs and may cause serious incidents for patients and health institutions.\(^{(2)}\)

Medication-related incidents are circumstances or events that may or may not cause unnecessary harm to the patient. They are classified as: reportable circumstances, no-harm incidents, near-miss incidents and adverse events.\(^{(3,4)}\)

According to international studies, such incidents may affect up to 947 of 1,000 patients per day in intensive care units, increasing hospital costs up to $2.8 million.\(^{(5,6)}\)

In 2009 in Brazil, 305 medication-related incidents were identified in 44 patients hospitalized in an intensive care unit evaluated over a period of 30 days.\(^{(7)}\)

In this sense, intensive care units are identified as high-risk scenarios for medication-related incidents, whether due to the instability of the clinical condition of the patients or to the variability of situations and time pressure to which health care professionals are subjected, particularly nursing staff.\(^{(1)}\)

Despite advances in studies about medication-related incidents, it remains difficult to measure their extent, characteristics and prevalence, hindering coping with and management of risks related to drug therapy in intensive care units.\(^{(7)}\)

Thus, this study aimed to estimate the prevalence of medication-related incidents identified in records of patients hospitalized in an intensive care unit in a teaching hospital.

Methods

Cross-sectional study conducted in the intensive care unit of a tertiary school hospital located in the city of Goiânia, central region of Brazil. The institution is part of the Unified Health System of the Brazilian government and has had a risk management service since 2002 that encourages reporting of incidents.

The population of the study consisted of 116 records of patients hospitalized in the intensive care unit in the period from January 1 to December 31, 2011. All patients who were admitted to the unit within the period of the study and had made use of drugs during the hospitalization period were considered. The research tool was structured and pre-validated by two experts in patient safety, and included the following variables: gender, age, duration of hospitalization, hospital specialty, clinical outcome, number of medications in use, number of doses used, clinical outcome, type of incident, type of problem, stage of the process, shift in which the incident occurred and behavior of the professional in relation to the incident.

The Conceptual Framework for the International Classification for Patient Safety proposed by the World Health Organization was adopted to classify the variable “type of incident.” According to this classification, a reportable circumstance is a situation in which there is significant potential for harm but no incident occurs; a no-harm incident is an event that reaches the patient but no harm occurs; a near miss is an incident that is intercepted before reaching the patient; and an adverse event is an incident that results in harm to the patient.\(^{(3,4)}\)

Data were descriptively analyzed with the Statistical Package for Social Science, version 22.0 for Windows, presenting absolute and relative frequencies. The prevalence was calculated by considering the number of exposed hospitalizations as the numerator and the total of investigated hospitalizations as the denominator, calculating a 95% confidence interval. Fisher’s exact test assuming a maximum significance level of 5% (p<0.05) was used to verify significant association.

The development of the study complied with national and international standards of ethics in research involving human beings.
Results

All 116 hospitalizations that occurred in 2011 were analyzed. A predominance of female patients (52.6%) was observed, and the average age was 56.3 years. Infectious diseases accounted for 21.5% of the admissions in the unit. The mean hospitalization period was 10.5 days and the death rate was 84%. The use of drugs in the unit produced 1,272 prescription sheets, totaling 30,257 doses prescribed during the period of analysis.

The study identified 2,869 incidents in 113 hospitalizations, an estimated prevalence of 97.4% (IC 95%; 93.1 - 99.3%). Reportable circumstances were the most prevalent type of incident, at 88.7% (IC 95%; 82.0 - 93.6%), followed by no-harm incidents at 87% (IC 95%; 80 - 92.2%), near-misses at 6% (IC 95%; 2.6 - 11.5%) and adverse events at 2.5% (IC 95%; 0.6 - 6.8%).

There were 1,437 cases of reportable circumstances registered during the hospitalizations. Higher occurrence was observed during the prescription and record stages, as shown in Table 1. Absence of administered drug checks was the type of reportable circumstance that presented higher incidence (47.9%), followed by absence of annotations about administration of drugs (21.1%). The study also demonstrated the practice of early prescription (7.7%), which involves inserting a drug into a prescription sheet on a different day of its administration, thus increasing the risk of inadvertent administration.

Table 1. Reportable circumstances

<table>
<thead>
<tr>
<th>Type of problem</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absence of administered drug check</td>
<td>689(47.9)</td>
</tr>
<tr>
<td>Absence of annotation about drug administration</td>
<td>303(21.1)</td>
</tr>
<tr>
<td>Prescription with time duplication</td>
<td>256(17.8)</td>
</tr>
<tr>
<td>Early prescription</td>
<td>111(7.7)</td>
</tr>
<tr>
<td>Verbal drug suspension</td>
<td>40(2.8)</td>
</tr>
<tr>
<td>Lack of equipment to administer drugs (masks, expanders and others)</td>
<td>24(1.7)</td>
</tr>
<tr>
<td>Prescription with impaired print</td>
<td>11(0.8)</td>
</tr>
<tr>
<td>Prescription with drug duplication</td>
<td>20(1.3)</td>
</tr>
<tr>
<td>Prescription in improper form</td>
<td>10(0.7)</td>
</tr>
<tr>
<td>Total</td>
<td>1,437(100)</td>
</tr>
</tbody>
</table>

Table 2. No harm incidents

<table>
<thead>
<tr>
<th>Type of problem</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete prescription (missing dose, route, interval and/or other information)</td>
<td>883(62.4)</td>
</tr>
<tr>
<td>Omission by lack of drug in the institution</td>
<td>316(22.3)</td>
</tr>
<tr>
<td>Failure in dose scheduling and intervals</td>
<td>121(8.4)</td>
</tr>
<tr>
<td>Prescription of non-standard drugs</td>
<td>30(2.1)</td>
</tr>
<tr>
<td>Lapses, misconceptions and/or failures in dispensation</td>
<td>21(1.5)</td>
</tr>
<tr>
<td>Omission by patient out of the unit</td>
<td>90(6.4)</td>
</tr>
<tr>
<td>Unauthorized administration: Suspension of drug without notifying the nursing staff</td>
<td>9(0.7)</td>
</tr>
<tr>
<td>Extra dose due to early prescription</td>
<td>70(5.0)</td>
</tr>
<tr>
<td>Illegible drug name</td>
<td>50(4.0)</td>
</tr>
<tr>
<td>Omission resulting from lack of device to administer the drug</td>
<td>50(4.0)</td>
</tr>
<tr>
<td>Delay in administration schedule</td>
<td>50(4.0)</td>
</tr>
<tr>
<td>Anticipation in administration schedule</td>
<td>30(2.1)</td>
</tr>
<tr>
<td>Prescription to patient that is known to be allergic</td>
<td>20(1.3)</td>
</tr>
<tr>
<td>Pharmacy refused to accept the request</td>
<td>1(0)</td>
</tr>
<tr>
<td>Extra dose due to duplicate prescription</td>
<td>1(0)</td>
</tr>
<tr>
<td>Total</td>
<td>1,418(100)</td>
</tr>
</tbody>
</table>

Observed that 100% were avoidable and occurred during the administration stage.

Regarding the time of occurrence of the incidents, it was verified that 69% occurred during the daytime. It was also found that only in 1% of occurrences did health care professionals report the therapeutic decision shortly after identification of the incident. These include: suspension of drug administration (0.6%), adjustment of the activity (0.3%) and additional monitoring (0.1%).

The results obtained in the Fisher’s exact test showed that the occurrence of reportable circumstance was significantly associated with males (p=0.021), hospitalization time of up to 5 days (p=0.000) and use of up to 20.9 doses per day (p=0.015). No-harm and near-miss incidents presented associations with length of hospitalization of up to 5 days (p=0.003). No significant association between the variables was verified for adverse events.

In relation to adverse events, it was observed that 100% were avoidable and occurred during the administration stage.
Prevalence of medication-related incidents in an intensive care unit

Discussion

The present study has limitations in relation to the method that should be considered in the interpretation of the results. As such situations could result in penalties, the possibility of omission of some records of incidents and their consequences to professionals is considered. In addition, the review of retrospective data in secondary sources must also be considered in view of the quality of hospital records in Brazil. However, the study provides deeper insight into the problem of medication-related incidents in intensive care units, contributing to review of work processes and supporting the development and implementation of preventive actions targeting the quality and safety of patient assistance.

The first finding of this study was that the death rate in the investigated scenario was extremely high, surpassing findings of an international multicenter survey.\(^{(8)}\) The high death rate was related to the patient profiles, which were severe, with several comorbidities and multiple concurrent clinical problems.\(^{(9)}\) Combined with this, Brazil presents constant unavailability of beds in intensive care units, which hinders access by patients and affects the survival rate and therapeutic possibilities.\(^{(10)}\)

The findings on reportable circumstances in this study provide knowledge about another dimension of medication-related incidents in intensive care units, in which the events are inserted into the everyday context of the structure and work processes of the unit. In this sense, several publications presented satisfactory results in patient safety resulting from redesign of work processes and involvement of healthcare professionals.\(^{(11,12)}\)

<table>
<thead>
<tr>
<th>Table 3. Near-miss and adverse events</th>
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</thead>
<tbody>
<tr>
<td>Variables</td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Near-miss incidents</td>
</tr>
<tr>
<td>Prescription to patient that is known to be allergic</td>
</tr>
<tr>
<td>Additional dose due to incorrect scheduling</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Adverse events</td>
</tr>
<tr>
<td>Hypertension by dose omission</td>
</tr>
<tr>
<td>Adverse reaction to drug</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

It was observed that medication-related incidents were common in intensive care units. And although a very small fraction caused harm to patients, it is still necessary to manage the risks related to the medication process, considering that critical patients present higher needs for care and are therefore more vulnerable.\(^{(13)}\)

It was also found that near-miss incidents showed low prevalence. However, at the same that they demonstrate failures in carrying out activities, they also show the human capacity to intercept incidents. Most of the near-miss incidents were related to the administration stage, especially involving the interception of additional doses and the prescription of drugs to patients known to be allergic.

The results contribute to the capacity of nursing teams to intercept medication-related incidents, which constitute a major barrier to patient safety.\(^{(14,15)}\) However, the low number of records of near-miss incidents suggests the need to encourage and improve this capacity in light of the constitution of this defense barrier to patient safety in intensive care units. As nursing team professionals essentially work in the final stage of drug therapy, their responsibility for identifying and preventing such failures increases, as the administration act may interrupt the system and prevent mistakes initiated in early stages.

Adverse events presented a prevalence of 2.5%, and all the cases were related to the administration stage; most were generated by dose omission and adverse reactions to medications. These results significantly diverged from other national and international research.\(^{(5,16)}\) This difference suggests underreporting that masks the true magnitude of the events and undermines the quality of the care provided, also revealing a possible aspect of the organizational culture of institutions, as only 1% of the records described the actions of professionals in cases of incidents.

In many cases, reporting is seen as a rendering of accounts, which is also a barrier to voluntary reporting.\(^{(17)}\) Understanding safety in the medication process in a punitive way contributes neither to the development of assertive care practices nor to the
development of institutional safety culture in organizations.

Safety culture expresses individual and collective values, attitudes, skills and behavior patterns that determine the commitment and proficiency of safety and health programs in organizations. When organizations can build positive safety culture, they attain better levels of communication, common perceptions of the importance of safety, and confidence in the effectiveness of preventive actions.\(^{(18)}\)

The prescription stage had a higher proportion of incidents, similar to results found in other international research. Incidents in this stage of the medication process are common and must be confronted by professionals and health managers, especially in teaching hospitals, where safety culture - if implemented during the formation of health professionals - may result in changes in the health system.\(^{(6)}\)

Daytime was the period that presented a higher number of occurrences, similar to findings by national studies in intensive care units. This is related to the proportionally higher volume of drugs administered during this period.\(^{(6,7)}\)

It was observed that occurrences of medication-related incidents were associated with periods of hospitalization above 5 days, male patients and daily use of multiple doses of drugs. There is a consensus in several studies that prolonged hospital stays increase the exposure of patients to risks of being affected by incidents or failures during the care process and to the several environmental and intrinsic factors of a hospital environment.\(^{(19,20)}\)

The administration of large amounts of drugs per day may confuse health professionals and lead to incidents, as observed in an international study.\(^{(21)}\) However, the findings of that study suggested that other variables should also be considered, given that the prevalence of incidents was inversely proportional to the number of doses per day. These considerations reinforce the fact that the success of drug therapy in intensive care units involves conscious multidisciplinary work, appropriate staff assignments and a systemic approach to failures.\(^{(22)}\)

**Conclusion**

The study identified 2,869 medication-related incidents, with prevalence of 97.4% of exposed hospitalizations. Of these, 45.5% was related to the prescription stage and 99% of the records did not present the actions of the health professionals in relation to the incidents.

**Collaborations**

Azevedo Filho FM and Pinho DLM declare that they contributed in the stages of conception and project, data analysis and interpretation, elaboration of the article, critical review pertinent to intellectual content and final approval of the version to be published. Bezerra ALQ; Amaral RT and Silva ME collaborated in the elaboration of the article, critical review pertinent to intellectual content and final approval of the version to be published.

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Prevalence of medication-related incidents in an intensive care unit


Perceptions of nurses and clients about nursing care in kidney transplantation

Camila Medeiros dos Santos
Filomena Maria Kirchmaier
Wagner Jaernevy Silveira
Cristina Arreguy-Sena

Objective: To analyze the perceptions of nurses and transplanted patients about the pre-transplantation nursing consultation of kidney transplantation.

Methods: Qualitative study with content analysis as the methodological approach. The participants were ten nurses and two categories were identified (contents and user demands in the immediate pre-transplantation phase; and conceptions, behaviors, expectations and emerging situations during and after the kidney transplantation and 20 transplanted patients with two categories (previous experiences with restrictions imposed by the dialysis; and unexpected or conflicting situations identified during and after the transplantation). The research instrument contained the variables related to the sample characteristics, guiding questions and situations of overcoming according to the perceptions of nurse specialists and post-transplanted patients.

Results: Coincidence and complementariness was found between the subjects’ approaches and the forms of coping during and after the transplantation.

Conclusion: The nursing consultation in the pre-transplantation phase is important to incorporate the orientations into the experiences and behaviors of transplanted patients in the course of the transplantation process and after the procedure.

Keywords
Nursing care; Kidney transplantation; Nursing, practical; Nursing process; Nursing research

Descritores
Cuidados de enfermagem; Transplante de rim; Enfermagem prática; Processos de enfermagem; Pesquisa em enfermagem

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Abstract

Corresponding author
Camila Medeiros dos Santos
José Lourenço Kelmer street,
unnumbered, Juiz de Fora, MG, Brazil.
Zip Code: 36036-330
cristina.arreguy@ufjf.edu.br

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Objetivo: Analisar as percepções de enfermeiros e dos transplantados sobre a consulta de enfermagem pré-transplante do transplante renal.

Métodos: Estudo qualitativo tendo a análise de conteúdo como aporte metodológico. Participaram dez enfermeiros com identificação de duas categorias (conteúdos e demandas dos usuários na fase de pré-transplante imediato; e concepções, comportamentos, expectativas e situações emergentes no trans/pós-transplante renal) e 20 transplantados com duas categorias (experiências prévias com restrições impostas pela diálise; e situações inesperadas ou conflituosas identificadas no transplante e na fase pós-transplante). O instrumento de pesquisa continha as variáveis relacionadas com a caracterização da amostra, questões norteadoras e situações de superação segundo percepções de enfermeiros especialistas e pessoas pós-transplantadas.

Resultados: Houve coincidência e complementariedade entre as abordagens dos sujeitos e as formas de enfrentamento no trans/pós-operatório.

Conclusão: A consulta de enfermagem no período pré-transplante renal é importante para a incorporação das orientações às vivências e comportamentos das pessoas transplantadas ao longo do processo de transplantação e após a realização do procedimento.

Resumo

Universidade Federal de Juiz de Fora, Juiz de Fora, MG, Brazil.
Hospital Universitário, Universidade Federal de Juiz de Fora, Juiz de Fora, MG, Brazil.
Conflicts of interest: no conflicts of interest to declare.
Introduction

The kidney transplantation is a surgical act that consists of the ablation of one person’s organ and its implantation in another person. It is indicated for people with stage 5 chronic kidney failure. Pre-emptive transplantation can be considered though, defined as the practice of transplantation before the patient starts the kidney replacement therapy.\(^\text{(1)}\)

Kidney transplantation is the preferred option, contributing towards greater survival and a better quality of life for these clients.\(^\text{(2,3)}\)

Kidney transplantation can be practiced using a healthy organ from a dead or live donor (relative or not). It allows the subject to regain their way of life, generally altered by the aspects involved in the dialysis treatment.\(^\text{(4-6)}\)

The comparison between the number of kidney transplants and the number of people awaiting a kidney reveals the magnitude of this public health problem. As a result, the government spends resources on the management and maintenance of dialysis patients and impede patients from using the benefits of the transplantation.\(^\text{(7)}\)

It is important to highlight that patients under dialysis, especially hemodialysis, live with several nuances the treatment imposes, including dependence on a machine to survive, the need to live with a treatment access, which is the arteriovenous fistula, graft or double-lumen catheter, and with limitations, such as dietary and fluid volume restrictions. This reality entails negative impacts for the biopsychosocial being and lifestyle of the patients and their families.\(^\text{(8,9)}\)

The abovementioned situations underline the importance of the transplantation in these people’s life. The risks inherent in the post-kidney transplantation are high.\(^\text{(10)}\) Hence, due to the presence of complications, rejection or not of the graft, the kidney transplantation may mean an abrupt interruption of the transplanted subject’s expectations, representing the need to return to the dialysis treatment, living with its nuances or even with death.

Nursing care is important across the kidney transplantation process in different aspects, highlighting the patient and the family’s preparation for the transplantation, the organ procurement, maintenance of the potential donor in brain death, as well as during and after the transplantation.

The nurses need to prepare to welcome and take care of these patients, respecting their activity context, contributing towards the integraliy of care. The nursing consultation is a soft technology modality the nurses use to guide and express their evidence-based professional activities in the work environments and in specialized care.

The premises that justify the development of this research are: 1) living with dialysis treatment is a stressful and bothersome reality that can interfere in the quality of life of patients and their family members; 2) awaiting a kidney can come with disinformation, hampering the assimilation of the defense mechanism to cope with the procedure and the post-transplantation period; 3) the nursing consultation is a care technology modality that can allow the nurses to identify the care needs and demands to cope with the kidney transplantation process and 4) patients’ failed/successful transplantation experiences can guide therapeutic conducts to be included in the content of the nursing consultation in the pre-kidney transplantation period.

In view of the above, the objective in this research was to analyze the nurses and transplanted patients’ perceptions of the nursing consultation in the pre-kidney transplantation period.

Methods

This qualitative study, which adopts content analysis as the methodological approach, was undertaken in 2013 at a specialized nephrology service in an interior city of the State of Minas Gerais and involved nurses and patients after kidney transplantation.

The intentional sample consisted of: 1) Ten nurses who worked with kidney replacement treatment patients before and/or after a kidney transplantation and 2) 20 post-transplantation patients, in coherent verbalization conditions, male and female, over 18 years of age.
The exclusion criteria were: nurses and absent post-transplantation patients (vacation, leave, diseases, trip or absence from the consultation).

The research instrument contained the following research variables: characterization of the participants; guiding question (Post-transplantation patient: did you participate in a nursing consultation? How do you assess the care received? After the kidney transplantation, what situation(s) did you consider unexpected? What did you expect from the transplantation? What did you expect after having received the kidney transplantation? What would you like to receive clarifications about or what are you interested in? and Nurses: How do you conceive the renal transplant patient and the patient to deal with in the kidney transplantation process? What do you consider that needs to be discussed during the pre-renal transplantation nursing consultation? After the renal transplant, what situation do you consider unexpected in your professional experience? What expectation do you witness about the kidney transplant candidates when they submit to the renal transplantation? How do you feel when dealing with people in the kidney transplantation process? What do you consider important to discuss in the pre-renal transplant nursing consultation to favor coping and adherence to the treatment in the post-transplantation period? and additional information.

The data were collected during individual interviews and digitally recorded, held in a private environment and triggered by the guiding questions.

The collected data were organized and analyzed according to the thematic categorical content analysis technique. The recorded data were transcribed and then, the subjects’ discourse was subject to floating reading.

Next, for the sake of further exploration, the material was read repeatedly. This fact permitted the division of the text into recording units and the identification of emerging categories. For that purpose, the software NVivo version 10 was used and the similarity of codes criterion was adopted to identify the units of meaning. The clusters were presented through dendrograms and pie charts, aiming to show the strengths of the link between the units of meaning established, according to Jaccard’s correlation criteria available in that software.

This information added rigor to the data analysis and interpretation, as it favored a graphical image of the links between the thematic categories and the research problem, corresponding to the conceptions of the transplanted patients and the nurse specialists with regard to the contents and utility of the nursing consultation in the pre-renal transplant period. The content analysis was based on literature relevant to the theme.

The research development complied with the Brazilian and international ethical standards for research involving human beings.

Results

Among the 20 transplanted patients, 55% were women between 35 and 43 years of age; 80% had less than eight years of education and 5% ≥14 years; 16.6% were retired and had no stable occupation and 10% were students and general maintenance workers, respectively. The mean waiting time for the renal transplant was two years (range between four months and seven years); 55% of the transplants involved a deceased donor and 75% of the participants took part in the nursing consultation in the pre-kidney transplantation phase.

Among the ten nurses, eight were nephrology specialists; 50% had between five and nine years of professional experience and 30% more than ten years; the length of activity in nephrology ranged between two months and 17 years, with 50% between five and ten years, and the religion practiced was Catholic (50%); Kardecist (20%) and protestant (30%).

Four clusters were identified, two of which served to express the nurses’ impressions (1- contents and demands of the users in the immediate pre-transplantation phase and 2- conceptions, behaviors, expectation and possible situations that emerge during and after the renal transplant) and two to express the transplanted patients’ impressions in the post-procedure period (1- previous experiences with restrictions and kidney replacement
Discussion

The limitations in the study results are related to the qualitative method, which does not provide evidence, but can reveal new aspects of the research problem.

The results indicated that, in practice, the pre-transplantation phase is a rich moment that can favor educational approaches, clarification of doubts, reduction of anxiety and reassertion of treatment adherence behaviors in the post-transplantation phase, that is, components that picture the nurse’s activity area and are essential to guarantee the success of the transplantation therapeutics.

The contents the participating nurses highlighted permeated the need to identify the conceptions, knowledge, information and needs individually; the assessment of the users’ expectations and expected lifestyle in the post-transplant phase. Hence, the professionals who have contact with the users throughout the transplant process identify and have reached a consensus on these elements, whether in situations of success or failure.

In the category “contents and demands of users in the immediate pre-transplantation phase”, the requisites, preparations and emerging needs in the pre-renal transplant phase were addressed, expressed in the thematic axes “content addressed and...” (Figure 1).
work in the pre-transplant phase” as shown in the dendrogram (Figure 1).

In the pie chart (Figure 1), it could be identified that, in the nurses’ perspective, there was a causal nexus between the contents addressed during the nursing consultation and the possible causes the patients experienced in the course of the renal transplant (intra or immediate or late post-transplant phase). This fact was evidenced by the correlation lines of the knots constructed by means of the coding similarity technique, based on Jaccard’s correlation coefficient. These lines picture the range of the nurses’ perception and experience with the renal transplant process, to the extent that it takes the form of professional perception of the emerging needs and care demands since the pre-transplantation until the intra and post-transplant phase, due to the fact that they know the problems and reasons for failure that may emerge.

There is evidence that adherence in the post-kidney transplant period is more significant without side effects of the immunosuppressive drugs and with appropriate professional monitoring, including compliance with the orientations on how to proceed on certain occasions. This can contribute to return to the previous activities. The relevance of assessing the transplanted patient’s behavior with regard to the health professionals’ orientations is highlighted, with a view to identifying the threshold of non-adherence to the conducts established, especially regarding the medication prescribed in the kidney transplantation context.(10)

In the category “conceptions, behaviors, expectations and possible emerging situations during the intra/post-kidney transplant period”, the intent was to understand the participants’ expectations and their information and conceptions about what they experienced during and after the renal transplant, with a view to maximizing the adherence to the treatment and recovery.

The nurses who are active in nursing consultations are affiliated with the transplantation service itself and those who dealt with the users in the kidney replacement phase reaffirmed the importance of addressing some contents in the nursing consultation as a form of preparation, getting familiar with situations they would face in the immediate and mediate post-transplantation phase and adhering to the treatment, aware of the relevance of their conducts to optimize the transplanted organ.

According to the patients going through the renal transplant process, the nursing consultation addressed the conceptions, knowledge and expectations built based on the desired lifestyle for the post-transplantation phase.

The doubts and uncertainties the people who will receive a kidney transplant makes them re-affirm the absence of care and/or treatment in the post-transplantation period, hampering their coping when these situations emerge in the post-transplantation period. The process of providing information and clarifying doubts is fundamental to adjust a healthy and responsible behavior.(10)

In addition, there is the personal lack of experience, although they can approximate what will happen to them through the experiences shared with the situation of other colleagues undergoing renal replacement therapy.

Experiencing the possibility of the transplant as a magical formula capable of putting an end to the feeling of being stuck due to the dialysis treatment, overcoming the dissatisfaction with not being able to work and/or study, being obliged to maintain limitations and changes in dietary habits and fluid intake can make the transplant be wanted and sought to overcome these limitations, without influencing the care the transplant procedure will demand. A study that assessed the quality of life before and after the transplant showed an important improvement in the general quality of life in the domains measured, clearly showing the positive result of the renal transplant in the transplanted patients’ lives, mainly in their physical health and social relationships.(2)

Strategies like the nursing consultation and the use of a questionnaire to measure the quality of life of people who are receiving a transplant can provide
evidence of contents that are to be discussed, so that the changes will not turn into situations that are disappointing or impede a high-quality life.

It should be added that the information in the correlation circle, which shows the connections between the categories, permit identifying the lack of links between category 2 (assessment in pre-transplantation life) and categories 3 (current status), 4 (expectations before and after) and 6 (unexpected or conflicting situations) and, therefore, the frailty of these participants to find therapeutic support.

This is equivalent to saying that candidates for a kidney are unable to perceive all possibilities and specific needs that will emerge in the course of the transplantation process during the pre-renal transplant phase. They will need a consolidated interpersonal trust relationship and a bond of referral to use when the demands and needs emerge.

That is the nurses’ view, as demonstrated by the connections between all categories that picture the transplantation process. They have therapeutic resources that can be used during the nursing consultations with kidney transplant candidates, in coping with the transplantation process and in living with a transplanted kidney.

Although the chronic kidney failure is not cured after the renal transplant, i.e. drugs need to be taken, dietary restrictions/care continue and bodily care is needed, the possibility of a transplant is seen as something favorable, with mental repercussions.\(^{(1)}\)

The inclusion of the family members and their understanding can contribute to the treatment and the adherence to the recommended therapeutic conducts. International experiences exist with information centers to clarify doubts.\(^{(12)}\)

Evidence exists in the literature that the information and sensitization process of the patients who will undergo a renal transplant favors the overcoming of the limitations that are therapeutically recommended during the post-renal transplantation period, besides helping with adherence to the use of the immunosuppressive drugs, to the extent of reducing the occurrence of graft rejection.\(^{(13)}\)

**Conclusion**

The nursing consultation during the pre-renal transplant period is important to incorporate the orientations into the experiences and behaviors of the transplanted patients in the course of the transplantation process and after the procedure.

**Collaborations**

Santos CM; Kirchmaier FM; Silveira WJ and Arreguy-Sena C declare that they contributed to the study conception, analysis, interpretation of the data, writing of the article, relevant critical review of the intellectual contents and final approval of the version for publication.

**References**


Prevalence in the use of psychotropics and associated factors in primary health care

Prevalência do uso de psicotrópicos e fatores associados na atenção primária à saúde

Tatiana Longo Borges¹
Adriana Inocenti Miasso¹
Kelly Graziani Giacchero Vedana¹
Paulo Celso Prado Telles Filho²
Kathleen Mary Hegadoren³

Abstract

Objective: Investigating the prevalence in the use of psychotropics and associated factors in primary health care with socio-demographic and pharmacotherapeutic factors, medical history, and Common Mental Disorders.

Methods: A cross-section study which includes 430 primary health care patients. The research instruments were Self-reporting Questionnaires and medical records. A chi-squared test was used in the univariate analysis, and a logistic regression was used in the multivariate analysis.

Results: The prevalence in the use of psychotropics was 25.8%. There was an association among the use of psychiatric drugs and common mental disorders, use of non-psychiatric drugs, number of medications prescribed, number of pills a day, clinical pathologies, age, and schooling. In the multivariate analysis, the predictors for the use of psychiatric drugs were: common mental disorders, clinical pathologies, and schooling.

Conclusion: The prevalence in the use of psychiatric drugs and the associated factors varied according to the univariate or the multivariate analyses.

Keywords
Primary care nursing; Public health nursing; Mental disorders; Psychotropic; Prevalence

Corresponding author
Tatiana Longo Borges
Bandeirantes Avenue, 3900, Ribeirão Preto, SP, Brazil. Zip Code: 14040-902
tatilborges@usp.br

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¹Escola de Enfermagem de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, SP, Brazil.
²Universidade Federal dos Vales do Jequitinhonha e Mucuri, Diamantina, MG, Brazil.
³University of Alberta, Edmonton, AB, Canada.

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**Introduction**

Psychiatric drugs are among the medication types which are the most prescribed in the United States.\(^{(1)}\) Such phenomenon seems to happen worldwide, as studies conducted in other countries showed high usage rates for them.\(^{(2)}\)

Although the benefit related to the use of psychiatric drugs as a therapeutic modalities cannot be denied, their popularization gave rise to questions regarding the real need for them.\(^{(3)}\) Not always are psychiatric drugs used to treat specific mental disorders; sometimes the very doctor prescribing them cannot specify the reason some of their patients use them.\(^{(1, 4)}\)

As the current Brazilian mental health policies consider the primary health care units as the gateway for patients with psychological symptoms, and as such units are responsible for treating mental disorders which are considered less serious, the so-called Common mental Disorders, there is no information in the literature in order to investigate whether the people who use psychiatric drugs are positive for Common Mental Disorders, and to investigate the factors related to the consumption of psychiatric drugs.\(^{(5, 6)}\)

The importance of studies which discuss that subject is justified by the possibility for patients to be guided, not only as to the best therapeutic modality for their cases, but also in regards to the correct use of medications, as the misuse of psychiatric drugs involves the risk of conditions that may be serious.\(^{(7)}\)

This study aimed at investigating the prevalence in the use of psychiatric drugs in primary health care units, and the possible associations among their use, and socio-demographic and pharmacotherapeutic factors, medical history, and the presence of Common Mental Disorders.

**Methods**

This is a quantitative, epidemiological, cross-sectional study, and it is correlational and descriptive in character. It was conducted in a municipality in the countryside of São Paulo - Brazil.

The city which was used as the research field is divided in five health care sectors. The basic health care units with the highest reach in regards to the number of people treated were chosen for each sector. The data were collected over nine months. Individuals were recruited whilst waiting for doctor’s appointments in the related units.

Individuals had to meet the following criteria to be included in the study: being 18 years of age or older, being capable of expressing oneself in Portuguese, and having appointments scheduled in the related units. Individuals were excluded from the study for: coming to the units in order to use the pharmacy, bandaging rooms, and vaccination rooms (without a scheduled appointment); being younger than 18 years; and having trouble communicating (example: being unable to speak).

Statistical associations were investigated among the dependent variable (use of psychiatric drugs) and independent variables (socio-demographic and pharmacotherapeutic factors, medical history, and presence of Common Mental Disorders).

The data were collected through structured interviews in the very health care units, in private places. The script utilized comprised questions related to socio-demographic and pharmacotherapeutic profiles of patients.

The description of medications was conducted with the first level of Anatomical Therapeutical Chemical classification - ATC.\(^{(8)}\)

In order to identify the prevalence of Common Mental Disorders, the Brazilian version of SRQ-20 (Self-Reporting Questionnaire), which comprises 20 questions, was used. It was validated in the early 1980s, and it has been widely used ever since.\(^{(9)}\)

Medical records of patients were analyzed, in order to properly identify the prescribed psychiatric drugs, so as to minimize the possibility of mistakes. In order to test whether the instrument prepared could reach the proposed objectives through its content and method, a pre-test was conducted in the research site. Subjects interviewed in the pre-test stage were not part of the sample.

The sample comprised 430 patients. Stratified sampling was used. Each Basic Health Care Unit
consisted of one stratum. The tolerable sampling error was 5%, and the significance level, 5%. A nonresponse rate was added, and it corresponded to 15%.

Associations between the dependent variable and the independent variables were investigated through Chi squared test. Association hypotheses were accepted when “p” found was lower or equal to 0.05. When independent variables consisted of only two categories, Yates’ correction for continuity was used. In the cases in which there were categories with less than five individuals, Fisher’s test was used.

Logistic regression models were developed in order to check the impact of independent variables on the dependent variable. All explanatory variables which presented p<0.05 in the univariate analysis were included in the models, and so were the variables which, despite not presenting significant associations, were strongly related to the dependent variables, according to the literature. It is important to point out that only the variables which did not present multicollinearity problems were included in the logistic regression models. The models were analyzed for suitability through the Hosmer-Lemeshow test.

The study development met the national and international ethics regulations in regards to studies involving human beings.

Results

The sample comprised women mostly (84.8%). The average age was 45 years, ranging from 18 to 83 years. Most subjects interviewed were married (59.3%), had elementary schooling (51.6%), worked formally or informally (57.7%), had a monthly family income of up to three times the minimum monthly wage (54.9%), and a religion (95.3%) - most were catholic. 65.8% were verified to make use of medications, and 58.8% presented clinical pathologies - there was a higher prevalence for high blood pressure (31.4%) and endocrine pathologies (30.7%). Also, 5.6% were diagnosed with depression.

Use of psychiatric drugs and related factors

The prevalence in the use of psychotropics was 25.8%. The most prescribed type was the one of antidepressants (N06A) (73%), followed by benzodiazepine anxiolytic drugs (N05B) (46.8%), antiepileptic drugs (N03A) (4.5%), antipsychotics (N05A) 3.6%, and dopaminergic drugs (N04B) (0.9%).

Among the antidepressants, the most prevalent medication was fluoxetine, which accounted for 53.1% of prescriptions. Amitriptyline and escitalopram were present for 28.4% and 22.2% of subjects, respectively. Among the benzodiazepine anxiolytics, the two most prescribed and equally prevalent ones were diazepam and clonazepam. Each of them was present in 48.1% of prescriptions. 30.6% of subjects were observed to use psychiatric drugs. When the data were collected, they had at least two psychiatric drugs prescribed.

In table 1, the use of psychiatric drugs was verified to be the most prevalent in the category of users who are older than 60 years (41.6%), and the lowest one, in the range of people from 18 to 40 years of age (10.2%). The association between age and use of psychiatric drugs was statistically confirmed (p<0.001). A significant association between the use of psychiatric drugs and schooling was verified (p<0.001). Most psychiatric drug users (65.8%) had finished or were attending elementary school.

The prevalence of common mental disorders was 41.4%. In table 2, 41% of people who are positive for Common Mental Disorders were observed to make use of psychiatric drugs. Among the people who were negative for Common Mental Disorders, that rate was 15.1%. Such association was significant (p<0.001). All patients diagnosed with depression (5.6%) were making use of psychiatric drugs at the time interviews were conducted. Significant associations were found among the use of psychiatric drugs, pharmacotherapeutic variables, and clinical diseases (p<0.001).

The logistic regression model (Table 3) with all predictors was statistically significant (x2(8, N = 430) = 97.81, p<0.001). The model as a whole was able to account for between 20.3% (Cox and Snell
R-squared) and 29.9% (Nagelkerke R-squared) of the variance between being either using or not using psychiatric drugs, and it correctly classified 79.1% of the cases.

Having clinical diseases was the strongest predictor in the use of psychiatric drugs, presenting an odds ratio (OR) of 5.4; the variable Common Mental Disorders was the second strongest one, with an OR of 3.9. Variable schooling presented an OR of 1.7.

**Table 1.** Socio-demographic and economic variables and use of psychiatric drugs

<table>
<thead>
<tr>
<th>Variables</th>
<th>Use of psychiatric drugs</th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes n(%)</td>
<td>No n(%)</td>
<td>Total n(%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Feminine 99(27.1)</td>
<td>266(72.9)</td>
<td>365(100)</td>
<td></td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Masculine 12(18.5)</td>
<td>53(81.5)</td>
<td>65(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>18 to 40 years 18(10.1)</td>
<td>161(89.9)</td>
<td>179(100)</td>
<td></td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>41 to 59 years 56(34.8)</td>
<td>106(65.4)</td>
<td>162(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 60 years 37(14.6)</td>
<td>25(85.4)</td>
<td>62(100)</td>
<td></td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Schooling</td>
<td>Complete/incomplete</td>
<td>73(32.9)</td>
<td>149(67.1)</td>
<td>222(100)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>high school education</td>
<td>26(14.6)</td>
<td>152(85.4)</td>
<td>178(100)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete/incomplete</td>
<td>12(40.0)</td>
<td>18(60.0)</td>
<td>30(100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>university education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>Single 15(17.6)</td>
<td>70(82.4)</td>
<td>85(100)</td>
<td></td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Married 61(23.9)</td>
<td>194(76.1)</td>
<td>255(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Widower 17(42.5)</td>
<td>23(57.5)</td>
<td>40(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Divorce 18(36.0)</td>
<td>32(64.0)</td>
<td>50(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td>Catholic 49(29.0)</td>
<td>120(71.0)</td>
<td>169(100)</td>
<td></td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other 33(22.0)</td>
<td>117(78.0)</td>
<td>150(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>Unemployed 9(16.7)</td>
<td>45(83.3)</td>
<td>54(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Informal job 24(23.5)</td>
<td>78(76.5)</td>
<td>102(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Formal job 25(17.1)</td>
<td>121(82.9)</td>
<td>146(100)</td>
<td></td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leave of absence 7(63.6)</td>
<td>4(36.4)</td>
<td>11(100)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Retired 24(44.4)</td>
<td>30(55.6)</td>
<td>54(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Housewife 22(34.9)</td>
<td>41(65.1)</td>
<td>63(100)</td>
<td></td>
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<td></td>
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<tr>
<td>Monthly income</td>
<td>&gt;three times the minimum</td>
<td>45(24.1)</td>
<td>142(75.9)</td>
<td>187(100)</td>
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<td></td>
<td>monthly wage$^*$</td>
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</tr>
<tr>
<td></td>
<td>&lt;three times the minimum</td>
<td>66(27.2)</td>
<td>177(72.8)</td>
<td>243(100)</td>
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<tr>
<td></td>
<td>monthly wage$^*$</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Number of people in the family</td>
<td>Up to four 91(26.0)</td>
<td>259(74.0)</td>
<td>350(100)</td>
<td></td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>More than four 20(25.0)</td>
<td>60(75.0)</td>
<td>80(100)</td>
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</table>

**Table 2.** Variables related to pharmacotherapeutic profiles, presence of clinical diseases, and Common Mental Disorders

<table>
<thead>
<tr>
<th>Variables</th>
<th>Use of psychiatric drugs</th>
<th></th>
<th></th>
<th>Total n(%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes n(%)</td>
<td>No n(%)</td>
<td>Total n(%)</td>
<td></td>
<td></td>
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<tr>
<td>Use of non-psychiatric drugs</td>
<td>Yes 96(35.6)</td>
<td>174(64.4)</td>
<td>270(100)</td>
<td>&lt;0.001</td>
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<tr>
<td></td>
<td>No 15(9.4)</td>
<td>145(90.6)</td>
<td>160(100)</td>
<td></td>
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<tr>
<td>Number of types of medications</td>
<td>Up to two 37(24.2)</td>
<td>116(75.8)</td>
<td>153(100)</td>
<td>&lt;0.001</td>
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<tr>
<td></td>
<td>Three or more 74(56.9)</td>
<td>56(43.1)</td>
<td>130(100)</td>
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<td>Number of pills a day</td>
<td>Up to two 30(26.8)</td>
<td>82(73.2)</td>
<td>112(100)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Three or more 79(53.0)</td>
<td>70(47.0)</td>
<td>149(100)</td>
<td></td>
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</tr>
<tr>
<td>Presence of associated clinical diseases</td>
<td>Yes 96(37.9)</td>
<td>157(62.1)</td>
<td>253(100)</td>
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<td>162(91.5)</td>
<td>177(100)</td>
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<tr>
<td>CMD</td>
<td>Yes 73(41.0)</td>
<td>105(59.0)</td>
<td>178(100)</td>
<td>&lt;0.001</td>
<td></td>
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<tr>
<td></td>
<td>No 38(15.1)</td>
<td>214(84.9)</td>
<td>252(100)</td>
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</table>

**Table 3.** Logistic regression model for predicting the use of psychiatric drugs

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>p-value</th>
<th>OR CI95% Lower</th>
<th>Upper</th>
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<tbody>
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<td>Constant</td>
<td>-3.5</td>
<td>0.6</td>
<td>&lt;0.001</td>
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<td>CMD</td>
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</tr>
<tr>
<td>Yes</td>
<td>1.3</td>
<td>0.2</td>
<td>&lt;0.001</td>
<td>3.9</td>
<td>2.36</td>
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<td>No</td>
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<td>Clinical diseases</td>
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<td>Yes</td>
<td>1.7</td>
<td>0.3</td>
<td>&lt;0.001</td>
<td>5.4</td>
<td>2.84</td>
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<td>No</td>
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<tr>
<td>Gender</td>
<td></td>
<td></td>
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<tr>
<td>Feminine</td>
<td>0.5</td>
<td>0.4</td>
<td>0.17</td>
<td>1.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Masculine</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Elderly</td>
<td>0.3</td>
<td>0.3</td>
<td>0.33</td>
<td>1.4</td>
<td>0.7</td>
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<td>Not elderly</td>
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<tr>
<td>Schooling</td>
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<td>Low</td>
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<td>0.2</td>
<td>0.04</td>
<td>1.7</td>
<td>1.02</td>
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<tr>
<td>Medium to high</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Income</td>
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<td>0.2</td>
<td>0.15</td>
<td>1.5</td>
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<td>&gt;three times the</td>
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<td></td>
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<tr>
<td>minimum monthly wage$^*$</td>
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<tr>
<td>Occupation</td>
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<tr>
<td>Unemployed</td>
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<td>0.3</td>
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</tr>
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</tr>
<tr>
<td>Marital status</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>No partner</td>
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<td>0.2</td>
<td>0.21</td>
<td>0.7</td>
<td>0.43</td>
</tr>
<tr>
<td>With a partner</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

The first limitation of this study relates to its cross-sectional design, which does not allow for predicting causality in the questions mentioned. The research instrument used to detect common mental disorders is not the golden standard, which would be psychiatric interviews. Even so, SRQ-20 has standards which are considered reliable for use in prevalence studies.
Despite the limitations, the results present relevant aspects for the nursing practice, by establishing the dimension regarding the use of psychiatric drugs in primary health care. It is possible to use the associations found as a base for planning actions which are specific for this environment. One of these aspects regards to the association between the use of psychiatric drugs and clinical diseases. In that sense, nurses can guide patients in regards to the possible enhancing of adverse effects which may result from the simultaneous use of psychiatric drugs and other classes of medications, and how to prevent or minimize them. Also, considering the association between the use of psychiatric drugs and socio-demographic factors, nurses can structure support or education groups, in order to help treat psychological symptoms in that context.

When comparing the data found here with the literature, there are some points to consider. Consistent with the literature, the sample was verified to be predominantly feminine.\cite{7}

The usage rate of psychiatric drugs observed (25.8%) was higher than the one found in the literature, which ranges from 9 to 13\%\cite{1,2}.

In regards to the types of psychiatric drugs prescribed, the most prevalent ones were the ones in the class of antidepressants, followed by benzodiazepine drugs. Consistent with the results found in this study, other studies show that such medication classes are the ones which are the most prescribed in different countries.\cite{1,2}

The high rate of fluoxetine prescriptions may be justified by some factors. Firstly, fluoxetine is classified as a selective inhibitor for serotonin reception, a class of antidepressants which are safer and more tolerated. Notwithstanding, one should mention that all antidepressants and benzodiazepine anxiolytics prescribed consist of medications distributed by the Brazilian *Sistema Único de Saúde* - SUS (Single Health System), which could motivate its prescription despite there being other options.\cite{10}

In regards to socio-demographic factors, the use of psychiatric drugs was shown to be related to age and schooling. The tendency for the prevalence in the use of psychiatric drugs is observed to rise according to subjects’ age range.\cite{11} Such finding corroborates the results found in this study. Thus, the analysis of data showed that the lower prevalence in the use of psychiatric drugs was found for the age range between 18 to 40 years (10.1\%), followed by persons between 41 and 59 years of age (31.6\%). The use of psychiatric drugs was more common for subjects above 60 years of age (41.6\%).

In the multivariate analysis, low schooling (patients who reported to have complete or incomplete elementary school education) was shown to be a predictor for the use of psychiatric drugs, alongside with suffering from Common Mental Disorders and clinical pathologies. The latter was the factor which contributed the most with the model, with an OR of 5.4.

In regards to schooling, no studies were found in the literature specifically proving the association between it and the use of psychiatric drugs. However, as the use of psychiatric drugs was shown to be constantly associated with Common Mental Disorders in this study, it is possible to use the literature regarding Common Mental Disorders to clarify that relationship. That way, it is important to point out that schooling is usually linked to worse chances of achieving professional and social success, and it may contribute to a worse quality of life, to the possibility of developing Common Mental Disorders, and to an increased likelihood of using psychiatric drugs.\cite{9}

Obviously, as a great deal of patients who make use of psychiatric drugs have clinical pathologies, it is not surprising that they take more medications and use more pills a day, as found in this study. Notwithstanding, there is evidence that making use of more than one drug is common among psychiatric drug users.\cite{6,11} Such aspect is particularly important, once those patients have higher risks of suffering from adverse effects and drug interactions.\cite{2,11}

The association between psychiatric drugs and Common Mental Disorders, revealed in this study, is confirmed by previous studies.\cite{9} Despite such association, one cannot help but notice, in this study, the fact that among the people who were negative for Common Mental Disorders, 15.1\% made use of psychiatric drugs.
Before that context, it is important to consider two assumptions: either there are patients who use psychiatric drugs and present no symptoms, or their symptoms have remitted. Thus, there is evidence that the psychiatric drugs are not being effective, which indicates discrepancies in regards to their use and to the correct identification of Common Mental Disorders.

Being of particular interest for the discussion of results, this study unveiled the reasons why physicians who worked in primary health care units prescribed psychiatric drugs. The people interviewed consider that psychiatry, “is not a science like the others; it leaves room for many interpretations”. Besides that, they considered that factors such as, “the patients seek for treatment for their symptoms” and “the lack of resources in the unit” outweigh the very needs from patients when prescribing psychiatric drugs.(3)

Also, family doctors in the United States classified their knowledge on the prescription of psychiatric drugs as nonexistent or insufficient, even though they routinely prescribed those medications.(12)

Acknowledgments
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Collaborations
Borges TL and Miasso AI contributed to design the project, to develop the research, to collect, analyze and interpret the data, to draft its text, to make a critic and relevant review of the intellectual content, and also to get the approval for the final version to be published. Vedana KGG; Telles Filho PCP, and Hegadoren KM contributed to develop the research, to draft its text, to make a critic and relevant review of the intellectual content, and also to get the approval for the final version to be published.

Conclusion
The prevalence found for the use of psychotropics was high. In the univariate analysis, there was an association among the use of psychiatric drugs and common mental disorders, use of non-psychiatric drugs, number of medications prescribed, number of pills a day, clinical pathologies, age, and schooling. In the multivariate analysis, the predictors for the use of psychiatric drugs were: common mental disorders, clinical pathologies, and schooling.

References
Quality of life of HIV seropositive women
Qualidade de vida de mulheres portadoras do HIV

Jéssica Monique Bellini¹
Renata Karina Reis¹
Lilian Andreia Fleck Reinato¹
Rosilane de Lima Brito Magalhães²
Elucir Gir¹

Corresponding author
Elucir Gir
Avenida Bandeirantes, 3900, Ribeirão Preto, SP, Brasil. CEP: 14040-902
e gir@eerp.usp.br

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HIV; HIV infections; Quality of life; Questionnaires; Women

Descritores
HIV; Infecções por HIV; Qualidade de vida; Questionários; Mulheres

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Abstract
Objective: Analyze the quality of life of HIV seropositive women.
Methods: Cross-sectional study including 40 women selected through non-probabilistic sampling. The questionnaire WHOQOL-HIV bref was the research instrument employed, considering the six domains of the instrument and socio-demographic and clinical aspects. Data analysis was performed using the Kolmogorov-Smirnov test to analyze the normality of sampling average distributions, and the Mann-Whitney and Kruskal-Wallis tests to analyze the difference between averages or medians of the scores for quality of life. The Spearman coefficient was used for potential correlations.
Results: According to the questionnaire, the Spirituality domain (average=59.5) reported the highest score, while the Environment domain (average=52.1) scored lowest. The average age was 41 years old; 97.5% declared themselves to be heterosexual; and 80.0% used antiretroviral treatment.
Conclusion: Spirituality was the best-performing domain, followed by the Physical domain. The lowest average scores were observed for the Environment and Social Relations domains.

Resumo
Objetivo: Analisar a qualidade de vida de mulheres portadoras do HIV.
Métodos: Estudo transversal que incluiu 40 mulheres selecionadas por amostra não-probabilística. O instrumento de pesquisa foi o questionário WHOQOL-HIV bref, considerando-se os seis domínios do instrumento e os aspectos sociodemográficos e clínicos. Para análise dos dados foi realizado o teste de Kolmogorov-Smirnov para a normalidade das distribuições de médias amostrais e os testes Mann-Whitney e Kruskal-Wallis para analisar a diferença entre as médias ou medianas dos escores de qualidade de vida. O coeficiente de Spearman foi utilizado para possíveis correlações.
Resultados: Segundo o questionário, o domínio Espiritualidade (média = 59,5) apresentou maior escore e o domínio Meio Ambiente (média = 52,1) o menor escore obtido. A média da idade foi de 41 anos, 97,5% declararam ser heterossexuais, e 80,0% utilizavam tratamento antiretroviral.
Conclusão: A espiritualidade foi o domínio com melhor desempenho, seguido do domínio Físico. Os menores escores médicos foram observados nos domínios Meio Ambiente e Relações Sociais.

1Escola de Enfermagem de Ribeirão Preto, Universidade de São Paulo, Ribeirão Preto, SP, Brazil.
2Universidade Federal do Piauí, Teresina, PI, Brazil.
Conflicts of interest: there are no conflicts of interest to be declared.
Introduction

The number of individuals living with HIV has increased due to, among other factors, reduced mortality rate, mainly because of the introduction of the policy of universal access to antiretroviral therapy. The epidemiological situation indicates that, by the end of 2013, 35 million individuals worldwide lived with HIV/AIDS, of which 15.9 million were women. Although the man/woman ratio has decreased in some countries, women represent 50% of all adults living with HIV.

Thus, in countries where access to antiretroviral therapy is a reality, the perception of the disease has been changed from a lethal to a chronic health condition. The number of individuals taking antiretroviral therapy in Latin America and the Caribbean has increased from 210,000 in 2003 to 795,000 in 2013, representing 56% of people needing treatment and 44% of all people with HIV.

Many times, living with the human immunodeficiency virus means having to cope with depressive symptoms as well as the stigma and discrimination associated with the disease, in addition to the need for social support. Moreover, there are the side effects of the therapeutic regimen, in addition to the fight against prejudice perceived by individuals with HIV. All of these aspects reinforce the importance of evaluating quality of life.

The disclosure of the diagnosis of HIV infection causes changes to the woman’s life, such as dismissal or voluntary abandonment of employment, restrictions in the ability to do household chores, and abnegation of pleasant activities due to the manifestation of the disease. The possibility of losses related to the physical impairments associated with the difficulty of living with a chronic disease that still bears stigma and discrimination can trigger isolation and loneliness.

The social roles played by men and women and the existing inequality have a negative impact on the quality of life of women living with HIV. Studies with different populations show a worsening of the quality of life of women compared to that of men.

The quality of access to treatment also influences the quality of life. HIV seropositive women present higher average scores for depressive symptoms and lower quality of life than non-infected women.

The objective of this study was to analyze the quality of life of HIV seropositive women.

Methods

This was a cross-sectional study conducted at a specialized outpatient care unit in the interior of São Paulo, southeast region of Brazil.

The non-probabilistic sampling of the study was comprised of 40 HIV seropositive women with a previously booked medical appointment from January to July 2011 who met the following inclusion criteria: 18 years old or more; aware of the HIV/AIDS infection for at least six months; and undergoing regular clinical follow up at the site of study. The exclusion criteria were as follows: pregnancy; puerperal period; and/or psychiatric disease.

Researchers collected data in a private room, through individual interviews, for 15 to 20 minutes on average.

The following instruments were employed: a socio-demographic and clinical questionnaire; and the WHOQOL-HIV bref instrument designed by the World Health Organization, translated into and validated in Portuguese. This is an instrument of quality of life for individuals with HIV/AIDS, the shortened version of which consists of 31 questions distributed in six domains: Physical; Psychological; Degree of Independence; Social Relations; Environment; and Spirituality. Each domain can be scored from 0 (worst QL) to 100 (best QL).

Data was input into a Microsoft Office Excel® spreadsheet and was analyzed through the Statistical Package for the Social Sciences, version 18.0 software. The Kolmogorov-Smirnov test was performed to evaluate the normality of sampling averages distributions. It used the syntax to calculate scores for each item of the instrument offered by the Group Survey on Quality of Life in Brazil, in Portuguese. The Mann-Whitney and Kruskal-Wallis tests were performed to analyze the differences between the averages or medians of scores for quality of life. The Spearman coefficient was used to analyze potential correlations.
The study development met the national and international standards of ethics for research with human subjects.

**Results**

The study included 40 women aged 22 to 69 years old, aged 41 years on average, with most (57.5%) in the age group of 30 to 50 years. Regarding relationships, 22 (55.0%) were in a relationship and 18 (45.0%) stated that they were not in a relationship. The education category considered the completed years of education; most prevalent was up to eight years for 25 (62.5%) participants. With regard to the link between labor and income, 22 (55.0%) had no link and 27 (67.5%) earned from one to three minimum wages a month.

Concerning the time of HIV diagnosis, 50.0% (19) had up to five years of diagnosis and 28.9% (11) reported more than 11 years. The evaluation of T CD4+ lymphocytes disclosed a prevalence of the range above 350 cells/mm³ in (650%) women, and just 5 (12.5%) reported results below 200 cells/mm³. As regards viral load, 22 (55.0%) patients presented with an undetectable count.

Regarding the clinical phase of the infection/disease, 24 (60.0%) respondents were classified as AIDS cases, eight (23.7%) as asymptomatic HIV, and five (13.1%) as symptomatic HIV.

Concerning the use of antiretroviral therapy, most of the participants - 32 (80.0%) - reported using it and the time of use ranged from nine months to 13 years and six months, with an average of seven years.

Regarding the domains that make up the WHOQOL-HIV bref, Environment (52.1) was the domain reporting the lowest average score, and the highest score was found in the domain of Spirituality (59.5) (Table 1).

![Table 1. Distribution of scores for the WHOQOL-HIV bref domains](image)

<table>
<thead>
<tr>
<th>Domains</th>
<th>Number of items</th>
<th>Mean</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Standard Deviation</th>
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<tr>
<td>Physical</td>
<td>4</td>
<td>58.8</td>
<td>80</td>
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<td>32</td>
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<tr>
<td>Psychological</td>
<td>5</td>
<td>57.6</td>
<td>80</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Degree of independence</td>
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<tr>
<td>Social relations</td>
<td>4</td>
<td>55.9</td>
<td>80</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Environment</td>
<td>8</td>
<td>52.1</td>
<td>68</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Spirituality</td>
<td>4</td>
<td>59.5</td>
<td>80</td>
<td>36</td>
<td>36</td>
</tr>
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Table 2 shows the highest score in the domain of Spirituality among women in a stable...
Table 3. Socio-demographic variables and domains

<table>
<thead>
<tr>
<th>Variables</th>
<th>Physical</th>
<th>Psychological</th>
<th>Degree of independence</th>
<th>Social relations</th>
<th>Environment</th>
<th>Spirituality</th>
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<tr>
<td>Time of awareness about the HIV diagnosis (year)</td>
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<td></td>
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<tr>
<td>1</td>
<td>- 5</td>
<td>57.05</td>
<td>54.74</td>
<td>53.89</td>
<td>59.37</td>
<td>50.42</td>
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<tr>
<td>6</td>
<td>- 10</td>
<td>62.00</td>
<td>64.80</td>
<td>64.50</td>
<td>58.00</td>
<td>52.25</td>
</tr>
<tr>
<td>&gt;11</td>
<td>62.18</td>
<td>59.35</td>
<td>61.09</td>
<td>49.45</td>
<td>55.82</td>
<td>65.09</td>
</tr>
<tr>
<td>T CD4+ (cells/mm³)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&lt; 200</td>
<td>52.80</td>
<td>56.96</td>
<td>59.20</td>
<td>51.20</td>
<td>47.60</td>
<td>44.00</td>
</tr>
<tr>
<td>201 a 350</td>
<td>60.44</td>
<td>59.38</td>
<td>59.56</td>
<td>57.78</td>
<td>53.11</td>
<td>64.00</td>
</tr>
<tr>
<td>&gt; 350</td>
<td>59.38</td>
<td>57.11</td>
<td>56.62</td>
<td>56.15</td>
<td>52.62</td>
<td>60.92</td>
</tr>
<tr>
<td>Viral load (copies/ml)</td>
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<tr>
<td>Undetectable</td>
<td>62.18</td>
<td>59.05</td>
<td>59.45</td>
<td>56.36</td>
<td>53.91</td>
<td>61.09</td>
</tr>
<tr>
<td>Detectable</td>
<td>54.67</td>
<td>55.82</td>
<td>55.33</td>
<td>55.33</td>
<td>49.89</td>
<td>57.56</td>
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<tr>
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<td>63.56</td>
<td>52.98</td>
<td>59.56</td>
<td>53.78</td>
<td>51.33</td>
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<td>Symptomatic</td>
<td>57.60</td>
<td>52.48</td>
<td>51.20</td>
<td>58.40</td>
<td>51.60</td>
<td>60.80</td>
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<tr>
<td>AIDS</td>
<td>57.33</td>
<td>61.07</td>
<td>58.67</td>
<td>56.67</td>
<td>52.50</td>
<td>58.17</td>
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<td>Perception of health status</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Bad</td>
<td>44.00</td>
<td>41.60</td>
<td>32.00</td>
<td>46.00</td>
<td>45.00</td>
<td>56.00</td>
</tr>
<tr>
<td>Not bad, not good</td>
<td>42.00</td>
<td>48.53</td>
<td>52.67</td>
<td>55.33</td>
<td>53.67</td>
<td>50.67</td>
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<tr>
<td>Good</td>
<td>60.94</td>
<td>57.60</td>
<td>55.53</td>
<td>54.59</td>
<td>49.29</td>
<td>58.12</td>
</tr>
<tr>
<td>Very good</td>
<td>65.07</td>
<td>63.36</td>
<td>65.33</td>
<td>58.93</td>
<td>55.60</td>
<td>65.07</td>
</tr>
<tr>
<td>Use of antiretroviral therapy (TARV)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>52.80</td>
<td>56.96</td>
<td>59.20</td>
<td>51.20</td>
<td>47.60</td>
<td>44.00</td>
</tr>
<tr>
<td>No</td>
<td>60.25</td>
<td>57.60</td>
<td>55.25</td>
<td>60.25</td>
<td>53.25</td>
<td>64.00</td>
</tr>
<tr>
<td>Interrupted</td>
<td>59.16</td>
<td>57.77</td>
<td>59.16</td>
<td>53.47</td>
<td>52.32</td>
<td>59.79</td>
</tr>
</tbody>
</table>

relationship (62.36), who declared to be bisexual (72.00), with no sexual partner (64.31), and earning income from one to three minimum wages (2.07).

Women with levels of T CD4+ lymphocytes >350 cel/mm³ scored higher in the domain of Spirituality when compared to those with T CD4+ lymphocytes <200 cel/mm³ (Table 3). In relation to the detection of viral load, it was observed that individuals with lower viral load reported better quality of life scores in the Physical and Spirituality domains when compared to individuals with higher viral loads. Regarding antiretroviral therapy (TARV), it was found that users of this therapy reported better scores in the domain of Degree of Independence.

**Discussion**

As limitations to the results of this study, it is worth mentioning the cross-sectoral design and the use of non-probabilistic sampling in one single health service, thus restricting data generalization.

Regarding quality of life, Spirituality was the domain with the best performance. This domain evaluates forgiveness and fault, concerns about the future, and death and dying.

Being in a relationship was perceived as the best contributor to the score of the domains Degree of Independence and Spirituality.

The use of retroviral therapy presented the best score in the domain of Spirituality. Another study also reported better quality of life in the Physical and Psychological domains and those of Degree of Independence and Spirituality.(15)

The Physical domain scored second in quality of life. This domain evaluates issues such as pain and discomfort, energy and fatigue, sleep and rest, and symptoms of infection.(13) There was a difference regarding the quantification of viral load and the physical domain, where the lower the viral load, the higher the score of the Physical domain.

The scores achieved in the domain of Social Relations—which evaluates personal relationships, social support, and sexual activity—were the second lowest scores. In this study, the lowest scores observed for this domain were: being in a relationship; being employed; stated bisexuality; and no sexual partner.

The Environment domain scored the lowest. This domain evaluated physical security; financial status;
Quality of life of HIV seropositive women

and physical environment regarding pollution, noise, traffic, climate, and conditions of the site where respondents lived. However, differences were found between the scores of the Environment domain in relation to viral load, where the lower the viral load, the better the evaluation in all domains. It was also found that when the CD4 values are above 350 cells/mm³, there was a better score in the domain of Spirituality. This differed from the study that reported better levels of quality of life in the domains Physical, Psychological, and Degree of Independence for those with a count of CD4 ≥350 cells/mm³.

Conclusion

Spirituality was the best-performing domain, followed by the Physical domain. The lowest average scores were observed for the Environment and Social Relations domains.

Collaborations

Bellini JM; Reis RK; Reinato LAF; Magalhães RLB and Gir E declare to have contributed with the elaboration and development of the research, data interpretation, writing, relevant critical review of the intellectual content, and approval of the final version to be published.

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Patient safety in the operating room and documentary quality related to infection and hospitalization

Segurança do paciente no centro cirúrgico e qualidade documental relacionadas à infecção cirúrgica e à hospitalização

Blanca Torres Manrique¹
Loreto Maciá Soler²
Andreu Nolasco Bonmati²
Maria Jose López Montesinos³
Florentina Pina Roche³

Keywords
Patient safety; Checklist; Operating room nursing; Nursing records; Surgical wound infection; Hospitalization

Descritores
Segurança do paciente; Lista de checagem; Enfermagem de centro cirúrgico; Registros de enfermagem; Infecção da ferida operatória; Hospitalização

Abstract
Objective: To describe the documentary quality of two records related to patient safety in the operating room and to identify differences between information related to infection and hospitalization.

Methods: Comparative study based on two cross sections, conducted with 3,033 patients who had been hospitalized for more than 24 hours in an Orthopedics and Traumatology Center. Sociodemographic and clinical data, as well as information provided in forms were compared. Postoperative infection was identified as an adverse event.

Results: There was a significant correlation between hospitalization days and the total number of diagnoses collected (Pearson=0.328; p<0.001). When diagnoses and infections were grouped together, a significant value was found between closed fractures and infection (p=0.001).

Conclusion: Differences in the degree of completion were observed between the two records. There were no differences between adverse events.

Resumo
Objetivo: Descrever a qualidade documental de dois registros relacionados à segurança de pacientes no centro cirúrgico e estabelecer as diferenças nas informações relacionadas à infecção cirúrgica e à permanência hospitalar.


Resultados: Houve correlação significativa entre os dias de hospitalização e o número total de diagnósticos coletados (Pearson=0.328; p<0.001). Quando se agruparam os diagnósticos e a infecção, notou-se um valor significativo entre as fraturas fechadas e a infecção (p=0.001).

Conclusão: Foram observadas diferenças no grau de preenchimento entre os dois registros. Não houveram diferenças no evento adverso.

¹Universidad de Cantabria, Spain.
²Universidad de Alicante, Spain.
³Universidad de Murcia, Spain.

Conflicts of interest: there are no conflicts of interest to declare.
Introduction

The operating room is one of the environments with the highest number of adverse events of hospitalization. It is a multifactorial cause resulting from the complexity of procedures, the interaction of multidisciplinary teams and work under pressure. In most related studies, it was proved that the operating room is more likely to pose risks, but most of them can be avoided. The presence of adverse events in a surgical intervention is estimated at 37.6%.

One of the objectives of The World Alliance for Patient Safety, in its second campaign, Safe Surgery Saves Lives, was to strengthen surgery safety practices as defined by the World Health Organization. The program addressed important safety matters such as inadequate safety anesthetic practices, surgical infections that may be avoided and lack of communication between members of the surgical team.

In this world campaign, the Alliance implemented the Surgical Safety Checklist in June 2008. This initiative aimed to identify the basic rules of surgical care that can be applied universally. The implementation of the Surgical Safety Checklist results in team work, in greater participation and communication, in a sense of responsibility of all members of the surgery team and in a change in personal attitude. The verification systems are in fact routine practice in fields such as the aeronautical, aviation and nuclear industries.

In centers where the Surgical Safety Checklist was used, there was a decrease in the rate of greater complications in patients, from 11% to 7%, and the rate of hospital mortality after main surgeries decreased from 1.5% to 0.8%.

In order to correctly fill the Surgical Safety Checklist, only one person should be in charge of using and filling it in during a surgery. The World Health Organization proposed that the “checklist coordinator” be a nurse.

Although it seems simple from an administrative point of view, the process of implementation of the Surgery Safety Checklist is complex, due to two circumstances that must be considered for efficient results: professionals’ resistance to change and the adaptation of the list to the needs of the environment and the particularity of the place where it is to be used.

The objectives of this study were to describe the documentary quality of two records related to patient safety in the operating room and to identify differences between information related to infection and hospitalization.

Methods

This is a comparative study, based on two cross sections related to 2009 and 2010, supported by data recorded at the Orthopedics and Traumatology surgery center of Hospital Santa Cruz de Liencres de Cantabria, Spain, conducted with 3,033 patients who had been hospitalized for more than 24 hours. All records from the studied years that met the inclusion criteria were included. Its duration was 2 years (from 2009 to 2010).

The calculation of the sample size was performed using the EPIDAT 3.1. In order to compare the rates of surgery infection between both groups of patients, an assumption of the proportion was made within Group 1, with Free Forms, at 4%; and an expected minimum decrease of 2% within Group 2, with Surgery Safety Checklist, with a 95% confidence interval and 80% of potential.

The independent variables were: age on the day of intervention, gender, length of stay and primary and secondary diagnosis. The studied variables related to documentary quality were the rates of completion of all items of both records. As results variables, we studied: postoperative complications, surgery infection, comorbidity and length of stay.

For grouping diagnoses, according to the international classification of diseases, in its ninth revision, clinical modification (ICD-9), a division was made into six categories, based on primary diagnosis and prognosis of severity: arthrosis, closed frac-
tures, inflammation/infections, neoplasms, malformations and other pathologies.

A descriptive analysis was performed for both groups of patients, in which a comparison was made between the variables age, gender, diagnosis of intervention and degree of completion of each record, by means of frequency percentage.

Quantitative variables were analyzed with measures of central tendency, and qualitative variables were calculated with frequency percentages. In order to analyze the association between infection and the group to which the patient belonged, a chi-square test was performed.

Afterwards, univariate and multivariate analyses were performed in order to associate the infection variable with the other variables studied. The analysis was performed by means of the Statistical Package for the Social Sciences, using a basis created for this purpose.

The development of the study complied with national and international ethical guidelines for research involving human subjects.

Results

Out of 6,300 patients surveyed, 3,033 records met the inclusion criteria and were studied. In 2009, within Group 1 (Free Form), 1,733 records were included, whereas Group 2 (Surgery Safety Checklist) had 1,300 records in 2010.

The mean age of patients on the day of intervention in 2009 (Group 1) was 60 years old, and in 2010 (Group 2), it was 59 years old. As for gender, 56.2% were women and 43.8% were men, with a similar distribution for both groups of patients.

The length of stay in both cases was 5 days, with no significant difference (p=0.589).

Of the total diagnoses studied, arthrosis had an incidence of 43.9% of the total of patients, thus being the most frequent.

Concerning information on the checklist, at the first step, the Entry Stage, the forecast of critical events was revised by an anesthetist, reaching 57.9%. The surgeon revised severe or unexpected cases, duration and the expected blood loss, and a rate of 36.1% was found; the nurses revised the confirmation of sterility and checked whether there were questions or problems related to material and/or equipment, reaching 89.1%.

Complementary information had the following results: antibiotic prophylaxis administered in the last 60 minutes remained at 52.9%; the item availability for interventions of radiological images that are essential for intervention achieved 60.7%, and the lack of precedence of the type of intervention, 16.4%.

The adequate site of operation, in cases of laterality or multiple structures or levels, was indicated by the surgeon in 99% of patients.

In the next step, Time Out, in which all the safety protocols were considered before induction of anesthesia so as to ensure safety of the procedure, the nurse confirmed orally the patient’s identity in 99.2% of cases, the site of operation in 98.8%, the type of intervention was written down in 98.8%, the type of intervention was written down in 96.1% of cases and informed consent was reported in 91.4%.

At the third and last stage, Sign Out, before the patient left the surgery unit, the nurse confirmed orally the exact surgical intervention that was performed in 79.1% of cases. In addition, before the patient’s departure, the instrument nurse confirmed orally the exact counting of the material and needles in 77.9% of cases, and gauze compresses in 18.4% of cases. There was no counting of the remaining material in 11% of cases, and in 69.7% of cases regarding gauze compresses.

As for signatures of the Surgery Safety Checklist by all team members, the results were: 42.3% of anesthetists, 97.6% of nurses and 21.2% of surgeons.

Postoperative infection before the first 72 hours was reported in 1% of cases in both years, which has no statistical significance (p=0.844).

The length of stay resulting from the intervention was similar in both groups, with no statistical significance. The mean of hospitalization days, after intervention on those who had signs of surgery in-
fection, had no statistical significance between both groups, as shown in table 1.

Regarding information related to the patient’s diagnosis, the records of the Surgery Safety Checklist group were greater in number when compared to the Free Form group. Through the Surgery Safety Checklist, 562 patients were reported with one or two diagnoses and 490 with three or more.

A significant correlation between hospitalization days and the total number of diagnoses was found (Pearson=0.328; p<0.001).

**Table 1.** Age, length of stay and days with postoperative infection in 2009 and 2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean age</th>
<th>p-value</th>
<th>Mean stay</th>
<th>p-value</th>
<th>Mean days of infection</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>60.65</td>
<td></td>
<td>5.5</td>
<td></td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>59.08</td>
<td>0.038</td>
<td>5.1</td>
<td>0.080</td>
<td>12.2</td>
<td>0.128</td>
</tr>
</tbody>
</table>

In the relationship between postoperative infection and hospital stay, there was a significant difference (Table 2). Likewise, when diagnoses of intervention and surgery infection were grouped, a significant difference was also found between closed fractures and infection (p=0.001).

**Table 2.** Results of the relationship between age, stay and infection

<table>
<thead>
<tr>
<th>Variables</th>
<th>Infection</th>
<th>No infection</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean days of stay</td>
<td>12</td>
<td>5.32</td>
<td>0.002</td>
</tr>
<tr>
<td>Age</td>
<td>62.58</td>
<td>59.92</td>
<td>0.41</td>
</tr>
</tbody>
</table>

For multivariate analysis, models of multivariate logistic regression were fitted with the variable response to infection proportion and explanatory variables (gender, age, stay and grouped diagnoses). Results obtained are presented in table 3.

**Table 3.** Results of the fitted model

<table>
<thead>
<tr>
<th>Variables</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Form - Surgery Safety Checklist</td>
<td>0.635</td>
</tr>
<tr>
<td>Gender</td>
<td>0.754</td>
</tr>
<tr>
<td>Age</td>
<td>0.411</td>
</tr>
<tr>
<td>Length of stay</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Grouped D1*</td>
<td>0.256</td>
</tr>
<tr>
<td>Grouped D1* (1)</td>
<td>0.012</td>
</tr>
<tr>
<td>Grouped D1* (2)</td>
<td>0.997</td>
</tr>
<tr>
<td>Grouped D1* (3)</td>
<td>0.998</td>
</tr>
<tr>
<td>Grouped D1* (4)</td>
<td>0.933</td>
</tr>
<tr>
<td>Grouped D1* (5)</td>
<td>0.811</td>
</tr>
<tr>
<td>Constant</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Grouped D1 - Primary diagnosis related to intervention

Until 2009, a compulsory form was used to record the intraoperative and care safety measures, in an original version with three copies, called Free Form, which was specific to surgery. It is an independent document that completes the others that are part of the clinical record.

In 2010, the studied hospital implemented the Surgery Safety Checklist, which divides the surgical procedure into three stages, each one corresponding to a period of time in the normal course of the process: before, during and after the intervention, when the surgeon, the anesthetist and the nurse perform their duties. In both cases, the nurse is in charge of filling in the forms.

Patient safety has been discussed in different countries and regions at different times. However, since the World Health Organization asserted its importance, strategies related to patient safety have been improved.

The Surgery Safety Checklist was implemented in most European Union countries and is used in a large number of surgical specialties. The results obtained for the degree of completion in our study were not different than those published since the strategy of surgery safety was officially released.

The implementation of measures that require changes in attitude and processes is complex, and the application of the Surgery Safety Checklist is no exception. The recommendations of the World Health Organization regarding the filling in or the modification of the list were followed, in order to adapt it to the local practice at Hospital Santa Cruz de Liencres, and to reach consensus regarding its filling in. In most hospitals where it was imple-
mented, the checklist was changed and adapted to the needs of each specialty and to the management of the organization\(^{(17)}\), which is different in each country, and this opens up the scope for studies related to the validity of records among countries.

As in other studies\(^{(18)}\), one of the items that was less frequently filled in was the presentation of the members of the surgery team and their roles. This can be explained by the process of implementation and methodology used in training and awareness of the Surgery Safety Checklist or by the lack of culture of this way of filling in records.

The percentage of confirmation of patients’ details (identity, site of operation, procedure and consent) is similar to those informed by other surgical units\(^{(19)}\).

The application of the Surgical Safety Checklist allowed for the detection of events that altered the normal course of the surgery, without affecting the patient. There are many publications stating that the effect on morbidity and perioperative mortality and the culture of safety at the surgical unit is improved with the Surgery Safety Checklist\(^{(20,21)}\). However, this information was not reported in our study.

It is worth mentioning the differences between the degree of completion among the nursing staff and the other groups, which is certainly associated with the culture of filling in that existed before with the previous record (free and instrumentalist). Rates of completion of 90% and 100% were obtained, whereas for the rest of the team, rates of 42.3% were obtained for anesthetists and 21.2% for surgeons. In addition, in most published studies, coordination was performed by the nursing team, who was also responsible for filling in\(^{(22)}\) and took charge of it as another routine surgery task.

When comparing the number of Surgery Safety Checklists of different hospital units at a global level, between 80 and 90%\(^{(17,19,23)}\) of cases the rates of completion were similar to those of the Orthopedics and Traumatology surgery center of Liencres.

After a deeper analysis of the results of this study, it was possible to find that not all items of the Surgery Safety Checklist were filled in, in which the second stage (Time Out) was the one with the highest degree of completion among the consulted studies.

Patterns of completion of the Free Form should be between 80% and 90%, as it is a compulsory procedure carried out by the nurse, besides being a document that is part of the clinical record. When we observe the pattern of the variable of completion in the Surgery Safety Checklist, the most complete and with the highest number of signatures is the one completed by the nurse in relation to the rest of the team\(^{(16)}\).

**Conclusion**

Both the Free Form and the Surgery Safety Checklist fulfilled the expectations of the management and participation of health professionals in clinical safety. The need to improve the filling in of some items of the second record was evident, as well as the need to focus efforts on encouraging its completion. It was not possible to associate adverse events on patients with the use of each document.

**Collaborations**

Torres B, Macia L, Nolasco A, Lopez MJ and Pina F contributed to the project conception, research development, interpretation of data, writing and critical review and final approval of the published version.

**References**


Quality of life of frail and institutionalized elderly

Lucélia Malaquias Cordeiro¹
Jéssica de Lima Paulino¹
Maria Eliana Peixoto Bessa¹
Cíntia Lira Borges²
Saul Filipe Pedrosa Leite¹

Abstract
Objective: To assess the quality of life of institutionalized frail elderly.
Methods: Cross-sectional study including 33 frail and pre-frail elderly, classified based on the Edmonton Frailty Scale. An instrument was applied to characterize the sociodemographic aspects and the World Health Organization Quality of Life for Older Persons to assess the quality of life.
Results: The female sex was predominant (54.5%) and the mean age was 76.8 years (±9.3). A significant association was observed between the quality of life and all of its facets, and a strong relation was found between quality of life and “past, present and future activities” (r=0.715; p<0.001).
Conclusion: The presence of frailty did not interfere directly in the elderly’s quality of life and showed a significant association with the motive for the institutionalization.

Keywords
Nursing care; Skilled nursing facilities; Nursing geriatric; Quality of life; Frail elderly

Resumo
Objetivo: Avaliar a qualidade de vida de idosos frágeis institucionalizados.
Métodos: Estudo transversal com a inclusão de 33 idosos frágeis e pré-frágeis, classificados a partir da Escala de Fragilidade de Edmonton. Foram aplicados: um instrumento para caracterização dos aspectos sociodemográficos e o instrumento World Health Organization Quality of Life for Older Persons para avaliação da qualidade de vida.
Resultados: Houve predomínio do sexo feminino (54,5%) e a média de idade foi de 76,8 anos (±9,3). Observou-se associação significativa entre a qualidade de vida e todas suas facetas, e houve forte relação entre qualidade de vida e “atividades passadas, presentes e futuras” (r=0.715; p<0.001).
Conclusão: A presença de fragilidade não interferiu diretamente na qualidade de vida de idosos e apresentou associação significativa com motivo de institucionalização.

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Conflicts of interest:
no conflicts of interest to declare.
Introduction

The aging phenomenon is a global concern and reality. The transition of the population’s demographic profile entails sudden epidemiological changes in terms of the increased number of frail elderly and the need for institutionalization. This situation entails challenges to maintain and improve the quality of life and wellbeing of this population.

Frailty in elderly people is a public health problem, and its peculiarities still lack further research. The advance of this syndrome leads to the need for formal health care, mainly in developing countries, where a large part of the population is low income, without socioeconomic conditions to manage home care. The prevalence of institutionalized frail elderly has been estimated at 34.9%,(1) 53.7%(2) and 68.8%(3) in studies undertaken in Europe, and 49.3%(4) and 45.8%(5) in Brazilian studies.

The institutionalization, which is an adverse result of frailty, derives from factors that suggest family abandonment, exclusion and social isolation. These are reasons that contribute to the appearance of negative thoughts, feelings and attitudes or to rejection, which compromises the elderly’s emotional and mental conditions and quality of life.

In that context, quality of life is a comprehensive and multidimensional term, which is established based on a concept that addresses the physical health, psychological status, social relations and environment based on subjective assessments.(6) In the aging context, the World Health Organization proposes the Active Aging Policy, which aims to increase the expectation of a healthy life to quality of life for all people who are aging, including frail, physically disabled and care-needing elderly.

It is highlighted that studies about frailty, quality of life and institutionalization are scarce. Thus, dynamical knowledge of these three pillars should contribute to the elaboration of public policies and intervention actions to promote health; prevention of disabilities; and to social and health replanning, with a view to advancing in the institutionalization sector.

Thus, the objective in this study was to assess the quality of life of institutionalized frail elderly.

Methods

Cross-sectional study undertaken at a long-term institution for elderly in the city of Fortaleza, in the Northeast of Brazil, which attended to elderly with all levels of dependence. The target population consisted of individuals aged 60 years or older. The research was undertaken in September 2014.

A convenience sample was selected. The inclusion criteria were: male and female elderly in physical and mental conditions to answer the questions, scoring between 5 (apparently vulnerable) and 10 (moderate frailty) on the Edmon- ton frailty scale. Out of 50 elderly, 33 attended to the prerequisites and were included in the final sample.

To collect the data, the following sociodemographic variables were chosen: age range, sex, marital status, education, retirement, length and motive of institutionalization and number of visits. In addition, to assess the quality of life, the World Health Organization Quality of Life for Older Persons (WHOQOL-OLD) was applied, which consists of 24 items distributed in six facets: sensory abilities; autonomy; past, present and future activities; social participation; death and dying; and intimacy.

The collected information was organized in Microsoft Excel 2010 and analyzed in the Statistical Package for the Social Sciences version 20.0. Before the exploratory analysis of the data, simple frequencies, means, standard errors, minima and maxima were calculated. Quartile-based cut-off scores were established for the WHOQOL-OLD scores. Next, groups of elderly were divided with score ≤71 (quartile 1), between 72 and 88 (quartile 2), and ≥89 points (quartile 3). Then, the groups were correlated with the sociodemographic, institutionalization and frailty characteristics, using the chi-square test. Pearson’s correlation coefficient was calculated to identify the inter-relation between quality of life and the WHOQOL-OLD facets. Significance was set at p<0.05 and p<0.01. After this processing, the results were analyzed according to the relevant literature.
The development of the study complied with the Brazilian and international ethical standards for research involving human beings.

**Results**

The study included elderly with a mean age of 76.8 years (±9.3), 54.5% being women. The information on the sociodemographic, institutionalization and frailty profile are described in table 1. The sole significant variable associated with quality of life was the motive for the institutionalization (p<0.024), demonstrating that the elderly who were institutionalized upon their own initiative (30.3%) had lower levels of quality of life when compared to the elderly who entered through relatives (51.2%) or due to abandonment (18.2%).

The elderly presented a mean quality of life of 80.45 points (±10.56). The highest mean score was observed in the facet “death and dying” (16.88±3.57) and the lowest in “intimacy” (10.52±4.31) (Table 2).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups of quality of life score quartiles</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quartile 1 (n(%))</td>
<td>Quartile 2 (n(%))</td>
<td>Quartile 3 (n(%))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age range* (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>9(27.3)</td>
<td>1(11.1)</td>
<td>5(55.6)</td>
<td>3(33.3)</td>
<td>0.779</td>
</tr>
<tr>
<td>70-79</td>
<td>11(33.3)</td>
<td>2(18.2)</td>
<td>5(45.5)</td>
<td>4(36.4)</td>
<td></td>
</tr>
<tr>
<td>80-89</td>
<td>11(33.3)</td>
<td>4(36.4)</td>
<td>4(36.4)</td>
<td>2(27.3)</td>
<td></td>
</tr>
<tr>
<td>90-100</td>
<td>2(6.1)</td>
<td>1(50.0)</td>
<td>1(50.0)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>18(54.5)</td>
<td>4(26.7)</td>
<td>7(46.7)</td>
<td>4(26.7)</td>
<td>0.907</td>
</tr>
<tr>
<td>Male</td>
<td>15(45.5)</td>
<td>4(22.2)</td>
<td>8(44.4)</td>
<td>6(33.3)</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Single</td>
<td>10(30.3)</td>
<td>3(30.0)</td>
<td>6(60.0)</td>
<td>1(10.0)</td>
<td>0.410</td>
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<td>Widowed</td>
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<td>3(27.3)</td>
<td>3(27.3)</td>
<td>5(45.5)</td>
<td></td>
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<tr>
<td>Married</td>
<td>6(18.2)</td>
<td>-</td>
<td>4(66.7)</td>
<td>2(33.3)</td>
<td></td>
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<tr>
<td>Separated</td>
<td>6(18.2)</td>
<td>2(33.3)</td>
<td>2(33.3)</td>
<td>2(33.3)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Illiterate</td>
<td>10(30.3)</td>
<td>1(10.0)</td>
<td>4(40.0)</td>
<td>5(50.0)</td>
<td>0.335</td>
</tr>
<tr>
<td>Unfinished/finished primary education</td>
<td>16(48.5)</td>
<td>6(37.6)</td>
<td>7(43.7)</td>
<td>3(18.7)</td>
<td></td>
</tr>
<tr>
<td>Finished secondary education</td>
<td>7(21.2)</td>
<td>1(14.3)</td>
<td>4(57.1)</td>
<td>2(28.6)</td>
<td></td>
</tr>
<tr>
<td>Retirement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>32(97.0)</td>
<td>8(25.0)</td>
<td>15(46.9)</td>
<td>9(28.1)</td>
<td>0.305</td>
</tr>
<tr>
<td>No</td>
<td>1(3.0)</td>
<td>-</td>
<td>-</td>
<td>1(100.0)</td>
<td></td>
</tr>
<tr>
<td>Length of institutionalization** (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥5</td>
<td>12(36.4)</td>
<td>3(25.0)</td>
<td>4(33.3)</td>
<td>5(41.7)</td>
<td>0.583</td>
</tr>
<tr>
<td>6-10</td>
<td>13(39.4)</td>
<td>3(23.1)</td>
<td>8(61.5)</td>
<td>2(15.4)</td>
<td></td>
</tr>
<tr>
<td>&gt;10</td>
<td>8(24.2)</td>
<td>2(25.0)</td>
<td>3(37.5)</td>
<td>3(37.5)</td>
<td></td>
</tr>
<tr>
<td>Receives visits?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>24(72.7)</td>
<td>4(16.7)</td>
<td>11(45.8)</td>
<td>9(35.7)</td>
<td>0.166</td>
</tr>
<tr>
<td>No</td>
<td>9(27.3)</td>
<td>4(44.4)</td>
<td>4(44.4)</td>
<td>1(11.1)</td>
<td></td>
</tr>
<tr>
<td>Who visits?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relatives</td>
<td>23(69.3)</td>
<td>4(17.4)</td>
<td>11(47.8)</td>
<td>8(34.8)</td>
<td>0.236</td>
</tr>
<tr>
<td>Friends</td>
<td>1(3.0)</td>
<td>-</td>
<td>-</td>
<td>1(100.0)</td>
<td></td>
</tr>
<tr>
<td>Nobody</td>
<td>9(27.3)</td>
<td>4(44.4)</td>
<td>4(44.4)</td>
<td>1(11.1)</td>
<td></td>
</tr>
<tr>
<td>Motive for institutionalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disease</td>
<td>17(51.5)</td>
<td>2(11.8)</td>
<td>6(35.3)</td>
<td>9(52.9)</td>
<td>0.024</td>
</tr>
<tr>
<td>Own initiative</td>
<td>10(30.3)</td>
<td>5(50.0)</td>
<td>5(50.0)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Abandonment</td>
<td>6(18.2)</td>
<td>1(16.7)</td>
<td>4(66.7)</td>
<td>1(16.7)</td>
<td></td>
</tr>
<tr>
<td>Frailty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apparently vulnerable</td>
<td>17(51.5)</td>
<td>5(29.4)</td>
<td>7(41.2)</td>
<td>5(29.4)</td>
<td>0.967</td>
</tr>
<tr>
<td>Mild frailty</td>
<td>10(30.3)</td>
<td>2(20.0)</td>
<td>5(50.0)</td>
<td>3(30.0)</td>
<td></td>
</tr>
<tr>
<td>Moderate frailty</td>
<td>6(18.2)</td>
<td>1(16.7)</td>
<td>3(50.0)</td>
<td>2(33.3)</td>
<td></td>
</tr>
</tbody>
</table>

n=33; Chi-square test (p<0.05); *mean: 76.8 (±9.3), minimum: 62, maximum: 100; **mean: 5.7 (±5.7), minimum: 6 months, maximum: 20 years
All facets revealed significant correlations with the quality of life. The facet “past, present and future activities” obtained the highest correlation (0.715) and “autonomy” the lowest correlation (0.494) with the quality of life (Table 3).

### Table 3. Pearson’s correlation coefficient between quality of life and facets of WHOQOL-OLD, as well as prediction indicators of quality of life

<table>
<thead>
<tr>
<th>Facets</th>
<th>r</th>
<th>Scores</th>
<th>t</th>
<th>r²</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory abilities</td>
<td>0.603</td>
<td>1.872</td>
<td>4.213</td>
<td>0.364</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Autonomy</td>
<td>0.494</td>
<td>2.149</td>
<td>3.160</td>
<td>0.244</td>
<td>0.004</td>
</tr>
<tr>
<td>Past, present and future activities</td>
<td>0.715</td>
<td>3.483</td>
<td>5.687</td>
<td>0.511</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Social participation</td>
<td>0.647</td>
<td>2.707</td>
<td>4.724</td>
<td>0.419</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Death and dying</td>
<td>0.533</td>
<td>1.575</td>
<td>3.509</td>
<td>0.284</td>
<td>0.001</td>
</tr>
<tr>
<td>Intimacy</td>
<td>0.513</td>
<td>1.255</td>
<td>3.325</td>
<td>0.263</td>
<td>0.002</td>
</tr>
</tbody>
</table>

r = Pearson’s correlation coefficient; r² = determination coefficient; p<0.01

### Discussion

The study limitations referred to the cross-sectional design, which did not permit any cause-and-effect relation, and to the picturing of a specific population’s reality, without the possibility to generalize the data. On the other hand, the results should contribute to enhance the scientific evidence on the theme quality of life, frailty and institutionalization, and to minimize the risk the institutionalized elderly are prone to, through the assessment of the levels of frailty and quality of life.

These research results confirmed that the quality of life worsens in elder elderly, aged 80 years or older. It is expected that, over the years, the elderly are more susceptible to physical and mental problems, which impair the practice of activities of daily living, autonomy and independence, mainly when these elderly are frail and suffer due to the physical disabilities inherent in the syndrome, reducing the quality of life level. In addition, as a result of the institutionalization, these effects can be enhanced.

A significant association was found between the motive of the institutionalization and the quality of life (p<0.024). Different motives make the elderly enter long-term institutions for the elderly upon their own initiative, whether because they live alone, consider themselves a burden or feel neglected by the family, or because they are aware of their need for health care. This can entail low levels of quality of life, as these elderly can face adaptation difficulties, staying at the institution because they accept their new reality, but because of their pride or health needs. On the opposite, elderly who are abandoned and/or suffer from comorbidities will probably find a new opportunity in life and a new start. Opposite results were found in a research in Colombia.

The elderly’s mean quality of life score was positive (80.45±10.5), different from other studies involving institutionalized elderly. It is important to consider this information, as the quality of life of elderly at long-term institutions is directly associated with the attention and the individual and specialized care they receive. It is also of great value to focus on interventions aimed at improving the mental and emotional health even further, strengthening the social support and controlling chronic illnesses, which are crucial factors to maintain these elderly’s quality of life.

Although there is no consensus on the fact that frailty influences the individuals’ quality of life negatively, there is a growing interest in studying quality of life in institutionalized frail elderly. In this study, no correlation was found between frailty and quality of life (p=0.967).

As regards the facet “death and dying”, high scores were identified in the WHOQOL-BREF (16.88±3.57), showing that the institutionalized elderly accept death well. Consenting with one’s own finiteness can influence the quality of life since, as one ages, the death of the partner, family members and friends is an event the elderly expect. It is highlighted that low levels of qual-
ity of life are strong predictors of institutionalization, disabilities, physical frailties and death within one year.(11)

The lower mean quality of life score in the facet “intimacy” (10.52±4.31) can be explained by the characteristic of the long-term institutions for the elderly in this study, which consists of group rooms, without private space for couples. The intimacy is a very reserved activity; the elderly needs freedom and autonomy to practice it and, probably, they are impeded from expressing their freedom at the institution, protecting themselves and not demonstrating their feelings. Similarly, the prejudice of employees and health professionals towards sexuality in old age remains present, which aggravates the feeling of shame and the lack of initiative. Studies indicate the positive impact of an active sexual life on the elderly’s quality of life.(12)

The institutionalized and frail elderly can experience transformations related to the loss of identity, autonomy and confidence, intensifying the state of solitude and the dependence for the basic activities of daily living. Autonomy is the ability to make decisions; therefore, even disabled elderly can be capable of responding for themselves. In this study, the facet “autonomy” showed a low correlation (r=0.494; p<0.004) with quality of life, diverging from other studies in which the facet “autonomy” scored lower, and a stronger association with quality of life.(7) It is highlighted that care delivery at the long-term institution, mainly to frail or weakening elderly, should be based on their inclusion in the decision process, through health measures and strategies, allowing them to serve as specialized subjects of their care, permitting the empowerment of the being.

The facet “past, present and future activities” was strongly correlated (r=0.715; p<0.001) with quality of life. This information points towards the elderly’s satisfaction with the accomplishments, objectives achieved and life projects. It is inferred that most investigated elderly came from lower social classes and, consequently, lived with financial limitations, suffering inherent in the poverty conditions and did not have many aspirations, desires or motivations, thus affirming that they were satisfied with their conquests and had conformed to what was about to come. Thus, a good option to maintain this result would be the possibility of an environment as close to the elderly’s home as possible, respecting their opinions, values, beliefs and attitudes, stimulating and favoring the reception and accomplishment of new perspectives.

Therefore, it is fundamental to assess the quality of life of institutionalized elderly, mainly when frail, as a topic in the multidimensional assessment of elderly people. The purpose is to intervene as early as possible, so as to avoid negative health outcomes, extend the years of life and turn the institution into an environment of comfort and wellbeing, contributing to the active aging and to a better quality of life.

Conclusion

The presence of frailty did not direct interfere in the quality of life of institutionalized elderly and showed a significant association with the motive of the institutionalization.

Collaborations

Cordeiro LM; Paulino JL; Bessa MEP; Borges CL and Leite SFP declare that they contributed to the conception of the study, analysis, data interpretation, writing of the article, relevant critical review of intellectual content and final approval of the version for publication.

References

Quality of life of frail and institutionalized elderly


Acute kidney injury in the postoperative period of cardiac surgery

Lesão renal aguda no pós-operatório de cirurgia cardíaca

Mayara Silva do Nascimento1
Tatiane Carneiro Aguiar2
Alynne Vicentina Elias da Silva1
Tayse Tâmara da Paixão Duarte1
Marcia Cristina da Silva Magro1

Abstract

Objective: To identify the occurrence of acute kidney injury (AKI) in the postoperative period of cardiac surgery.
Methods: A prospective cohort study including 51 patients exposed to coronary artery bypass surgery, valve replacement, or combined surgery (bypass surgery and valve replacement) without history of kidney disease and kidney transplant, and who were followed from the preoperative period until 72 hours after surgery. Acute renal failure was defined as baseline creatinine increase of 0.3 mg/dL in 48 hours or less, or its increase from 1.5 to 1.9-fold, or a reduction in urine flow <0.5mL/kg/h for 6 hours. The Kidney Disease: Improving Global Outcomes (KDIGO) classification was used.
Results: The KDIGO classification showed that 92.2% of patients had renal impairment. The urinary flow criterion of this classification alone showed that 31.4% of patients had renal dysfunction in stage of risk, 33.3% in stage of renal injury, and 21.6% in stage of renal failure. By the serum creatinine criterion, 27.5% were identified in the stage of risk, 3.9% in stage of injury and another 3.9% in stage of kidney failure.
Conclusion: A high percentage of patients in the postoperative period of cardiac surgery (coronary artery bypass surgery and valve replacement) progressed to acute kidney injury.

Keywords
Acute kidney injury; Myocardial revascularization; Thoracic surgery; Postoperative period; Perioperative nursing

Descritores
Lesão renal aguda; Revascularização miocárdica; Cirurgia torácica; Período pós-operatório; Enfermagem perioperatoria

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Corresponding author
Marcia Cristina da Silva Magro
Faculdade Ceilândia da Universidade de Brasília. Centro Metropolitano, conjunto A, lote 01, Brasília, DF, Brazil. CEP: 70910-900
marciamagro@unb.br

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Acute kidney injury (AKI) is considered an abrupt, potentially reversible condition, and generally with complete recovery when the patient survives this stage of disease.\(^1\)

However, recent epidemiological and observational studies highlight the association of an episode of acute kidney injury with long-term adverse outcomes such as chronic kidney disease, cardiovascular events and premature death. The increased incidence of acute kidney injury and its association with severe intra-hospital complications, coupled with rising costs, are factors that make this disease a major problem for health systems.\(^1\)

Acute kidney injury is a clinical syndrome broadly defined as an abrupt decline in renal function, which occurs over a period of hours to days and results in retention of nitrogen products and metabolic waste. Although its initial clinical manifestation is usually oliguria, the volume of urine may be normal or high, and patients may be asymptomatic, especially in the beginning of the clinical picture. The diagnosis of acute kidney injury is revealed from a recent increase in serum creatinine and/or urea, or a reduction in urine output.\(^2\)

Risk factors for acute kidney injury include older age, male gender and diabetes mellitus.\(^3\) However, the most important risk factor is the pre-existing chronic kidney disease.\(^4\) This, in turn, is a predictor of acute kidney injury in the postoperative period.\(^5\)

Acute kidney injury is a critical problem in severely ill patients and is usually predictive of increased morbidity and mortality.\(^6\) It affects between 5 and 30% of patients in the postoperative period of cardiac surgery.\(^7,8\)

Renal dysfunction can be identified in the postoperative period of cardiac surgery, both in patients with pre-existing renal damage and in those without previous renal impairment. Thus, in this period, the mortality from acute kidney injury increases substantially.\(^9\)

The need to diagnose acute kidney injury as early as possible, in order to prevent or limit the various complications associated with it, has become the key for implementing strategies to control and minimize the risks of progression to chronic kidney disease.\(^10\)

In this scenario, the standardization of diagnosis and staging of acute kidney injury has become a worldwide effort in the development and improvement of multidimensional classification systems sensitive to the detection and stratification of renal injury. Among these, stand out the RIFLE criteria (acronym from Risk, Injury, Failure, Loss in End-stage) and Acute Kidney Injury (AKIN), published in 2004 and 2007, respectively.\(^11\)

Despite the current achievements, the mortality rate has barely changed, which has maintained and made the deployment of tools for the early identification of AKI an urgent matter. Based on the RIFLE and AKIN classifications, in 2012 the classification named Kidney Disease: Improving Global Outcomes (KDIGO) was published and implemented in clinical and surgical realities for identifying its diagnostic value and its precocity in the identification of acute kidney injury in hospitalized patients.\(^2,12\)

The KDIGO classification (Chart 1) can subsidize the early management of patients in clinical practice by defining the AKI as the serum creatinine increase of 0.3mg/dL in a 48-hour period and/or reduction of glomerular filtration rate (GFR) in 7 days, or even the urine output reduction lower than 0.5 mL/kg/h for 6 hours. Serum creatinine and urine output are key markers for renal impairment staging.\(^12\)

**Chart 1. Clinical Practice Guideline for Acute Kidney Injury**

<table>
<thead>
<tr>
<th>KDIGO Classification</th>
<th>Incidence/Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1 (risk)</td>
<td>Increase in baseline creatinine between 1.5 and 1.9-fold, or increase of &gt;0.3 mg/dL, or decreased urine output &lt;0.5mL/kg/h for 6 to 12 hours</td>
</tr>
<tr>
<td>Stage 2 (renal injury)</td>
<td>Increase in baseline creatinine between 2 and 2.9-fold, or decreased urine output &lt;0.5mL/kg/h for more than 12 hours</td>
</tr>
<tr>
<td>Stage 3 (renal failure)</td>
<td>Increase in baseline creatinine of 3-fold, or creatinine increase to &gt;4mg/dL, or start of dialysis, or in patients under 18 years, estimated creatinine clearance &lt;35mL/min/1.73m² or decreased urine output &lt;0.3mL/kg/h for more than 24 hours, or anuria for 12 hours or more</td>
</tr>
</tbody>
</table>


In this scenario, studies have shown that active surveillance of changes in serum creatinine and urine output can automate alerts, guide the dosing of drugs, reduce the incidence of acute kidney injury, improve patient safety and help with identifying the occurrence of complications.\(^13,14\)
The objective of this study was to identify the occurrence of acute kidney injury in the postoperative period of cardiac surgery.

**Methods**

This is a cohort, prospective and quantitative study carried out from August 2013 to June 2014 in the intensive care unit of a public hospital in Distrito Federal.

Patients aged over 18 years, exposed to coronary artery bypass surgery, valve replacement, or combined surgery (bypass surgery and valve replacement) without history of kidney disease and kidney transplantation were included. Those exposed to surgery of aneurysm correction, vascular surgery, contrast examinations in the last 72 hours prior to surgery and with chronic kidney disease (glomerular filtration rate<60mL/min/1.73m²) were excluded.

To obtain the estimation of the sample size (n) was used a ratio estimator formula. The p-value considered in the formula was 85%, obtained from patients who developed acute kidney injury in a pilot test with 20 patients. For the formula parameter, was assumed the absolute precision (d) of d = 10%. The sample size calculation resulted in 49 patients. The sample size used was 51 patients.

The follow-up of patients was from the preoperative period until 72 hours after surgery and was linked to the exposure to cardiac surgery procedure.

Acute renal failure was defined as baseline creatinine increase of 0.3 mg/dL in 48 hours or less, or its increase of 1.5 to 1.9-fold, or a reduction in urine flow <0.5mL/kg/h for 6 hours.\(^{(12)}\)

Data were collected from a structured data collection instrument with information of identification, demographic, clinical (previous diseases, use of medicines and pre-surgery laboratory tests), surgical (time of surgery, use of vasoactive drugs, intubation time, post-surgery laboratory tests and type of surgery), length of stay in the intensive care unit, and the prognostic index called Acute Physiology and Chronic Health Evaluation II (APACHE II).

The results were expressed in absolute and relative frequency, median and percentile of 25% and 75%.

The Fisher’s exact test and chi square test were used for analysis of categorical variables. The Mann-Whitney test was used to compare categorical and continuous variables, and the Spearman's rank correlation coefficient was calculated to compare the continuous variables. P-values <0.05 were considered significant.

The development of the study met national and international ethical standards for research involving human beings.

**Results**

In total, 51 patients with average age of 58±17 years were followed-up in the study. The majority (58.8%) was hypertensive, with mean body mass index of 25,9kg / m² and APACHE II of 15. There was a slight predominance (51%) of the female gender and the majority of patients used vasoactive drugs (Table 1).

A percentage of 21.6% of patients had surgical procedures prior to cardiac surgery. Among cardiac surgeries, there was prevalence of coronary artery bypass, followed by valve replacement and, the combined surgeries in a lesser percentage. The mean duration time of surgery was 300 minutes. The patients remained on mechanical ventilation for a median period of 12 hours. The positive end-expiratory pressure (PEEP) average of these patients was 5.4cmH2O (Table 1).

The cardiopulmonary bypass (CPB) time in valve replacement surgery was superior to the time in coronary artery bypass surgery.

The KDIGO classification signaled 92.2% of patients with renal impairment. The urinary flow criterion of this classification alone showed that 31.4% of patients had renal dysfunction in stage of risk, 33.3% were classified in the stage of renal injury and 21.6% in stage of renal failure. By the serum creatinine criterion, 27.5% were identified in the risk stage and 3.9% in both the stages of renal injury and renal failure.

There was a significant relationship between the male gender and performing coronary artery bypass surgery (p = 0.04) by the chi square test. The patients who underwent valve surgery (29.4%) made more use of vasopressin, and this statistical relationship was significant (p = 0.007) by the Fisher’s exact test.
A significant relationship was found between the coronary artery bypass surgery and the following risk factors: hypertension \((p = 0.04)\), diabetes \((p = 0.001)\), smoking \((p = 0.008)\) and dyslipidemia \((p = 0.009)\), according to the chi square test.

Patients undergoing coronary artery bypass surgery had median age between 51 and 73 years, and those who underwent valve surgery between 35 and 55 years. These results showed significant association \((p<0.001)\) by the Mann-Whitney test. On the other hand, the body mass index was similar among patients undergoing coronary artery bypass surgery \((26.6)\) and valve replacement \((25)\).

Patients who underwent coronary artery bypass surgery showed a higher percentage \((61.5\%)\) of kidney injury or failure, while among those who underwent valve replacement, a lower percentage \((38.5\%)\) progressed to kidney injury or failure.

Regarding the surgical scenario, patients who underwent valve surgeries required longer time of cardiopulmonary bypass, between 93 and 153 minutes and, consequently longer surgical time \((340\) minutes), compared to those who underwent coronary artery bypass surgery, in which surgical time ranged from 70 to 101 minutes, and 270 minutes of surgery. In particular, the CPB time was significantly associated with the type of surgery \((p = 0.01)\), but this association was not observed with surgical time \((p = 0.1)\).

### Discussion

Limitations of this study were related to absolute increases in serum creatinine by acute changes in the volume of distribution, acute dehydration or situations of volume expansion, which are common in critically ill patients hospitalized in intensive care units.\(^{15}\) In addition, the adopted sample size can also limit the generalization of results. On the other hand, the study contributes to encouraging the health team to use a functional classification for identification of acute kidney injury, especially nurses, who are the professionals responsible for direct management of patients.

Acute kidney injury is a complication often observed in the postoperative period of cardiac surgery, with complex clinical repercussions that impact negatively on the early and late prognosis of patients.\(^{16}\) Despite the scientific and technological advances in the health field, the approach of acute kidney injury is complex and challenging due to lack of criteria for its classification of complexity and early identification.\(^{17,18}\) Thus, implementing the KDIGO classification system enabled the recognition and stratification of acute kidney injury in the intensive care setting.

This functional classification system of the kidneys is of fundamental importance and favors the monitoring of renal function, facilitating the implementation of measures for prevention and treatment of early acute kidney injury.\(^{10,19}\)

The female gender was identified as an independent risk factor for postoperative renal injury, although this is not a consistent finding. However, compared to men, women normally have less muscle mass and are typically older at the time of surgery. These two factors can affect serum creatinine levels. In this study, the female gender was predomi-
nant and such evidence can be a factor to justify the significant percentage of renal injury, considering that women have physiologically lower glomerular filtration rates than men.(20) Allied to this factor, the use of potent vasoconstrictor drugs (norepinephrine and vasopressin) in a percentage of patients in this study may be an aggravating additional for kidney dysfunction.

Acute kidney injury is known to be multifactorial. However, one of the most common causes of acute kidney injury in patients who underwent cardiac surgery is resultant of the perfusion techniques used in extracorporeal circuit management. Such techniques can trigger the need for dialysis or renal replacement therapy. A meta-analysis showed that off-pump surgery may decrease the risk of acute kidney injury compared to cardiopulmonary bypass surgery. Nonetheless, these results were inconclusive, considering the several definitions of this pathology.(19)

Moreover, during cardiac surgery, generally it is not the extracorporeal circulation alone, but also its duration time that causes a reduction in kidney function. The duration of cardiopulmonary bypass and the occurrence of postoperative renal dysfunction are controversial. However, a meta-analysis found that this period represents an independent risk factor for acute kidney injury.(18) In this sense, the present study found a statistically significant relationship (p = 0.01) between the type of surgery and cardiopulmonary bypass time.

Patients with AKI generally have longer periods of hospital stay and consume more financial resources. In accordance with current evidence, few markers determine if the kidneys are adequately protected during surgery.(21)

Scientific evidence identified acute kidney injury incidences of 14 and 51% using the KDIGO classification system.(22,23) However, in this study, more than half of patients developed acute kidney injury after cardiac surgery. Among other factors, this is because the classification enables the identification of acute kidney injury in the first two days after renal insult.(24)

In addition, it was found that a high percentage of patients progressed to stage 2. In this context, the importance of implementing protocols, warning systems and preventive strategies should be reinforced in clinical practice, in order to control the impact of this insult in the quality of life of affected individuals, minimize the risk of progression to more advanced stages of disease and worsening of prognosis.(21)

Decreased urine output can determine hemodynamic and endocrine changes, but not all the acute kidney injury is manifested through reduction of this parameter. Evidences have shown urine output as a more sensitive indicator to detect acute kidney injury than the biomarkers usually employed in clinical practice.(9,17)

Serum creatinine is a late marker of acute kidney injury. Changes in its results may be due to non-renal variables such as age, body weight, muscular mass, protein intake, among others, usually found late. From this perspective, the use of KDIGO classification subsidizes the early detection of acute kidney injury, and enables the staging of the degree of impairment of renal function.(17)

Advanced age, overweight and comorbidities are clinical characteristics of a population predisposed to the development of renal dysfunction.(9,17) Scientific studies such as the present one have showed that older age and overweight were factors present in the sample who developed AKI.(10,25)

The high APACHE II score can be considered a risk factor for death in patients with acute kidney injury, as well as risk for requiring dialysis(6) - a reality observed in this study.

Norepinephrine is used in cases of hypotension. In such cases, it is common that patients in the period after cardiac surgery develop acute kidney injury by reduction in renal blood flow and subsequently, ischemia. The major cause for the emergence of acute kidney injury after cardiac surgery is surely ischemia secondary to renal hypoperfusion.(26)

Scientific research shows that a higher time of mechanical ventilation significantly exposes patients to the occurrence of acute kidney injury after cardiac surgery.(19) In this study, despite the high incidence of acute kidney injury, the invasive ventilation strategy employed an average positive end-expiratory pressure of 5.4±0.9cmH2O. A systematic
review supported that the occurrence of acute kidney injury in patients on invasive mechanical ventilation was more directly related to the change of hemodynamic variables. Still, the possibility of developing this pathology as a result of ventilation strategy is not excluded.  

The KDIGO classification favors the early identification of kidney dysfunction and thus, enables the adoption of preventive measures and implementation of individualized interventions to identify renal impairment, which may represent an important differential in clinical practice.

Conclusion

A high percentage of patients in the postoperative period of cardiac surgery progressed to acute kidney injury. Only by the urinary flow criterion of KDIGO classification, most patients were stratified in stages 1 or 2. The urine output showed greater discriminatory power as a marker of acute kidney injury when compared to the creatinine criterion.

Collaborations

Silva AVE participated in the design and development of the project. Nascimento MS and Aguiar TC participated in the collection and interpretation of data and writing of the article. Duarte TTP contributed in the stages of study review, formatting, organization of theoretical framework, correction of agreement and submission process. Magro MCS collaborated in the stages of design, project planning, analysis and interpretation of data, writing and critical review of important intellectual content and approval of the final version to be published.

References


Patient identification systems in obstetric units, and wristband conformity
Sistemas de identificação de pacientes em unidades obstétricas e a conformidade das pulseiras

Terezinha Hideco Tase¹
Daisy Maria Rizatto Tronchin²

Abstract
Objective: To evaluate the conformity of wristband identification of women in the obstetrics clinic and their newborns in the delivery room.

Methods: A quantitative study with a sample of 800 opportunities, selected by probabilistic sampling. Data collection occurred using a form completed at the bedside. The chi-square test was used to compare the conformity between the units, and a 95% confidence interval was adopted.

Results: The general compliance was 58.5% in the clinic, and 22.3% in the delivery room. Regarding the three-step protocol, the higher compliance in the clinic was related to the stage of identification of components (93.4%) and the lower, to the wristband conditions (70%); in the delivery room, the highest rates were also those steps, 69% and 44.5%, respectively. When comparing the units, the clinic produced better conformity levels with a statistically significant difference.

Conclusion: The findings allowed for restructuring of the protocols and implementing them in the institution.

Keywords
Maternal-child nursing; Nursing administration research; Nursing assessment; Patient safety; Patient identification systems

Descritores
Enfermagem materno-infantil; Pesquisa em administração de enfermagem; Avaliação em enfermagem; Segurança do paciente; Sistemas de identificação de pacientes

Keywords
Maternal-child nursing; Nursing administration research; Nursing assessment; Patient safety; Patient identification systems

Resumo
Objetivo: Avaliar a conformidade das pulseiras de identificação de mulheres na clínica obstétrica e seus neonatos no centro obstétrico.

Métodos: Estudo quantitativo, com casuística de 800 oportunidades, selecionadas por amostragem probabilística. A coleta de dados ocorreu mediante formulário preenchido à beira-leito. O teste Qui-quadrado foi utilizado para comparar as conformidades entre as unidades e adotado o intervalo de confiança de 95%.

Resultados: A conformidade geral foi de 58,5% na Clínica e 22,3% no Centro Obstétrico. Quanto às três etapas do protocolo, a maior conformidade na Clínica correspondeu à etapa componentes de identificação (93,4%) e a menor, às condições da pulseira (70%); no Centro Obstétrico, os maiores índices também foram nessas etapas 69% e 44,5%, respectivamente. Na comparação entre as unidades, a Clínica obteve melhores índices conformidade, diferença estatisticamente significante.

Conclusão: Os achados possibilitaram reestruturar os protocolos e implementá-los na Instituição.

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¹Hospital das Clínicas, Faculdade de Medicina, Universidade de São Paulo, São Paulo, SP, Brazil.
²Escola de Enfermagem, Universidade de São Paulo, São Paulo, SP, Brazil.

Conflicts of interest: there are no conflicts of interest to declare.
Introduction

The binomial wristband identification protocol still has vulnerable points; those are related to the process itself, as well as those involving professionals who perform it, and the structural conditions. Associated with that, there are other factors involved, such as: implementation of protocols, technological apparatus, the multidisciplinary team commitment, patient displacement and specificity of the newborn, that in the case has no mechanism that may contribute to confirming the identification data.

Vulnerable points of the identification process are also checked during occasions of patient surname homonyms or those with similar hospital identification who share the same unit, room or diagnostic support services, side by side.

However, the misidentification of the patient still permeates the organizations that provide care, being portrayed by situations such as the absence of a wristband for several days or even throughout the hospitalization, presence of several wristbands designed to characterize potential hazards (falls, allergies, among others), wristbands with incorrect identifiers such as first name, surname, hospital identification number, or absence of those recommended by the institutional protocol, unreadable data, and an inadequate wristband condition mainly in terms of the inadequate size of the wristband for the user.

On the other hand, there was the absence of assessments to measure the quality of performance on the mother and child identification protocol, through wristbands aiming to detect problems involving the different institutional sectors and the proposal of corrective and preventive measures able to reduce injuries especially prolonged hospitalization, disability, the wrong infant presented to a mother, and death of newborn.

In the health context, risk and safety perceptions are complex issues because of the numerous elements in the work process, the peculiarities and characteristics of each situation, and the multifactorial nature behind the failures in the system.\(^{(1,2)}\)

Patient identification is an area of high priority among the many management and care processes in health services because, when there is an error or adverse event regarding non-compliance in patient identification, in most situations, the outcomes are catastrophic. On the other hand, it is a practice that contains preventable measures when it is valued by health professionals, it needs low-cost materials, and it must be described in institutional protocols.\(^{(3)}\)

In 2007, the World Health Organization (WHO), in partnership with the Joint Commission International (JCI), an American-based accrediting agency, released nine patient safety solutions for the prevention of errors and adverse events in health care. These solutions are defined as projects or interventions in systems that are able to prevent or attenuate harm to the patient, and include: managing the risks associated with look alike – sound alike medication names; correct patient identification; handoff communication during the transfer of responsibility for the patient; performance of the correct procedure at the correct body part; control of concentrated electrolyte solutions; ensuring the appropriateness of medication throughout the care process; avoiding catheter and tubing misconnections; needle reuse and injection device safety, and improved hand hygiene to prevent infections associated with health care.\(^{(4,5)}\)

In view of this reality, patient identification is considered one of the solutions, and it is an essential and critical component of safe care; if correctly performed, it is likely to prevent many errors or adverse events in different areas of practice.

In this sense, the WHO has determined measures for the unequivocal identification of the patient, such as the presence of a wristband from admission to discharge, use of the wristband to verify the patient for all health professionals before care, establishment of institutional protocols predicting exceptions such as homonyms, abbreviations or inability to use the wristband. Also highlighted is the importance of involving the patient/family in the identification process, especially during the confirmation of data, and explaining the need to maintain the wristband.\(^{(6)}\)

Thus, an important international program with various operating areas was established, observing: behavioral aspects of patients and health profession-
The patient identification process using wristbands does not create too much difficulty to implement, since it is understood, valued by professionals and by patients, and incorporated into practice. These strategies are of greater value when compared to the training of professionals and to governmental and institutional recommendations. The objective of this study was to evaluate the wristband identification protocol of the women admitted to the Obstetric Clinic, and newborns in the delivery room, at a university hospital of São Paulo.

**Methods**

This was quantitative, exploratory research, using a descriptive approach, with prospective data collection, conducted in the obstetrical clinic and delivery room of a tertiary care university hospital in São Paulo, during the period between September of 2013 and March of 2014.

The sample consisted of 800 opportunities (400 women and 400 neonates), and a significance of 5%, $z = 1.96$, $p = 0.50$ $m = 5\%$ was used for calculation. The selection process was conducted as a systematic random probability sampling, based on the total number of beds in the obstetrical clinic. The exclusion criteria adopted was women admitted for an obstetric cause, whose pregnancy did not result in a live birth. For the sampling at the Obstetric Center, the day of the week and the number of delivery/day was used.

Data were collected through a form. The study variables were: presence and quantity of wristband(s); a plastic wristband and white printed or handwritten/label for a pregnant woman; and for postpartum women, two plastic bracelets, printed or handwritten on white laces, and a wristband with the sequential delivery number on the arm. The identifiers for the woman were: complete and correct first and last name, hospital registration number, and bar code. Wristband conditions were: readability of identifiers (letters of appropriate reading size, absence of flaws in print, smudges /erasures, dirt or secretions and the material used), and conditions of wristband (free from tears, cuts, folds, or problems with the lock/adhesive, and of an appropriate size).

For newborns, variables differed for presence and quantity; four wristbands, two of white plastic - one on the right arm and the other on the right leg, and two wristbands made from laces with the sequential delivery number - one on the right arm and one on the right leg, along with the newborn identifiers: full and correct name and surname of the mother, with the acronym “NB of” (“newborn of”) and “sequential number” of birth, hospital register identification, barcode, and on the wristband made of the laces, the sequential number of the delivery. With regard to the wristband conditions, the variables established earlier were added with the NB-sized wristbands.

It is emphasized that the recommended identifiers were compared to those inserted in medical records or the hospital census. In this study, conformity was defined as compliance with the requirements determined by the institutional protocol in regard to the items evaluated and to noncompliance, its opposite.

Data were organized in an electronic spreadsheet and analyzed based on descriptive and inferential statistics, using the chi-square test to compare the conformity rates with the significance level of 5% ($p <0.005$). The adopted confidence interval was 95%.

The conformity rates established by the authors for the protocols were 90% in the general conformity and the three-step protocol: presence and quantity of wristbands, identification of required identifiers, and wristband conditions, both in the obstetrical clinic as well as in the delivery room.

The development of the study met the national and international standards of ethics in research involving human subjects.

**Results**

Figure 1 shows the general conformity of the identification protocol for pregnant/postpartum women admitted to the Obstetrical Clinic and newborns in the delivery room.
The data in figure 1 show that in the identification protocol for pregnant/postpartum women, the conformity index (58.5%) was higher than the nonconformity. However it was not a marked difference (17.0%), but indicates weakness in the identification process because of the proximity of percentages.

It appears that the conformity of the newborn identification protocol obtained the percentage of 22.3%, approximately three times lower than that of nonconformity, pointing to a higher vulnerability in the identification process as well, which may lead to aggravating elements in care, compromising the safety of the newborn.

The data in table 1 demonstrate conformity and noncomformity, according to the three steps of the identification protocol for pregnant/postpartum women in the Obstetrical Clinic, defined as follows: the presence and quantity of wristbands; required identifiers, and conditions of the wristband.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Conformity n(%)</th>
<th>Nonconformity n(%)</th>
<th>Total n(%)</th>
<th>CI 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence and quantity of wristbands</td>
<td>349(87.2)</td>
<td>51(12.8)</td>
<td>400(100)</td>
<td>(84.0; 90.5)</td>
</tr>
<tr>
<td>Required identifiers</td>
<td>355(93.4)</td>
<td>25(6.6)</td>
<td>380(100)</td>
<td>(90.9; 95.9)</td>
</tr>
<tr>
<td>Conditions of the wristbands</td>
<td>266(70.0)</td>
<td>114(30.0)</td>
<td>380(100)</td>
<td>(65.4; 74.6)</td>
</tr>
</tbody>
</table>

*Chi-square test, p<0.001; n=400

The results of table 1 show that, of the three steps of the identification protocol, the highest percentage of conformity (93.4%) occurred in the second stage – required identifiers – and the lowest occurred in the third stage - conditions of the wristbands (70%), with a statistically significant difference (p <0.001). These findings show that only the second step reached levels estimated by the authors of 90% conformity.

In the step, quantity of the wristbands, the percentage of nonconformity, 51 (12.8%) was due to nine (2.3%) absences of wristbands, 11 (2.7%) had wristbands present, but without any identifiers, and 31 (7.8%) did not match the condition of the mother or postpartum woman, as described in the institutional protocol. Due to the first two reasons - lack of wristband and wristband without any identifiers, the second and third stages were evaluated, considering 380 opportunities.

The data in table 2 presents conformity and noncomformity in the three steps of the NB identification protocol in the delivery room.

Table 2 shows that of the three steps of the NB identification protocol, the highest percentage of conformity (69%) was concentrated in the second step - the required identifiers - and the lowest percentage (44.5%) was found in the third - the con-
Table 2. Conformity in the three steps of evaluation of newborn wristbands

<table>
<thead>
<tr>
<th>Steps</th>
<th>Conformity</th>
<th>Non conformity</th>
<th>Total</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence and quantity of wristbands</td>
<td>220(55)</td>
<td>180(45)</td>
<td>400(100)</td>
<td></td>
</tr>
<tr>
<td>Required identifiers</td>
<td>276(69)</td>
<td>124(31)</td>
<td>400(100)</td>
<td></td>
</tr>
<tr>
<td>Condition of the wristbands *</td>
<td>178(44.5)</td>
<td>222(55.5)</td>
<td>400(100)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Chi-square test, p<0.001; n=400

dition of the wristbands. At this step, the index of nonconformity, 222 (55.5%), was higher than conformity, due to the conditions of use and the size of the wristband, which was inadequate for the size of the NB. When comparing the three steps, there was a statistically significant difference, p <0.001.

Discussion

The limitations of the study results are inherent to the fact that the research needed to be conducted in two units of a tertiary care hospital, which restricts its generalization.

However, the research results enabled the situational diagnosis of the institution as assessing the conformity and nonconformity of a protocol, which constitutes itself in a reference point for future research to indicate acceptable levels of nonconformity and the establishment of goals to reduce these results.

It is noteworthy that, to provide safe care, it is necessary that all patients use an identification wristband; that the information contained in the wristband is correct and legible, and the professionals who care for these patients conduct a review of the data on the wristband before providing care.

Several studies have been conducted showing the prevalence of identification wristbands, errors arising from misidentification, and the behavior of professionals in the practice of identification, however there is little research whose purpose is to assess the general conformity and specific of practices or work processes on the basis of institutional protocols.

In the report issued by the Vermont Oxford Network System, a nonconformity percentage of 11% related to NB identification was found. Other studies assessing conformity in wristband identification in pediatric units demonstrate error rates of 9.2%, 17% and 20.4% in identification. Comparing the results of this study to the indexes found in the other studies; the general conformity rates were considerably lower, especially in identifying newborns at the delivery room. These results are considered worrying, in view of the importance of these care practices and the repercussions of nonconformity on the safety and health of patients.

Thus, there is a need for a comprehensive discussion and review of protocols at the institution, the research scenario, for the implementation of strategies and professional training in order to follow the established protocols, as well as the need for supervision and systematic surveillance to ensure safe practice.

An audit conducted in 89 European hospitals showed that patient identification was rarely used, although considered a basic strategy, with evidence that demonstrated its effectiveness in reducing adverse events and improving patient safety.

Regarding the absence of wristbands and nonconformities in the identification protocol verified in the study, there is a reality that must be recognized and ratified of high vulnerability by exposing the patient and the health professionals to preventable risks in health care.

Just like other studies, whose objective was adherence to institutional care practice protocols, patient identification has cultural and behavioral issues that need to be addressed and managed with the health care team and with patients.

Some authors have been researching these aspects. Investigating the opinion and practice of health professionals on patient identification, 17.1% did not know the reason for using the wristband, and 40.7% did not believe that using the wristband would prevent errors.

Similar results were found in a study on the opinion of the health care team and parents on patient identifiers in a pediatric unit. The health care team demonstrated knowledge about the
need of using the wristband (65% to 92%) and its benefits (64% to 78%). Regarding the parents, 89% believed it was necessary to use the wristband, and 57% reported that using the wristband could prevent mistakes. On the other hand, only 34% of children were identified with wristbands.\(^{(14)}\)

The involvement of patients and families in the identification process as an active partner in the process of confirming their own data, or as a holder of information on the measures and protocols involving identification and institutional security, creates allies in the process who are able to collaborate with health professionals to define and implement shared care plans.\(^{(10,15)}\)

In the same way, they understand that patient/user participation is one of the main points of safe care, and it was found that 91% of patients reported being able to collaborate to prevent errors that occur in hospitals; 84% felt comfortable asking the nurse to confirm the data on their wristbands.\(^{(16)}\)

Most patients (90.2%) agree to use the wristband identification during the hospital stay, even if these provide identifying codes of clinical conditions or risk.\(^{(17)}\)

Given the results, the need to review the work processes of health professionals and the identification protocol is noted, for the training of health professionals and acquisition of inputs appropriate for neonatal care.

Thus, the wristband is the identification method for knowledge, and will be an effective method to eliminate the flaw, if the patient accepts its use, if the information is correctly provided, and if professional caregivers value and check the identification wristband during their care processes.\(^{(18)}\)

**Conclusion**

The findings guided the redesign of care and management processes, and supported the restructuring of the protocols and the implementation of educational measures and strategies, impacting the consciousness of health professionals, to value the unequivocal identification of the patient.

**Acknowledgements**

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**Collaborations**

Tase TH and Tronchin DMR collaborated with the study design, data collection, analysis and interpretation of data, article writing, critical review of the intellectual content, and approved the final version to be published.

**References**


Association between quality of life and medication adherence in hypertensive individuals

Associação entre a qualidade de vida e adesão à medicação de indivíduos hipertensos

Juliét Silveira Hanus¹
Priscyla Waleska Simões¹
Graziela Amboni¹
Luciane Bisognin Ceretta¹
Lisiane Generoso Bitencort Tuon¹

Abstract

Objective: To evaluate the association between quality of life and medication adherence in hypertensive individuals.

Methods: Cross-sectional study carried out with 432 hypertensive subjects registered in a federal public computerized system. Data were collected in the households through a structured interview with questions related to socioeconomic and clinical variables, as well as assessment of treatment adherence, and the WHOQOL-BREF for quality of life. The Kruskal-Wallis H test was used to measure the association between the scales of quality of life and the classification of treatment adherence.

Results: The lowest scores were present in the self-assessment domain and the highest were found in the social domain. Individuals with extreme adherence to antihypertensive treatment showed higher scores in assessment of quality of life compared to individuals classified as extreme non-adherence to antihypertensive treatment.

Conclusion: The association between quality of life and medication adherence in hypertensive patients was not predictive. The hypertensive subjects with high medication adherence showed the best scores of quality of life, and the worst scores were presented by individuals classified as extreme non-adherence and as borderline to total non-adherence.

Keywords
Primary care nursing; Quality of life; Hypertension; Blood pressure; Medication adherence

Resumo

Objetivo: Avaliar a associação entre a qualidade de vida e a adesão à medicação de indivíduos hipertensos.

Métodos: Estudo transversal, realizado com 432 hipertensos cadastrados em sistema informatizado público federal. Os dados foram coletados no domicílio por entrevista estruturada com questões relacionadas a variáveis socioeconômicas, clínicas, avaliação da adesão ao tratamento e o WHOQOL-BREF para a qualidade de vida. Utilizou-se o teste de H de Kruskal-Wallis para medir a associação entre as escalas da qualidade de vida e a classificação da adesão ao tratamento.

Resultados: Os escores mais baixos estavam presente no domínio autoavaliação e os mais altos foram encontrados no social. Os indivíduos que possuíam adesão extrema ao tratamento anti-hipertensivo apresentaram escores mais altos na avaliação da qualidade de vida em comparação com indivíduos classificados como não adesão extrema ao tratamento anti-hipertensivo.

Conclusão: A associação entre a qualidade de vida e adesão à medicação em indivíduos hipertensos não foi preditiva, sendo que os melhores escores estavam presentes nos indivíduos hipertensos que apresentaram alta adesão à medicação e os piores escores da qualidade de vida se apresentaram nos indivíduos de não adesão extrema e limitrofe a não adesão total.

¹Universidade do Extremo Sul Catarinense, Criciúma, SC, Brazil.

Conflicts of interest: no conflicts of interest to declare.
Introduction

Cardiovascular diseases are the third leading cause of the global burden of disease,\(^1\) accounting for approximately 17 million deaths per year. Hypertension is considered the main risk factor contributing to the current epidemic of cardiovascular diseases.\(^2\) Each year 7.1 million deaths worldwide are attributed to hypertension and its prevalence has reached nearly 1 billion in 2000 around the world. This figure is projected to increase by 29.2%, reaching 1.56 billion in 2025.\(^3\)

Although the treatment for hypertension control reduces morbidity and mortality, the effective control of disease is concerning because the proportion of hypertensive patients with controlled disease has varied around 50% worldwide.\(^4,5\)

As hypertension is a chronic disease, it requires continuous treatment, and the adequate control is directly related to the degree of adherence to antihypertensive therapy.\(^6\) There is evidence that poor adherence affects the clinical evolution and quality of life of patients negatively, causing adverse outcomes such as increased morbidity and mortality.\(^7-9\)

The quality of life of hypertensive patients is strongly related to how their blood pressure is controlled,\(^10\) because symptoms caused by unsatisfactory disease control limit the performance of usual daily activities, resulting in financial difficulties, low self-esteem, feelings of incompetence, social isolation, among others.\(^11\)

Some studies evaluating the quality of life of hypertensive individuals have suggested that the very chronic condition, side effects of the drug therapy and clinical complications interfere in the physical, emotional and intellectual state, in social interaction, and activities of daily living, which are decisive factors for quality of life.\(^12-14\)

The quality of life is part of a complex structure with psychosocial characteristics that can negatively impact on individuals’ ability to manage their own chronic disease, however, the exact mechanism by which quality of life is associated with treatment adherence is still unknown.\(^15\)

Within this context, the present study aimed to evaluate the association between quality of life and medication adherence in hypertensive individuals.

Methods

This is a cross-sectional study that included hypertensive individuals registered in the federal public computerized system in a city of southern Brazil, from August to November 2011. The inclusion criteria were age equal to or over 18 years, diagnosis of hypertension, being registered at the health district, and presence in the domicile at least once among the three visit attempts.

Two health districts were selected for convenience, where 1,357 hypertensive subjects were registered. A simple random sample was calculated with a sampling error of 5% and 95% significance level, resulting in 258 hypertensive people in District A and 231 in District B, and the total of 489 hypertensive subjects comprising the sample.

Data were collected in structured interviews conducted in the homes of registered hypertensive subjects. The interviews involved issues related to socioeconomic and clinical data, the Instrument to Assess Treatment Adherence and the WHO-QOL-BREF.

The socioeconomic characteristics were age, gender, marital status, race, family income, educational level, height, weight, occupation, smoking and drinking habits. The clinical features investigated were type and amount of antihypertensive drugs administered, time from diagnosis of hypertension, systolic and diastolic blood pressure, type and amount of medications prescribed for sleep.

As participants are monitored monthly, information such as weight and height were collected from the records in the health booklet of the month in which was given medication for hypertension control. Blood pressure was measured by auscultation performed with the subject seated 15 minutes after initiation of the interview and the cuff at the level of the heart. Three measurements were taken with one-minute interval between each verification,
and the mean of the last two was considered. For blood pressure measurement were used the calibrated sphygmomanometer (Premium® brand) and the stethoscope Rappaport model (Premium® brand).

The Instrument to Assess Treatment Adherence was applied to measure users’ treatment adherence. It is a questionnaire with ten questions: 1) Adequate consumption of salt; 2) Adequate consumption of fat; 3) Body mass index; 4) Smoking abstinence; 5) No alcohol intake; 6) Regular practice of physical exercises; 7) Effective stress coping; 8) Proper use of medicines; 9) Attendance at monthly visits and 10) Control of blood pressure levels. The score established for assessment of adherence to hypertension treatment is 0-10, with the following classification of levels of adherence: X≤3 = Extreme non-adherence (ENA); X>3 and ≤5 = Borderline to total non-adherence (BNA); X>5 and ≤7 = Medium range of adherence (MRA); X>7 and ≤9 = Borderline to total adherence (BA); and X>9 = Extreme adherence (EA). The higher the score, the greater the adherence to treatment.

For the evaluation of quality of life, we used the WHOQOL-BREF, an instrument developed by the WHO Quality of Life Group, validated in Brazil, which has 24 questions covering the following domains: physical, psychological, social relationships, environment, self-assessment and general assessment, providing a comprehensive look of quality of life. The questionnaire scores the individual from 0 to 100, and the higher the score, the better the quality of life.

Data were tabulated and analyzed by both the Microsoft Excel 2010® and the Statistical Package for the Social Sciences (SPSS), version 22.0. The absolute and relative frequencies were calculated for the qualitative variables, and mean and standard deviation for the quantitative variables.

Data normality was tested by the Kolmogorov-Smirnov test, and since data were not normally distributed, the Kruskal-Wallis H test was used to measure the association between the scales of quality of life and the classification of treatment adherence. Finalizing our analysis, for the evaluation between the domains of quality of life and classification of treatment adherence, was used the Chi-square test of Association or Independence. In all analytical tests was used a significance level of α=0.05 and confidence interval of 95%.

The development of the study met national and international standards of ethics in research involving human subjects.

Results

The 432 hypertensive participants had a mean age of 62.1 (±11.0 years), 68.5% were females, 67.8% had not completed elementary school, 44.9% stated to be retired, and 82.9% were white. As for marital status, 73.1% reported living with a partner, 78% reported family income of 1-3 times the minimum wage (Table 1).

The mean time from diagnosis of respondents was 12.0 years (± 9.4 years). More than half of respondents had undergone antihypertensive treatment for more than six years, with medication exclusively as the most prevalent type of treatment. Interviewees used more than four drugs for their antihypertensive treatment, and the daily dose of drugs varied between two to three doses in most cases. Physical activity practice was uncommon among participants, as 15.7% reported practicing it regularly, while 14.8% did not practice regularly. Smoking and alcohol consumption occurred among hypertensive respondents, representing 11.1% and 13%, respectively. Regarding consumption of salt in food, more than half revealed they considered it was little/weak (Table 1).

The analysis of the general classification of the quality of life and the classification of treatment adherence of respondents were carried out. The quality of life assessed by the WHOQOL-BREF revealed the lowest scores in the domains of self-assessment 59.69 (±18.70) and physical 61.84(±18.06). The highest scores were found in the psychological domain 67.89(±15.32) and the social domain 75.33(±13.20). As for treatment adherence, we found that 40.5% of hypertensive subjects were classified in the medium range of treatment adherence and 45.8% as borderline to total adherence (Table 2).
The distribution can be observed according to the domains of quality of life obtained by the WHOQOL-BREF questionnaire in relation to the classification of treatment adherence. In this analysis, the highest scores associated with quality of life were found in extreme adherence (to treatment), revealing a mean score of 66.80
in the physical domain, 72.38 in the psychological, 79.63 in the social, 68.28 in the environment, 65.28 in self-assessment, and 69.91 in the general assessment domain. The lowest scores in quality of life were found in the classifications of extreme non-adherence and of borderline to total non-adherence.

Although these results may suggest association between treatment adherence and the scores obtained in the physical, psychological, social, environment, self-assessment and general assessment domains, we did not find statistical significance, as shown in table 3.

### Table 3. Distribution of data on quality of life x treatment adherence

<table>
<thead>
<tr>
<th>Quality of life</th>
<th>Extreme non-adherence</th>
<th>Borderline to total non-adherence</th>
<th>Medium range of adherence</th>
<th>Borderline to total adherence</th>
<th>Extreme adherence</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>53.57</td>
<td>60.83</td>
<td>60.98</td>
<td>62.12</td>
<td>66.80</td>
<td>0.649</td>
</tr>
<tr>
<td>Mean CI (95%)</td>
<td>-</td>
<td>54.65</td>
<td>58.13</td>
<td>59.61</td>
<td>61.72</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>-</td>
<td>16.84</td>
<td>19.11</td>
<td>17.94</td>
<td>12.83</td>
<td></td>
</tr>
<tr>
<td>Psychological</td>
<td>50.00</td>
<td>63.84</td>
<td>67.24</td>
<td>68.58</td>
<td>72.38</td>
<td>0.151</td>
</tr>
<tr>
<td>Mean CI (95%)</td>
<td>-</td>
<td>57.97</td>
<td>65.00</td>
<td>66.43</td>
<td>66.26</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>-</td>
<td>16.00</td>
<td>15.02</td>
<td>15.35</td>
<td>15.47</td>
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</tr>
<tr>
<td>Social</td>
<td>58.33</td>
<td>72.85</td>
<td>74.33</td>
<td>76.09</td>
<td>79.63</td>
<td>0.105</td>
</tr>
<tr>
<td>Mean CI (95%)</td>
<td>-</td>
<td>67.62</td>
<td>72.44</td>
<td>74.18</td>
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<tr>
<td>SD</td>
<td>-</td>
<td>14.27</td>
<td>12.71</td>
<td>13.62</td>
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<td>Environment</td>
<td>53.12</td>
<td>62.50</td>
<td>65.32</td>
<td>65.41</td>
<td>68.28</td>
<td>0.341</td>
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<tr>
<td>Mean CI (95%)</td>
<td>-</td>
<td>57.57</td>
<td>63.72</td>
<td>63.84</td>
<td>64.74</td>
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</tr>
<tr>
<td>SD</td>
<td>-</td>
<td>13.43</td>
<td>10.76</td>
<td>11.22</td>
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<tr>
<td>Self-assessment</td>
<td>37.50</td>
<td>57.66</td>
<td>58.64</td>
<td>60.29</td>
<td>65.28</td>
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</tr>
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<td>Mean CI (95%)</td>
<td>-</td>
<td>50.02</td>
<td>55.82</td>
<td>57.70</td>
<td>58.94</td>
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<tr>
<td>SD</td>
<td>-</td>
<td>65.30</td>
<td>61.46</td>
<td>62.98</td>
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<tr>
<td>General assessment</td>
<td>51.92</td>
<td>63.18</td>
<td>65.12</td>
<td>66.10</td>
<td>69.91</td>
<td>0.178</td>
</tr>
<tr>
<td>Mean CI (95%)</td>
<td>-</td>
<td>58.47</td>
<td>63.39</td>
<td>64.40</td>
<td>66.55</td>
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<tr>
<td>SD</td>
<td>-</td>
<td>67.89</td>
<td>66.85</td>
<td>67.80</td>
<td>73.27</td>
<td></td>
</tr>
</tbody>
</table>

Source: Data of hypertensive individuals followed in regional health units, Criciúma (SC), 2011.
Mean (± Standard Deviation); Statistical test: Chi-square test of association or independence.

### Discussion

The results of this study are related to the cross-sectional design, which does not allow defining relationships of cause and effect between variables. Note that much of the collected data were self-reported, which can cause errors or distortions by participants.

Quality of life is a complex and subjective construct that evaluates people’s health in a multifactorial way, in their physical and psychological condition, their level of independence, social relationships, personal beliefs and their relationship with the environment. In this study, the highest scores in quality of life were observed in the social and psychological domains, and the lowest scores were in the domains of self-assessment and physical. In relation to the classification of treatment adherence, most participants were classified in the category of borderline to total adherence.

The investigation on the relation between the quality of life and the adherence to antihypertensive treatment enables the development of strategies to expand assistance programs and policies, aiming to improve the adherence and quality of life of these individuals, and seeking to achieve adequate disease control goals. There is an increasing search for assessment of the quality of life of hypertensive subjects because this is considered an important indicator to identify the health status of individuals in face of the results of antihypertensive treatments.(16)

Besides medical treatment, it is essential that hypertensive individuals follow a nonpharmacological treatment, which consists of care for the management of weight control, diet, reduction of salt and alcohol consumption, smoking abstention, stress management and regular practice of physical activity.(17) The findings of this study showed that among the possible managements of nonpharmacological treatments, the regular practice of physical activity was the item of greatest commitment, since more than 50% of participants did not have this habit.

The quality of life of hypertensive individuals ends up being worse when compared to healthy individuals. Also, it is dependent on blood pressure levels, damage to organs, comorbidities (including...
Association between quality of life and medication adherence in hypertensive individuals

obesity) and treatment (both pharmacological and nonpharmacological).(18) A major challenge in controlling blood pressure is still due to non-adherence to treatment.(12)

A randomized clinical trial conducted at the Cardiology Institute in the city of Kanpur in India, evaluated the quality of life of 102 hypertensive subjects in follow-up by the service. The quality of life was similar to the findings of the present study, noting that the highest scores were in social and psychological domains, and the lowest scores were found in the domains of self-assessment and physical condition. Comparing variables such as age and gender, the profile of hypertensive individuals is similar.(17) Such a comparison may indicate that the hypertensive population has similar characteristics, given that a cross-sectional study carried out with 2,063 hypertensive patients who attended the hospital Isfahan in Iran has found similar data. It revealed that females were predominant over males, and the prevalence of hypertension is present in individuals aged 60 years or older.(19)

Comparing the mean values obtained from the scores of the quality of life instrument in our study, with data from a randomized clinical trial held in Hangzhou (China) with 73 hypertensive patients, the scores are similar, highlighting that the social domain had the highest score, and the domain of assessment of general health status had the lowest score in both studies.(6)

Another study showed that normotensive subjects had better scores, and a statistically significant difference was associated only to the environment domain. This matter suggests that hypertensive individuals may have lower quality of life scores than normotensive individuals, but their quality of life may not necessarily be associated with the disease.(11)

Poljićanin et al. suggested that hypertensive patients have the perception of being chronically sick, therefore, they feel more fragile, which ends up negatively affecting their quality of life.(20) The perception of having a chronic disease may be related to the problems faced by these individuals in self-care activities, such as in blood pressure control, nutrition, weight control, care of stress and physical activity.(21)

Within this context, a prevalence study was carried out in 2010 with 385 hypertensive in two hospitals that serve 70% of the Pakistani population. It showed that the relationship between treatment adherence and the quality of life of hypertensive subjects was apparent, i.e., it was not a determinant factor related to worse quality of life. This characteristic may indicate that other factors are affecting the quality of life during the course of treatment.(22)

A recent systematic review and meta-analysis of observational studies evaluating the quality of life in hypertensive patients found that hypertension reduces the quality of life, though in small magnitude.(6) However, the study carried out by Lambert and cols. suggests that the quality of life in hypertensive individuals can be decreased, and also indicates that the actual effect of high blood pressure on the quality of life is still poorly understood.

Conclusion

The association between quality of life and medication adherence in hypertensive patients was not predictive. The hypertensive subjects with high medication adherence presented the best scores, while the worst scores of quality of life were presented by individuals classified as extreme non-adherence and as borderline to total non-adherence.

Collaborations

Hanus JS participated in the conception and design of the project, analysis and interpretation of data, article writing and critical review of the relevant intellectual content, and final approval of the version to be published. Tuon LGB and Simões PW contributed to the interpretation of data, relevant critical review and final approval of the version to be published. Ceretta LB and Amboni G collaborated with the project design and final approval of the version to be published.

References


Prevalence of metabolic syndrome in metallurgical workers from different shifts

Prevalência de síndrome metabólica em metalúrgicos de diferentes turnos de trabalho

Évelin Moreno¹
Milva Maria Figueiredo De Martino¹
Roberto Fernandes da Costa²

Abstract
Objective: To investigate the prevalence of metabolic syndrome in workers from different shifts.
Methods: The population consisted of 93 workers, divided into: first shift (6:00 AM to 2:00 PM), second shift (2:00 PM to 10:00 PM), third shift (10:00 PM to 6:00 AM) and productive shift in administrative hours (7:30 AM to 5:00 PM). The components of the metabolic syndrome were obtained by blood collection in a 12 hour fasting and anthropometric measurements, through the NCEP-ATP III criteria.
Results: Seventy two percent were male, aged between 33 and 38 years. Metabolic syndrome was diagnosed in 26.8% of the sample. The highest prevalence occurred among first shift workers (p<0.000). The HDL-cholesterol, fasting glucose and triglycerides changes were higher in the first shift. There was difference in body weight, body mass index and chronotype (p=0.000), among working shifts.
Conclusion: The prevalence of metabolic syndrome was higher among first shift workers.

Keywords
Metabolic syndrome X; Occupational health nursing; Public health nursing; Shift work; Occupational health

Descritores
Síndrome X metabólica; Enfermagem do trabalho; Enfermagem em saúde pública; Trabalho em turnos; Saúde do trabalhador

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**Introduction**

Approximately 29.6% of the population of Brazil has a positive diagnosis for metabolic syndrome.\(^{(1)}\) Metabolic syndrome is defined by the National Cholesterol Education Program's Adult Treatment Panel III (NCEP-ATP III) as the association of at least three of the following risk factors: abdominal obesity (waist circumference in men ≥102cm and women ≥88cm); fasting hyperglycemia (≥110mg/dL); hypertension (systolic blood pressure ≥130mmHg and/or diastolic blood pressure ≥85mmHg); low level of high-density lipoprotein cholesterol (HDL-c) (male <40 mg/dL and women <50 mg/dL); and hypertriglyceridemia (≥150 mg/dL).\(^{(2)}\)

In addition to the risk factors mentioned above, other factors deserve attention: stress, working during evenings, overweight and excessive workload.\(^{(3)}\) Thus, working during the evenings can be considered an inducing factor of metabolic syndrome.\(^{(4,5)}\) The explanation for this result is supported by three pillars: (1) not standard meal time and unavailability of means of preparation;\(^{(6)}\) (2) sleep deprivation, causing physiological adaptations that alter eating behavior due to decreased levels of leptin and increased levels of circulating ghrelin;\(^{(7)}\) (3) maladjustment of circadian rhythm, which influences the control of body weight, glycemic control and hormones release.\(^{(8)}\)

The aim of this study was to investigate the prevalence of metabolic syndrome among workers in different shifts in a metallurgical industry, and to describe their associated risk factors.

**Methods**

Descriptive cross-sectional study that included 93 workers from the productive sector of a metallurgical industry of automobile parts in the city of Sorocaba, state of Sao Paulo, southeastern region of Brazil.

The working hours was divided into shifts as follows: first shift (6:00 AM to 2:00 PM), second shift (2:00 PM to 10:00 PM), third shift (10:00 PM to 6:00 AM) and productive shift in administrative hours (7:30 AM to 5:00 PM). We included 29 workers from the first shift, 20 workers from the second shift, 15 workers from the third shift and 29 workers from productive shift in administrative hours. Inclusion criteria were: to be working in a fixed shift for at least 12 months of experience in this shift, lack of medication or prior diagnosis of diabetes. All workers in the productive sector participated in the study.

Data collection occurred in the medical clinic of the industry, during their working shift hours. First, we evaluated the workers from the first shift and productive shift; then, the second shift, finally the third shift. Evaluations of metabolic components and blood pressure were performed by a nurse technician. The questionnaires were answered by the workers. Anthropometric evaluations were conducted by a professional of physical education, who had experience with this type of measurements.

The waist circumference was measured at the midpoint between the iliac crest and the lower costal margin, using a metal anthropometric tape of Sanny® brand with 0.1 cm accuracy.\(^{(2)}\) The body weight and height were measured with barefoot workers in light clothing, using a digital Sanny® scale brand with 0.1kg of accuracy, and the Sanny® stadiometer brand with 0.1cm accuracy.

A venous blood sample was collected after 12 hours of fasting and abstinence of exercise and alcohol. The measures included triglycerides, HDL-c and glucose. The material was analyzed by a Reference clinical laboratory in the city. The metabolic components were determined using the automatic biochemical analyzer Konelab® 60i (Thermo Electron Corporation, Wiener lab group, Rosario, Argentina).

Blood pressure was measured by auscultation through two measures, in the sitting position after 5 minutes of rest, as recommended by NCEP-ATP III using aneroid sphygmomanometer Tyco® brand.\(^{(2)}\)

The Pittsburgh Sleep Quality Index Questionnaire (PSQI)\(^{(9)}\) was used to assess the characteristics of sleep patterns and quantify the individual’s sleep quality. The final score defines that the results >5 represent poor sleep quality.

To classify chronotype, we used the Horne and Ostber questionnaire,\(^{(10)}\) adapted.\(^{(11)}\) Scores above 58 classify individuals as morning types, below 42
as afternoon types and 42-58, as intermediate or indifferent types.

The level of physical activity was analyzed through the International Physical Activity Questionnaire (IPAQ). The instrument presents the results as the following categories: sedentary, insufficiently active, insufficiently active A, insufficiently active B, active and very active.

Data such as gender, age, marital status, education, alcohol consumption, smoking, working hours, position and level of job satisfaction, were quantified through the identification form. The level of absenteeism (missing working days) and the quality of the parts produced were collected with the help of the coordinators of the productive sector.

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS Inc., Chicago, Illinois, USA), version 15.0. To verify the normal distribution assumption, we used the nonparametric test of Shapiro-Wilk. To compare the prevalence of the metabolic syndrome among shifts, we used the chi-square test. To compare the risk factors that characterize metabolic syndrome, we used the Kruskal-Wallis test. As for multiple comparisons between the risk factors per shift, the Mann-Whitney U test was used. General and between shifts comparisons for the variables mass, body mass index and chronotype were made by analysis of variance (ANOVA) and Tukey post-hoc. The significance level for all statistical tests was alpha = 0.05.

The development of the study met national and international standards of ethics in research involving human subjects.

**Results**

The study included 93 workers, aged between 33 and 38 years. Regarding marital status, 65 workers (70.0%) were married, 23 (25.0%) were single and 12 (5.0%) were separated or other. Participants had completed high school, as it was required by the industry. As to gender, 67 subjects (72.0%) were male. No stratification of the sample was performed by gender, as the shift presented low quantity of women.

The diagnosis of metabolic syndrome occurred in 26.8% of the study population and was higher among first shift workers (Figure 1).

The comparison between the components (systolic and diastolic blood pressure, triglycerides, HDL-c, fasting glucose and waist circumference), which characterize the metabolic syndrome, is presented in table 1.

Multiple comparisons were performed by the Mann-Whitney U test, and the first shift showed a statistically significant difference from other shifts.

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**Figure 1.** Comparison of positive diagnosis of metabolic syndrome among working shifts (Chi-square test)
Table 1. Comparison of median values and interquartile ranges for the variables among working shifts

<table>
<thead>
<tr>
<th>Variable</th>
<th>First shift n = 29</th>
<th>Second shift n = 29</th>
<th>Third shift n = 15</th>
<th>PSAH n = 20</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic blood pressure</td>
<td>120 (110-130)</td>
<td>110 (110-120)</td>
<td>120 (110-140)</td>
<td>110 (100-135)</td>
<td>0.537</td>
</tr>
<tr>
<td>Diastolic blood pressure</td>
<td>80 (60-80)</td>
<td>80 (75-90)</td>
<td>80 (70-90)</td>
<td>80 (72-80)</td>
<td>0.639</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>152.0 (151.0-153.5)</td>
<td>126.0 (124.0-130.0)</td>
<td>125.0 (120.0-142.0)</td>
<td>144.0 (142.2-148.8)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>94.0 (90.0-100.5)</td>
<td>91.0 (85.5-100.5)</td>
<td>95.5 (92.0-110.0)</td>
<td>93.5 (85.4-98.4)</td>
<td>0.135</td>
</tr>
<tr>
<td>HDL-Cholesterol</td>
<td>39.0 (37.0-47.5)</td>
<td>50.0 (50.0-56.0)</td>
<td>50.0 (45.0-51.0)</td>
<td>45.0 (42.3-51.8)</td>
<td>0.000*</td>
</tr>
<tr>
<td>Fasting glucose</td>
<td>103.0 (101.0-105.0)</td>
<td>84.0 (81.0-85.0)</td>
<td>91.0 (90.0-92.0)</td>
<td>94.5 (91.3-97.3)</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

*Kruskal-Wallis non-parametric test

Table 2. Absolute and relative values of the modifiable risk factors and variables associated with work

<table>
<thead>
<tr>
<th>Variables</th>
<th>Shift</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First n=29</td>
</tr>
<tr>
<td>Smoking</td>
<td>14 (48.3)</td>
</tr>
<tr>
<td>Sedentarism</td>
<td>12 (41.4)</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>16 (55.2)</td>
</tr>
<tr>
<td>Job dissatisfaction</td>
<td>27 (93.1)</td>
</tr>
<tr>
<td>Absenteeism</td>
<td>24 (82.8)</td>
</tr>
<tr>
<td>Poor quality of the parts produced</td>
<td>28 (96.6)</td>
</tr>
</tbody>
</table>

PSAH – Productive shift in administrative hours

The three variables (triglycerides, HDL-cholesterol and fasting glucose), with p<0.001. The second shift showed a statistically significant difference from the third shift when comparing HDL-c (p=0.027) and fasting glucose (p<0.001); and the production shift in administrative hours for the three variables (p<0.005). Between the third shift and productive shift in administrative hours, the difference was only for triglycerides (p=0.001).

The poor sleep quality was found in many first shift workers (69.0%) as well as in third shift workers (86.7%). In the other groups, the prevalence was inversely, as 55.2% workers of the second shift and 60.0% of the production shift in administrative hour had good sleep quality.

Some modifiable risk factors were more prevalent among first shift workers (Table 2).

As for the chronotype, 58.6% of workers of the first shift were classified as moderately morning types, 13.8% were definitely morning types and 27.6% were indifferent types (nor afternoon neither morning). The indifferent chronotype were more frequent in workers from second and third shifts. As for the productive shift in administrative hour, the highest prevalence was for moderately morning type.

According to ANOVA test, the third shift (85.0±12.2) had higher values of body mass (kg) and significant difference when comparing the first shift (74.7±10.7), with p=0.040. For the overall classification of chronotype, there was a significant difference when comparing the first shift with the others: first shift (62.2±7.2), second shift (54.0±8.4), third shift (56.7±8.5) and productive shift in administrative hours (59.8±9.3), with p=0.003.

Discussion

The limitation of the study was the cross-sectional design since it does not allow the establishment of cause and effect relationships. Our results showed higher prevalence of metabolic syndrome among first shift workers when compared to other shifts. The first shift of the assessed industry presented some evening shift characteristics (reduction in total sleep duration), as people woke up between 3:30 AM and 4:00 AM, since all depended on public transportation to go to work. This result is in line with other studies that showed high prevalence of metabolic syndrome in evening workers. In addition, such occurrence is highlighted when comparing evening workers to morning workers who have never worked in the evening.(4,5)

Most of the workers of the first and third shifts had poor sleep quality. Importantly, workers of the first shift declared sleeping in the public transportation, in the route between the residence and the...
industry. People who sleep less may suffer physiological adaptations, which are able to change eating behavior. Thus, the reduction in total sleep duration is associated with decreased serum leptin levels and increased circulating ghrelin increases hunger and food intake.\(^7\)\(^13\)\(^14\)

The studied industry had a cafeteria, however, workers complained about the quality of the served food and many chose to bring their own lunch box, frozen foods, savory or sweet. Workers from the first and third shifts reported that they often drank coffee to stay “awake”, and it was always accompanied by treats. Shift workers are more vulnerable to poor diet due to the unavailability of food preparation facilities, so they usually opted for fast food preparation, which has high fat contents. It is also common for workers to “eat” at work, in order to stay awake.\(^15\)

Most of first shift workers had higher levels of sedentarism. There are consistent reports about the relationship between high levels of sedentary lifestyles and the positive diagnosis of metabolic syndrome.\(^7\)\(^16\) This association is easily explained, since physical exercise increases the available glucose-mediated insulin, decreases glucose intolerance, improves insulin sensitivity, reduces blood glucose, lowers blood pressure levels and increases the ability of the muscle tissue in consuming fatty acids, causing thereby a confrontation of factors that lead to metabolic syndrome.\(^17\)

Smoking and alcohol consumption showed high frequency among first shift workers and productive shift in administrative hours. There were reports from first shift workers that this habit was intended to “forget about work.” Smoking helps maintain wakefulness.\(^18\) Alcohol use is also associated as a way to address sleep problems, however, this can be a risk factor for alcoholism. Heavy consumption of alcohol is associated with abdominal obesity, hypertension, hypertriglyceridemia, hyperglycemia, type 2 diabetes mellitus and the positive diagnosis of metabolic syndrome.\(^19\) Thus, smoking and alcohol consumption are risk factors for metabolic syndrome in evening workers.\(^14\)\(^16\)\(^17\)

First shift workers had a high rate of dissatisfaction with work and, according to their reports, it was associated to salary issues and career plan. Job satisfaction can be a source of health, but the job dissatisfaction can lead to impairments in physical, social and mental health and cause problems at work.\(^20\)

First shift workers had high levels of absenteeism. Study involving workers in the United States showed that 30.2% of the sample was diagnosed with metabolic syndrome, and this showed higher rates of absenteeism compared to healthy subjects.\(^21\) Thus, the syndrome is also associated with the industry’s productivity level.

The level of disapproval of finished products by first shift workers was 96.6%, thus, almost all delivered production was rejected by customers. Product quality is associated to customer satisfaction, because a satisfied customer keeps buying, on the other hand, a dissatisfied client will terminate business relationships with the industry, as well as adding negative value to the product to other customers.\(^22\)

As for the variables that characterize metabolic syndrome, the results showed that the first shift showed a statistically significant difference from other shifts to the variables triglycerides, HDL-c and fasting glucose. These changes are commonly found in the literature.\(^7\)\(^14\)

Most workers in the first shift were classified as moderately morning types or definitely morning types, not being evening or morning types. In addition, there was significant difference when comparing the chronotype score between shifts. It can be said that first shift workers were in proper working hours with their chronotype. Thus, the workers would have a protective effect related to shift work, considering the results from chronotypes, the ideal would be to work in the first shift (6:00 AM to 2:00 PM).\(^23\) However, the first shift had a higher prevalence of metabolic syndrome when compared to the others. We found no studies that exclusively addressed the chronotype and metabolic syndrome to confront the results of this study.

The third shift presented the highest values of body weight showing significant difference when compared to the first shift. However, the metabolic syndrome was not observed among workers of the third shift, perhaps because they presented a higher
level of physical exercise. Regular practice of physical activity contributes to the control and reduction of body mass and prevention of metabolic diseases. This practice can also help synchronization of circadian rhythms of shift workers.\(^{(7)}\)

In short, we found in the study population, increased prevalence of metabolic syndrome. This result may be due to the presence of certain risk factors, such as: poor sleep quality, poor diet, sedentarism, alcohol consumption and smoking. In addition, the metabolic syndrome may be associated with some variables related to work, such as absenteeism, low quality of the parts produced and job dissatisfaction. Such association was also found in a study conducted with adult workers in the USA.\(^{(21)}\)

The use of chronotype score for the choice of working hours was not considered a preventive factor of metabolic syndrome. Thus, our findings were consistent with results found in several studies.

There were more positive diagnosis of metabolic syndrome among first shift of workers, contrary to what the literature indicates. Metabolic syndrome can change the productivity and the reputation of the industry in the economic market, causing financial losses. Therefore, it requires special attention for all shift workers, not only for the evening shift, as advocated in several studies.

**Conclusion**

The prevalence of metabolic syndrome was higher among first shift workers. This result may be associated with poor sleep quality, poor diet, sedentarism, alcohol consumption, smoking, absenteeism and job dissatisfaction.

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Moreno E; De Martino MMF and Costa RF declare contribution to the project design, development of research, data interpretation, writing, critical review and final approval of the version to be published.


