In the cultural literature, cultural systems are defined by a set of rules, ideals, and values, which are appropriated by individuals and shape their self-perception and development. Some scholars state that people internalize such cultural attributes or qualities and their evaluations about themselves are based on these cultural appropriations. Thus, significant qualities in a given culture could influence peoples’ beliefs, perceptions, and attitudes toward significant life experiences such as aging. In order to further explore these notions, I recently participated in a test of structural models containing attributes or qualities that are important in the Canadian and Norwegian societies. Individualistic qualities such as self-sufficiency and freedom from social constraints were expected to most improve how the Canadian group saw themselves while aging. For the Norwegian group, collectivist qualities such as harmonious social relationships and connection to a large social group were improving qualities.

However, self-sufficiency was as significant as being part of a large social group, and social relationships hardly mattered to the Norwegian group’s perceptions of physical aging. Connection to a large social group figured more prominently than self-sufficiency or freedom from social constraints in the Canadian group’s perceptions of psychosocial loss. When distinct individual perceptions were included into structural models, losses in the degrees of freedom and adjustments in goodness-of-fit were found. In practice, these empirical consequences remind us of Leininger’s notion that individual meanings or values are variable. With regard to cultural congruence, priorities for nursing care should have less degrees of freedom. On the other hand, country-wide level qualities do not reflect diversity in individual-level perceptions.

Nurses care for people from different cultural backgrounds. Country-wide beliefs and values are a reasonable starting point for nurses to identify culturally-appropriate nursing care priorities. However, adjusting such priorities, which were initially based on the people’s values, is more likely to improve the goodness-of-fit and quality of nursing care for individuals who are unique.

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Erratum
Rare diseases: diagnostic and therapeutic journey of the families of affected people

Doenças raras: itinerário diagnóstico e terapêutico das famílias de pessoas afetadas

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Francine DeMontigny²

Abstract

Objective: To characterize the diagnostic and therapeutic journey of families of people with rare diseases within the network of Brazilian public services.

Methods: This was a qualitative research project. The bio-ecological theory of human development, by Urie Bronfenbrenner, was used to understand the data. The research instrument was a semi-structured interview, and data were analyzed using the content analysis method.

Results: Three central themes were grouped: “Journey of families in search of a diagnosis”; “Journey of families after the diagnosis of the disease”; “Journey of therapeutic maintenance”.

Conclusion: The access to specialized services enabled diagnosing of the rare disease. The treatment was a challenge, because there were few drugs available within the therapeutic options for these diseases. Legal recourse was essential for therapeutic access and maintenance.

Keywords
Public health nursing; Pediatric nursing; Maternal-child nursing; Rare diseases; Health services

Descritores
Enfermagem em saúde pública; Enfermagem pediátrica; Enfermagem materno-infantil; Doenças raras; Serviços de saúde

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Introduction

The birth of an ill child can cause changes within family life, giving rise to odd behaviors and feelings, which reflect the impact of coping with this new condition.

Families are faced with the need to readjust the roles of its members, to take on new responsibilities beyond the usual ones when a child is born, and to seek social and health services that offer them social, financial and emotional support. Rare diseases are particularly considered a continuous learning experience, not only for the affected individuals, but also for their family members who face numerous challenges, especially in the micro context of the family, and in the relationship with the health services to which they undoubtedly will be connected for a long time.(1)

Families of people with rare diseases are usually treated unequally in health services, but not exactly due to prejudice. Their rights related to access to quality health services, to equity, to resolution, and to integrality of interventions are not always respected, either because the services do not have the technological capabilities to manage a rare condition or because professionals are not prepared. Thus, the “negotiation” of family rights is denied from the beginning of the child’s life. After the diagnosis of the disease, the battle still continues, as these families need to seek ways to venture outside of the health system to continue with the proper treatment, which is usually expensive and often only possible through judicial means.

Importantly, some diseases are classified as rare due to the low frequency with which they occur in the population. However, the affected individuals do not always receive an early diagnosis and, moreover, there are few therapeutic options and rare scientific research in this area.(2) These diseases contribute to increased morbidity and mortality, particularly in children. The risk of preventable complications and deaths due to a late diagnosis can weaken the entire family system of the affected person.(3) There are more than 7000 different types of rare diseases. This amount is unstable, since it tends to increase, with the addition of five new diseases listed weekly. Thus, rare diseases are much more common in society than the name apparently suggests, because they constitute 6-10% of disease worldwide.(4)

The advancement of research in genetics, particularly on the human genome, made it possible to better understand the world of rare diseases. It was found that 80% of rare diseases to date are of genetic origin, involving one or several genes or chromosomal abnormalities that represent between three to four percent of births. Others are caused by viral or bacterial infections or allergies, or by degenerative, proliferative or toxic processes (chemicals, radiation etc.). In developed countries, infant mortality among people with rare diseases reaches 30%. This percentage may be even higher in Brazil, since many of these children are not properly diagnosed and therefore do not receive appropriate treatment.(3,4) As an example, we cite the case of cystic fibrosis, because the clinical trajectory of diagnosed patients is often identified as intermittent pneumonia.

The diagnostic and therapeutic journey of people with rare diseases can be a major challenge in relation to health services. The therapeutic journey is characterized by a succession of steps, from the onset of the disease, with the use of traditional medicine (self-medication and traditional healers) and modern medicine (modern care facilities). It represents the path to try to solve health problems, according to individual and socio-cultural practices.(5) This is a concern of studies that seek to know which paths users go through when they do not identify with the health system schemes or flows.(5,6) To date, there are no studies about the diagnostic or therapeutic journey of families of people with rare diseases, which evidences little research conducted on this phenomenon.

Considering the difficulties of families of people with rare diseases, in relationship to the health services and the scant research performed in the field of nursing, this study aimed to characterize the diagnostic and therapeutic journeys
usually taken by the families of people with rare diseases within the network of public services.

**Methods**

This was an exploratory study with a qualitative approach, whose theoretical framework for data interpretation was the bio-ecological theory of human development, by Urie Bronfenbrenner, encompassing the four elements of the bio-ecological model: process, context, person and time.\(^7\)

This study was developed in three reference services for rare diseases in the state of Rio Grande do Sul, in Southern Brazilian. The study participants were families of patients with rare disease enrolled in public services that provided services to people with mucopolysaccharidosis, cystic fibrosis and phenylketonuria. They included 16 families of people with rare diseases, represented by 14 mothers, one father and one grandmother.

The selection of the participants was performed by the service coordinators, who invited families to participate in the study. We sought to obtain a varied sample, in relation to families residing within the countryside and the capital, time of diagnosis, and age of those affected.

Semi-structured interviews were conducted, recorded with the consent of the participants in a single meeting, at home or in the health services. The duration of the interview was 50 to 100 minutes. Data were collected over five months, and interrupted when saturation was reached, or when enough information was provided for the researcher to respond to the objective of the study. We used a script with guiding questions grouped into four sections: (1) identification of the family representative interviewed; (2) history of the family relationship with the rare disease; (3) context of family life; and (4) family interaction with network health services. Data were analyzed by reading the empirical material, seeking the essence of the discourses using the content analysis technique.\(^8\)

During the pre-analysis phase, first contact with the material was established through reading and rereading of interviews, and the encoding of information. Then the thematic nuclei were delimited, using as references the regularities and patterns identified in the words, phrases and manifested behaviors, which translated the diagnostic and therapeutic journeys of these families.

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

**Results**

According to the adopted reference, the diagnostic and therapeutic journey of families of people with rare diseases was represented by three thematic nuclei, as shown in figure 1.

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**Figure 1. Journey of families of people with rare diseases**

1. Journey of families in search of a diagnosis
   - Early/late diagnosis (neonatal screening)
   - Family reorganization

2. Journey of families after the diagnosis of the disease
   - Basic care
   - Hospital service
   - Reference services
   - Family, friend and neighbor support
   - Unfamiliarity with the disease

3. Journey of therapeutic maintenance
   - Mobilization of patients and family members
   - Legal recourse
   - Participation in new drug studies
   - Economic losses in the family
The thematic nucleus, “Journey of families in search of a diagnosis” addressed the journey of families from the moment they realized the need to seek health care until the diagnosis of a rare disease. Within the families, men mostly conducted their role as providers; mothers, who were more available to go to appointments, trips and who had a wide knowledge about the child’s health, were defined as the main characters in this stage of family life.

The thematic nucleus, “Journey of families after diagnosis of the disease” referred to the three health care levels: specialized services, hospital services, and primary care. Families also sought qualified professionals to complement the care of the ill person. There was the need of families to share household chores within its members or close friends.

The thematic nucleus, “Journey of therapeutic maintenance” identified the ways of access to treatment, which should be maintained throughout life, especially via legal recourse. Families had significant economic loss due to unfamiliarity with rare diseases within the public health system.

Discussion

The limits of this research were related to the investigation only of the families of people with three rare diseases (mucopolysaccharidosis, cystic fibrosis and phenylketonuria), which does not allow for the generalization of the journey of families with other rare diseases. However, the selection of families residing in the capital and the countryside strengthens the results, enabling inference that the families residing in the countryside, despite the various difficulties in their journeys, can meet their health needs.

Nurses, as health educators, can act on guidance to families and patients in predictive tests (e.g. newborn screening), care during treatment, and genetic counseling. In addition, they can identify and mobilize non-governmental services, health and social services, easing the isolation that these families manifest in their diagnostic and therapeutic journeys. They can also promote the exchange of experiences among families experiencing the same condition, considering the need to project themselves on others, which can create opportunities for a safe environment for these families.

The Basic Health Unit was the first service used by eight families of this study. With the altered result of the newborn screening, they were notified of the possibility of rare disease in the newborn child. At that time, the families felt powerless, given the little information they were provided about the situation. Consistent with this observation, a study with parents of children with congenital hypothyroidism and cystic fibrosis showed that 54.5% of parents wanted more information when they were notified about the altered result of the newborn screening. However, studies performed with parents of screened children show that guidance provided about the exam during the prenatal period can facilitate understanding of an altered result.

Explanations can be given during prenatal care on the procedures and meanings of an altered test result, so that the family does not feel isolated from the context of neonatal screening. Moreover, nurses should be imbued with their health educator role and, as leaders of the Family Health Teams, provide professionals with knowledge about the current condition of rare diseases in their community.

For other families in this study, the difficulty focused on the investigation of the first symptoms, which seemed to be common in childhood, such as abdominal pain, cough, diarrhea and weight loss. Coming and going to health services became stressful moments when the diagnostic and therapeutic possibilities ended with the child’s health involu-
chronic diseases, showed that panic, anguish and anxiety were the main feelings during the course of recurrently going to the health service when the implemented therapy did not recover the child’s health. Under these conditions of the family’s disease experience, health services of greater complexity were needed to investigate the disease and stabilize the child’s health.

The families in this study found diagnostic support and multidisciplinary monitoring in referral centers, usually located in capital cities. From the connection with these services, they felt accepted by qualified professionals. Importantly, one of the reference services cited by these families was linked to a university hospital created with funds from research funding agencies, which features the hitherto informal characteristics of care for those with rare diseases in Brazil. A reference center for rare diseases can offer a set of specific actions, such as: early diagnosis for the newborn, treatment and rehabilitation, multidisciplinary therapeutic follow-up, and genetic counseling for affected individuals and their families.

The place of residence of eight families showed the need for qualified services close to those who do not live in large cities, where the reference services are usually located. A decentralization policy could ease the isolation and social limitations that these families experienced in accessing health services. Similarly, the provision of professionals to meet and work with people and families living with a rare disease of one of its members can contribute so that nurses can help families with their health care network journey from Primary Care to the reference services. Moreover, considering genetic counseling as part of the nursing process in the classification of nursing interventions, it follows that it can be a link that favors the professional-family interaction, softening the impact on the microsystem, mesosystem and exosystem.

Regarding high-cost treatment, the families of this study described their facilities and difficulties. Social activism of cystic fibrosis patient associations in Rio Grande do Sul was one characteristic that facilitated the access to high-cost treatment. This profile of social mobilization inherent in rare diseases in the world shows that the theme has not only medical issues, but a social problem related to basic human rights of affected people. For all families of people with phenylketonuria in this study, the access to treatment had a significant judicial route. This is a questionable situation, since phenylketonuria is one of the rare diseases contemplated in specific clinical protocols, ensuring access to treatment.

Yet, on the journey for the maintenance of a high-cost treatment, two families participated in research in experimental stages. Although there was no guarantee of the effectiveness of the treatment, these families referred to the research as a hope for cure and/or prevention of disease progression. However, it is observed that obtaining the correct diagnosis of a rare disease is not the end of the trajectory of these families. The judicial struggle for access to treatment is a constant in their history.

Conclusion

The access to specialized services enabled the diagnosis of a rare disease. The treatment was a challenge, since there are few drugs available within the therapeutic options for these diseases. Still, seeking legal recourse was essential for access to expensive medicines. In addition, it was realized that the Primary Care services were significant in the process of the diagnostic and therapeutic journey through the neonatal screening test.

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Collaborations

Luz GS; Silva MRS and DeMontigny F state that they contributed to the concept and design, analysis and interpretation of data; article writing, critical review of the relevant intellectual content, and final approval of the version to be published.
Rare diseases: diagnostic and therapeutic journey of the families of affected people

References


Trend in hospitalizations for diabetes mellitus: implications for health care

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Abstract

Objective: To analyze the trend in hospitalizations for diabetes mellitus in a period of 15 years, according to gender and age group.

Methods: Descriptive study, with time series data from hospitalization for diabetes mellitus in individuals of both genders, aged 20 or more, data obtained in the information system of the unified health system and analyzed according to descriptive statistics and polynomial regression.

Results: A total of 117,717 hospitalizations were registered, 61.6% were women. The general trend was stable, although it has been increasing for men (r²=0.83; p<0.001) and stable for women. Age group 50 - 59 and older than 80 years (r²=0.78; p<0.001 for both) showed increasing trend for men, while for all ages it was stable or it was declining for women.

Conclusion: The trend in hospitalization for diabetes mellitus stratified by gender and age was increasing just for men in the age group of 50 - 59 years and older than 80 years.

Keywords
Hospitalization/statistics & numerical data; Diabetes Mellitus; Diabetes complications; Delivery of health care; Prevalence

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Introduction

Diabetes Mellitus is a chronic disease of high prevalence, characterized as cardiovascular and cerebrovascular risk factor. It also represents serious public health problem, due to high rates of hospitalization due to decompensated charts and/or its complications, which demand high social costs to health services.\(^\text{(1)}\) Most people with diabetes are living in developing countries, where the increase will be even more significant over the next 19 years, reaching an increase of 69% among adults.\(^\text{(2)}\) Among these countries Brazil is one of them, which presents one of the highest rates of all Latin America, with prevalence of 6.0% in 2010 and estimate to reach 7.8% in 2030, reaching more than 12.7 million people with the disease.\(^\text{(3)}\)

Despite the availability of effective treatments to prevent or delay acute and chronic complications, diabetes mellitus still implies a huge burden to patients and health systems, leading to a further increase in demand for health care.\(^\text{(4)}\) Study found that 23.9% of individuals with diabetes mellitus have been hospitalized at least once due to disease, increasing from two to six times the likelihood of hospitalization because of its complications.\(^\text{(5)}\) It is estimated that, on average, diabetes is responsible for an excess of over 12,000 hospitalizations per 100,000 people per year.\(^\text{(5)}\)

These data demonstrate the magnitude and increase of this condition in the profile of morbidity of the population and show the need for qualification of the health care provided. Thus, studies are associating the quality of diabetes management in outpatient level to reduce hospitalizations at emergency services\(^\text{(6)}\) and hospitalizations due to diabetes mellitus and its complications.\(^\text{(7)}\) In this sense the study of evolution of hospitalizations for diabetes mellitus may also mean an indicator of effectiveness of outpatient care, as well as interventions implemented.

The qualification of health actions in outpatient level is one of the foundations for the proper functioning of the health system and consequently to effectiveness of care for people with diabetes because it is considered an outpatient care-sensitive condition, and there are still hospitalizations due to it, classified as preventable.\(^\text{(8)}\) Thus, the number of hospitalizations by these conditions may be indicative of the quality of outpatient care with respect to the diseases whose diagnosis and early treatment are effective in preventing complications and consequently hospitalizations.\(^\text{(9)}\)

Therefore, this study is justified considering the prognostic and behavior of hospitalizations caused by diabetes mellitus throughout a specific period, making it possible to improve health surveillance actions and evaluate the quality and appropriateness of interventions carried out until then. Thus, this study aimed to analyze the trend in hospitalizations for diabetes mellitus in a period of 15 years, according to gender and age group.

Methods

Descriptive study of ecological type, which analyzed the historical series of hospitalizations for diabetes mellitus in adults residing in the State of Parana, in the period from 1998 to 2012. We obtained the data in August 2013 in the hospital information system of the Unified Health System (SUS) that brings together approximately 80% of the hospitalizations of the country.

The main diagnosis of hospitalization related to diabetes mellitus is encoded according to norms of the international classification of diseases, 10\(^{th}\) revision chapter IV, on the E10 to E14 category. The variables analyzed were: age, gender and hospitalization rate. The age groups organized were “20-29”, “30-39”, “40-49”, “50-59”, “60-69”, “70-79” and “≥80” years.

The selected hospitalizations had main diagnosis of diabetes mellitus and took the survey authorizations for hospitalization of type 1 and
with data from population estimates, both provided by the Department of Informatics of the Unified Health System of Brazil. Crude rates of hospitalization were calculated by the ratio between the total number of hospitalizations for diabetes mellitus of residents of 20 years or more and the population resident in Paraná State, in the same year, by gender and age group, multiplied by 10,000.

Trend analysis was performed using the polynomial regression model considering the rates of hospitalization as the dependent variable (Y) and the years as independent variable (X). To avoid collinearity between the terms of the regression equation, the variable was centralized, so 2005 was the midpoint. Scatter diagrams were constructed between the rate of hospitalization and the years, in order to identify the function to express the relationship between them, and with that, the polynomial order and the polynomial regression models were chosen for the analysis. As a measure of accuracy of the models, we used the coefficient of determination ($r^2$). It should be noted that the data showed normal distribution observed by using the Kolmogorov-Smirnov test, and that the residual analysis confirmed the assumption of heteroscedasticity of the models. The trend was considered significant when the estimated model obtained $p<0.05$.

Initially, we tested the simple linear regression model ($Y = \beta_0 + \beta_1 X$) and later, we tested the models of second degree ($Y = \beta_0 + \beta_1 X + \beta_2 X^2$) and third degree ($Y = \beta_0 + \beta_1 X + \beta_2 X^2 + \beta_3 X^3$). It was considered as the best model that showed the highest statistical significance, greater precision and residual measurement without vices. When two models were similar to the same variable, from the statistical point of view, we opted for the simpler one, attending the principle of parsimony.

The series were softened through moving average centered on three successive averages. The calculations of coefficients of hospitalization and figure, containing the historical series were prepared in Microsoft Excel® spreadsheets, and for trend analysis, the software Statistical Package for the Social Sciences (SPSS) 20.0 was used.

The development of this study attended national and international standards of ethics in research involving human subjects.

**Results**

Over the 15 years analyzed 117,717 hospitalizations for diabetes mellitus patients occurred, they were all residents in the State of Paraná aged 20 years or more, of both genders, 61.6% were female. With respect to the behavior of the rates, for both genders, there was small oscillations over the years, these being more pronounced for females, and in the older age groups (Figure 1).

It was possible to estimate statistically significant regression models for almost all age groups except 30 - 39 years ($p=0.271$), 80 years or more ($p=0.571$), and in the total of hospitalizations for females ($p=0.360$); as well as those aged 40 - 49 years ($p=0.084$) and 70 - 79 years ($p=0.081$) for males, in addition to the overall total of hospitalization ($p=0.360$), which proved to be stable during the period.

It was identified, for both genders, that the greater the age, the greater the average coefficient of the period ($\beta_0$), reaching at double another age group among men, and tripling among women, especially from the 40 years. This coefficient was also higher for women in all age groups, reflecting the higher rates of hospitalization in this group.

Through the annual increment, it is possible to affirm that the overall coefficient of hospitalization for males showed increasing trend. However, the analysis by age group shows that only those of 50 - 59 years and 80 years or more showed positive acceleration ($r^2= 0.78; p<0.001$), with average increase of 0.5 and 11.6 cases per year, respectively. The rates declined for all other age groups or were stable as noted on age groups of 40 - 49 years ($r^2= 0.24; p= 0.084$) and 70 - 79 years ($r^2= 0.25; p= 0.081$). Annual increments observed in the female models show that the greater the age, the smaller the number of cases, presenting at least 10.9 cases per year in women over 70 years ($r^2= 0.81; p < 0.001$) (Table 1).
The study presents some limitations such as the use of secondary data, in which diagnostic coding errors are possible and still not possible to identify the re-hospitalization cases, in addition to not having been considered the change in the provision of beds and hospitalizations due to comorbidities, particularly in older individuals. However, the results are valid as they may indicate the importance of the implementation of actions in the framework of outpatient assistance, which aimed at greater resolution and prevention of complications of diabetes on the part of health professionals, and greater investments in this direction on the part of managers.
The epidemiological pattern of diabetes mellitus in the world, especially for type 2, has been modified over the past decades and these changes have been attributed to alterations in life habits, urbanization and ageing of the population. The increasing number of individuals diagnosed with diabetes mellitus and the frequency of complications associated with this disease, has resulted in an increase in the number of hospitalizations.

The economic impact of diabetes is expressive, and hospitalizations consume an important piece of public health resources, representing 55% of the cost with disease in Europe, 44% in the United States and 10% in Latin America. Meta-analysis investigated the extent of the complications and expenses caused by the disease found that in the year 2010, when diabetes mellitus was responsible for 278,778 potential years of life lost per 100,000 people and that in 2013 around 7% of people with the disease had had one or more complications that led to hospitalization. The annual direct cost with diabetes mellitus was estimated at 3,952 million dollars in the year 2000.

People with diabetes have an increased risk of hospitalization and re-hospitalizations compared to those without diabetes, which negatively affects the quality of life of the individual as well as increase the burden on health services. The findings of this study show that, in general, the trend in hospitalization for diabetes mellitus in adults were decreased, although the rates have behaved differently between the genders.

The analysis showed significant decline among female, with greater fall speed with the advancing age, except for the age groups from 30-39 and 70-79 years, which remained stable. In males, on the other hand, we observed significant increase in the coefficients of hospitalization relating only to the ages of 50-59 and 80 years or more, with decline or stability in other age groups. Despite reaching several age groups, older people have higher rates of hospitalization. Studies investigating the prevalence of diabetes mellitus are unanimous to show that this is much bigger in people aged over 40 years.

When analyzed separately by gender, it is observed that the rates for women remained higher throughout the period studied, confirming findings of another study that investigated the hospitalizations for diabetes mellitus, which also found female prevalence. The prevalence of women hospitalizations reflects the higher prevalence of the disease in this gender. Furthermore, studies show that cardiovascular risk associated with diabetes mellitus are considerably higher in women, leading to more cases of hospitalization.

However, the coefficient of female hospitalization presented significant decline in almost all age groups. This fact can be associated with the demand for health services in outpatient assistance, composed mostly for programs that benefit women health care in different cycles of life, and that they promote and reflect in the increased demand and use of health services, especially for older women. This may be a consequence of the predominance use of health services, which corroborates the results of randomized clinical trial, whose women had 1.4 times more chances of using the health service when compared with men.

It is believed that the increase trend in men hospitalizations may be associated with their reduced pursue for health services, the resistance in performing self-care, associated with neglect under the preventive actions, especially those that are focused on diseases of chronic degenerative nature, often seeking the health service, when hospitalization is already necessary. Thus, our findings are considered of great importance, mainly for health professionals, in order to encourage a reflection on the health of men who encompasses numerous risk factors and behaviors, in addition to social determinants that influence the demand for health service.

Specifically, a study on self-care behavior in men with diabetes mellitus type 2, showed that most of them did not know the symptoms of decompensation and complications of the disease, showed absence of adequate adherence to treatment and frequent monitoring of glycemic levels, plus body mass index, waist-hip ratio and glucose with averages above the recommended in healthy individuals. The sum of these factors may be associated to increased hospitalization in this group.
It is suggested, then, that the use of health services within the outpatient assistance appears as a key agent for early diagnosis of the disease, better glycemic control, monitoring of possible complications and hence prevention of aggravations and hospitalizations.\(^{(21)}\) It is a fact that this demand increases with advancing age, probably due to other health needs that result in increased attendance in services, facilitating the control of the disease and leading to reduction of hospitalizations as shown in polynomial models in female.

Thus, the provision of efficient care aiming at maintenance and proper control of glucose rates in people with diabetes \textit{mellitus} in primary health care, takes the reduction of acute and chronic complications inherent to the disease and consequently a reduction of hospitalizations for this cause.\(^{(22)}\) Likewise, the provision of continuing and qualified care, which prioritizes the effective communication with the patient with diabetes and the development of health education focusing on self-care, promotes the control of disease, consequently reducing complications and hospitalizations.\(^{(21)}\)

A broad review of worldwide research on characteristics of outpatient assistance associated with the risk of hospitalization for susceptible conditions shows, with increasing consistency, the inverse correlation between access to outpatient services and hospitalization for sensitive conditions. Thus, the increase of the coefficients in hospitalization for diabetes \textit{mellitus} is impacted by unhealthy lifestyles, overcoming the benefits provided by quality outpatient assistance, still associated to the fact that this is a chronic degenerative disease which demand a longer period of treatment to obtain the desired effects.\(^{(13)}\)

Furthermore, it is necessary to consider that in the State of Parana, the Family Health Strategy program is following the national pattern of population coverage prognostic, having increased 22.4% coverage in 2000 to 63.1% in 2013. The impact of this coverage and the quality of the assistance provided by the teams, may be associated with lower rates of hospitalization for diseases considered sensitive to this service.\(^{(8)}\)

In this sense, primary health care professionals are responsible for offering the best possible assistance, through information about the disease and associated self-care actions especially on healthy eating, daily physical activity practice and proper use of antidiabetic medications, in addition to warn about the possible complications and empower the patient to appropriate self-care.\(^{(20)}\)

Maintaining continuous surveillance of trends of avoidable hospitalizations and health programs aimed at the male population, especially regarding the chronic non-communicable diseases, configures itself as a useful tool to monitor the performance of the outpatient assistance work. It highlights, therefore, the need for qualification of the service, favoring search, monitoring, care and assistance in diabetes \textit{mellitus}, aiming at improving the control of the disease and prevent complications.

**Conclusion**

The trend in hospitalization for diabetes \textit{mellitus} stratified by gender and age was increasing just for men between 50-59 years and older than 80 years.

**Collaborations**

Santos AL and Teston EF contributed with the project design, implementing the research and analyzing database, study writing and approval of the final version. Latorre MRDO and Mathias TAF collaborated with the critical review of relevant intellectual content and final approval of the version to be published. Marcon SS contributed with the study writing, critical review of relevant intellectual content and approval of the final version to be published.

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Perception of students about alcohol consumption and illicit drugs

Percepção de estudantes sobre consumo de bebidas alcoólicas e drogas ilícitas

Efigenia Aparecida Maciel de Freitas¹
Margarita Antonia Villar Luis²

Abstract

Objective: To understand the perception of high school students regarding the consumption of alcohol and illicit drugs.

Methods: We developed an observational cross-sectional study, using a descriptive and qualitative approach, through the adoption of a focus group technique. The participants were 24 high school students from four schools, selected by chance, divided into four groups. The statements of students were recorded and transcribed; lexical analysis was performed.

Results: We classified 74 units of elementary context that were divided into four lexical classes and named according to their meaning, which revealed the following themes: existence of consumption; motivation for consumption; family influence; and, control/consequences.

Conclusion: The perception of students regarding the consumption of psychoactive substances shows that in the current scenario, alcohol markedly permeates the juvenile universe.

Keywords
Students; Perception; Alcoholic beverages; Street drugs; Alcohol drinking

Descritores
Estudantes; Percepção; Bebidas alcoólicas; Drogas ilícitas; Consumo de bebidas alcólicas

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Introduction

The use of psychoactive substances remains a challenge for researchers that study the motivation of young people with regard to drug abuse, and the meanings that permeate this practice. In this attempt, several data collection instruments that were validated and/or adapted to local cultures are used to broaden the understanding of this phenomenon. For some researchers the act of alcohol consumption is linked to the cultural context of each person, and the meaning that individual assigns to this habit.

Teenagers, as a population group, incorporate cultural patterns that are valued in the context in which they are integrated. Alcohol consumption by adolescents is related to the specific group behavior of this age and may be influenced by friends, and characterized as a facilitator and a precondition of interaction and permanence within a group. The risk of adolescents beginning to consume alcohol rises because of their position in the social network of friends, and friends of friends. This consumption is positively and significantly correlated when family members are also consumers. Parenting styles and parental attitudes and behaviors are significant factors (OR 2.1) associated with heavy drinking. However, there is a lack of studies in relationship to the perception of teenagers on the aspects involved to the initiation and persistence of this habit. Thus, this study aims to understand the perception of high school students about alcohol and other illicit drug use, aiming to support the planning of preventive measures through the partnership between the health and education areas, as suggested by the school health program (PSE - Programa de Saúde Escolar), and also to evaluate the use of the Alceste Software for textual analysis of the focus group technique.

Methods

This is qualitative research, conducted with 24 high school students from public and private institutions, in a city of the state of Minas Gerais (Brazil), which has 604,013 inhabitants. The high school students were divided into four groups comprised of six students from three public schools - randomly selected from the 27 existing schools in the city (central and peripheral regions) - and from a private school that agreed to participate in the study.

With regard to the composition of the focus group, we selected a first-year, second-year, and third-year high school class from each school, and at least two students from every room were randomly selected for invitation. Data collection was conducted through focus groups. A meeting of the groups was held for the performance of data collection. The dynamics of the focus group included the introduction of the participants, and the explanations of the study theme and objectives to be discussed, which followed a guiding script with the following sub-themes: what do you think about consumption of alcohol and other drugs by young people? What motivates young people to consume alcohol and other drugs? What are the possible consequences of the consumption of alcohol and other drugs by young people? What could young people do to control or reduce this consumption? The meetings with the participants took place in private rooms, provided by the participating schools, and had a maximum duration of 50 minutes. The conduct of the focus group followed the steps recommended for this technique: a mediator responsible for the initiation, motivation, development and conclusion of the discussion, a reporter and an observer. The dialogue was recorded by digital recording and transcribed in full. We used the Alceste (Analyse d’lexicale pair Contexte one Segments of Ensemble Texte) software, version 4.5, for the analysis of the material, which allows qualitative and quantitative analysis of textual data on the basis of the patterns assumed by the vocabulary distribution (cluster analysis), through different stages of segmentation of the discursive material, in order to distinguish classes of words that represent different forms of discourse on the topic of research interest.

The software graphically interprets the results, using a technical frame description of the vocabulary across classes, called factor analysis of correspondences (FAC). In this analysis, we obtain a
graphical representation, with axes that allow one to observe the contrasts between the forms and the classes. The FAC is presented in the form of a table and a figure that shows the two axes of a biplot type graph, as well as a set of points corresponding to the vocabulary of the analyzed text. The distribution of the points in relation to each other provided the textual analysis. The FAC is presented in the form of a table and a figure that shows the two axes of a biplot type graph, as well as a set of points corresponding to the vocabulary of the analyzed text. The distribution of the points in relation to each other provided the textual analysis. The biplot graph allowed the evaluation of the correlation between words. Vectors in the same direction indicated a positive correlation, and vectors in opposite directions indicated a negative correlation. The correlation is close to zero when the featured vector’s angle was 90 degrees. The development of the study met national and international standards of ethics in research involving human subjects.

Results

Initially, we designed a text from the transcript of the dialogues from the four focus groups that contained four components of the initial contextual units (ICU) called the “corpus”. The software’s statistics showed a split in the corpus into 157 elementary contextual units (ECU), which were considered the smallest units of analysis, consisting of three or four lines of text. The ECU summarized the idea of the phrase in respect to its length (measured in number of analyzed words) and score (in priority order). We classified a total of 74 ECU with 96.07% of the vocabulary richness, an average word number per ECU pairs of 9.71, and a word count of 2943. The 74 ECU were grouped into four lexical classes, containing the essence of this in the text “corpus” analyzed. In this study, the software distributed the corpus into four classes, and as observed in figure 1, in the distribution analysis the third and fourth classes are overlapped, the vectors that form those classes are in the same direction, showing a positive correlation between them. Most vectors between classes 1 and 2 formed close angles of 90°, showing that classes 1 and 2 are uncorrelated. While the classes 3, 1 and 4 have opposite vectors, indicating a negative correlation. The words contained in class 3 denote positive behavior in relationship to the focus of the research - the words “school” followed by “family” and “no drinking” appeared in the most

![Figura 1. Factor analysis of coordinated matches (FAC) presented by Alceste 4.5](image)
central part of this class. In class 4, we found the words “father”, “friend”; at the right posterior axis we observed the words: “Vodka”, “alcohol”, “party” and “beer”, and at the left side of the picture, the words “people” and “drug” are located.

The 74 ECU were grouped into four lexical classes (Figure 2) corresponding to the descending hierarchical classification (dendrogram) of words and to the word reduction from the roots (reduced forms) that composed them, originated from the textual analysis performed by the software, with their respective values of significance from the chi-square test applied to the crossing between the words and ECUs.

The four classes were named based on their meanings:

**Class one**
was named, “Existence of consumption.” This class was composed of 36 ECUs (49%), confirming the consumption of alcohol and other psychoactive substances as reported by young students, who also cited the influence of the media and the national law on the control of purchase and sale of alcoholic beverages by/to minors.

**Class two**
was named, “Motivation for consumption.” Comprising 16 ECUs (22%), this class presented the motivation, identified by young people, for the consumption of psychoactive substances. The acceptance for inclusion within a group is highlighted as a motivation for drinking. Leisure and rest time was displayed as an invitation for alcohol use, and the lack of dialogue in the family and the influence at home was an incentive.

**Discussion**
The limits of the study findings are related to the qualitative method, and the fact that it was developed in one city and at a specific school environment, excluding those students who dropped out of
school, including when this was motivated by the consumption of psychoactive substances. Only one private school agreed to participate.

Relevant findings were revealed when considering the use of the Alceste software for data analysis of studies with a qualitative approach. The graph generated from the textual analysis exposed opposing meanings of words distributed in each class, pointing to the words, school and family, with a positive connotation for prevention/protection for consumption, in contrast to the words, party, vodka, beer, that were directly related to the stimulus and consumption, which is strongly supported in the literature. These findings are important contributions to nursing interventions, and shall support the development of health measures and actions, in partnership with the educational network.

Another important factor is the dendrogram analysis, in which the hierarchical relationship among classes revealed the proximity between words of classes 1 and 2, and a less strong proximity of the words of class 4 with those with class 1, showing an opposition between the content existing in each class. It is observed that the words contained in the class (re)affirm the scenario of alcohol consumption, as well as the main types of beverages consumed by young people. The content of this class presents a less stronger proximity to the content revealed in classes 3 and 4 that make reference to family, father, brother and school, figures that are possibly related to the prevention/protection of the alcohol consumption habit and other psychoactive substance use, thus confirming the opposition between classes presented by the dendrogram.

Considering the classes identified by the Alceste analysis of the student reports, it is evident that the consumption of alcohol markedly permeates the juvenile universe, despite the Brazilian law prohibition of the purchase/sale of this substance to underage individuals. Paradoxically it is perceived, in their reports, that students are aware of this illegality and also criticized the ease of purchase and sale of alcoholic beverages by/to minors, however, despite this, they admitted their role related to the consumption and purchase of alcoholic beverages in several places, revealing the fragility of the applicability of that law. Other studies confirm the ease of buying alcohol in shops, and also reveal that greater availability of convenience stores near a school is associated ($p = 0.04$) with an increased risk of alcohol use among adolescents. Therefore the ease of access to alcohol by minors should permeate the agenda of discussions on the development of public policies, and should be a theme for further research focused on raising awareness about the importance of age limits and establishing greater punishment for violations of legal regulations.

The group also highlighted the power of the media that is seen to influence and encourage the consumption of alcohol by young people, with its constant appeal, through advertisements involving happy environments and beautiful people, conveying a message of power and achievement linked to alcohol consumption. This perception of students is important, considering that several studies have pointed out the time of youth exposure to advertisements and the strong influence of the media on their behavior. Younger adolescents appear to be susceptible to persuasive messages in alcohol commercials broadcast on TV, which sometimes results in a positive affective reaction to the ads, raising the chances of consumption by adolescents ($OR = 1.28, 95\% CI 1.01 to 1.61$).

When it comes to the most consumed beverages, spirits mixed with soda, juices and energy drinks were the most cited, which is worrying considering the high alcohol content of spirits, especially vodka, cited as one of the main drinks currently consumed by youth groups and adolescents. Studies show that this consumption of mixed drinks (alcohol and energy drinks) is increasing among young people, and it is associated with excessive alcohol consumption, a risky behavior in general, changes in subjective states and greater dependence ($AOR = 2.40, 95\% CI = 1.27 to 4.56; p = 0.007$).

The motivations for the use of alcoholic beverages involving the teenager’s universe appear to be linked to the approach to peers, to the opposite sex, and the need for integration into groups. These findings were corroborated by other studies, which indicate that the greater the use of psychoactive substances...
substances during adolescence, the higher the consumption by friends and contacts maintained within the consumer environment. Friends directly influence individuals by offering alcohol, and indirectly by expecting the effects of social acceptance that come with its use. Adolescents with a lower number of friends who use alcohol and other drugs are more likely to be abstinent (p = 0.0002). 

Regarding the influencing factors, there was a cultural pattern of contemporary society to encourage and sustain consumption. The family structure has an influence, both as a protective and control agent, and as a stimulus to the consumption of psychoactive substances. It is clear that the adolescent has the perception of family support as being able to interfere in their attitude, behavior and relationship with drugs. Several studies show that lack of parental support, alcohol consumption in the family, the use of alcohol and/or other drugs by parents and/or older siblings, divorce, permissive attitudes, and inability to control the children are some of the factors that favor the consumption of alcohol and other psychoactive substances by adolescents.

Another relevant aspect pointed out by students was in regard to the greater severity in law enforcement for consumption and sale of illicit drugs compared to alcohol, and the mention of the arrest of childhood friends for drug use/trafficking, which may also present ambiguity as to the influence exerted by peers in the initiation and/or continuation of the consumption of psychoactive substances.

It was noticed, in the statements of students, some concern about the number of girls who adopt the posture of consumption, reaffirming the socially constructed culture of a greater acceptance of alcohol consumption by males, as well as the major concern of the father in relation to alcohol consumption by the daughter, which can be interpreted as a continuation of the sexist culture on the education of children with regard to alcohol consumption.

The fact of the possibility of an impact of consumption is recognized by students, who confirmed the existence of negative consequences in different degrees of severity, affecting people with whom they were friends, but the prevailing belief that it “only happens with others” was observed, showing the teenager’s own sense of indestructibility, and that he/she is untouchable and nothing escapes his/her control.

The negative consequences reported by students, including death, are supported by the international literature. The World Health Organization (WHO) confirms the occurrence of different types of accidents related to the prior consumption of alcohol in the United States and Europe. Worldwide, each year, approximately 2.5 million deaths are attributable to alcohol. Excessive alcohol consumption is responsible for one in ten deaths among adults of working age in the United States, and remains a leading cause of premature mortality in the country. Those data are in line with the severity of substance use/abuse at the international level.

The software used was an appropriate data analysis tool, as it reduced the time devoted to this process, although it requires a careful preparation for the development of the corpus to be submitted, requiring several versions until the final drafting of text. The data revealed in this study may support the implementation of prevention/protection strategies involving health and education professionals, with the active participation of young people as protagonists in this process. For further research we suggest the implementation of such measures and the assessment the effectiveness of such programs.

**Conclusion**

The analysis of the students’ perception regarding the use of psychoactive substances revealed that, in the current scenario, the consumption of alcohol markedly permeates the juvenile universe. There is a standard of alcohol as an essential element during leisure time, in approaching the opposite sex, plus a feeling of pleasure and freedom, and the need for affirmation in the adult world. The huge media appeal and the influences of the social and the family environment were observed as essential in the control of, and in encouraging the use of, such substances.

**Collaborations**

Freitas EAM collaborated in the steps of study design, analysis, data interpretation, draft writing, crit-
Perception of students about alcohol consumption and illicit drugs

References

Cost-effectiveness of two types of dressing for prevention of pressure ulcer
Avaliação de custo-efetividade de dois tipos de curativos para prevenção de úlcera por pressão

Kelly Cristina Inoue1
Laura Misue Matsuda2

Abstract

Objective: To analyze the cost-effectiveness relationship of two types of dressing for prevention of sacral pressure ulcer.

Methods: This secondary analysis and comparative study included 25 patients. Of these, 10 used a hydrocolloid dressing and 15 used a transparent film dressing for prevention of sacral pressure ulcer. We measured costs of each dressing type, verified intermediate and final results, and estimated the cost-effectiveness relationship.

Results: The cost-effectiveness relationships for the intermediate results were R$174.68 for the hydrocolloid dressing and R$45.75 for the transparent film dressing. For the final result, the values were R$272.00 and R$28.97, respectively.

Conclusion: For sacral pressure ulcers, transparent film dressing was cost-effective compared with hydrocolloid dressing.

Keywords
Bandages, hydrocolloid/economics; Polyurethanes/economics; Nursing service, hospital; Pressure ulcer/prevention & control; Pressure ulcer/economics; Cost-effectiveness evaluation

Descritores
Curativos hidrocoloides/economia; Poliuretanos/economia; Serviço hospitalar de enfermagem; Úlcera por pressão/prevenção & controle; Úlcera por pressão/economia; Avaliação de custo-efetividade

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Conflicts of interest: none reported.
Cost-effectiveness of two types of dressing for prevention of pressure ulcer

Introduction

The lack of patient safety in health institutions is an international problem and currently managers and health professionals have been mobilized to improve safety. The nurse, as the leader of the nursing team and moderator of the health care team, must develop or enhance his/her managerial and care skills in order to provide the resources needed for patient safety and quality of healthcare.

One of major concerns in health, particularly with regard to nursing and inpatient safety, is the prevention of pressure ulcer. This condition corresponds to the area on tissue injury caused by pressure, shearing and/or friction.\(^1\) Pressure ulcers often affect areas with higher susceptibility to dissimilar distribution of weight or areas with excessive pressure, such as the sacral region.\(^2\)

The development of pressure ulcers is associated with intrinsic and extrinsic factors, especially immobility.\(^1\) However, the risk is also increased in elderly persons, patients with chronic illness, and patients hospitalized in intensive care units for long periods.\(^3-5\)

Absorbent foam dressing with a silicone border is recommended for prevention of sacral pressure ulcer in high-risk inpatients in intensive care units.\(^6\) This type of dressing limits the excessive humidity in the skin, improves tolerance of tissues to pressure and, at the same time, reduces shear strengths during passive mobilization.\(^7\)

Other types of dressing that can work similarly to absorbent foam dressings with a silicone border to prevent sacral pressure ulcers are polyurethane transparent film dressings and hydrocolloid dressings. The cost-effectiveness relationship must be evaluated in order to determine the best dressing for preventing sacral pressure ulcer, support the decision making process of health professionals and managers, and guarantee higher quality and safety of care while rationing financial resources.

Cost-effectiveness analysis of dressings used to prevent sacral pressure ulcer provides the opportunity to increase efficiency and reduce costs in intensive care units, where care cost are higher. For this reason, our study sought to answer the following question: What is the cost-effectiveness relationship of two different types of dressing used to prevent pressure ulcers in the sacral region? To answer this question we analyzed the cost-effectiveness relationship of two different types of dressing (polyurethane transparent film dressings and hydrocolloid dressings) used to prevent sacral pressure ulcer.

Methods

This secondary data analysis was conducted from October 2013 to March 2014 in the adult intensive care unit of a private teaching hospital in Paraná State, South Brazil.

We included 25 patients who were at least 18 years of age; had motor and/or neurological limitation for active mobilization in bed; and who, upon admission to the adult intensive care unit, received polyurethane transparent film dressing (n=15) or hydrocolloid dressing (n=10) on integrated skin of sacral region. We used non-probabilistic convenience sampling and excluded patients hospitalized in the adult intensive care unit for less than 24 hours.

Follow-up of patients from the group who used a polyurethane transparent film dressing and the group that received a hydrocolloid dressing was interrupted when the patient was discharged from the adult intensive care unit (n=8), died (n=7), or was transferred (n=1) or when desistence occurred (n=1), spontaneous decubitus change developed (n=1), pressure ulcer developed (n=6) or tape lesion on the sacral region was seen (n=1).

Dressings were placed by the nursing team using the team’s standard method upon patient admission in the intensive care unit for adults or in the maximal period of 24 hours after their admission. These procedures were done if no signs of tissue injury were observed, in case of previous training and continuous follow-up by the researcher. Before placement of the dressing, nurses cleaned the skin with gauze immersed in

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a Clorexiderm solution and then dried it with additional gauze.

In the polyurethane transparent film group, a standardized dressing, 15cm x 20cm (Teagarderm® non-sterile transparent film, each strip 15cm x 10m, 3M do Brasil Ltda, Brazil), was fixed to the skin base centrally located 20 cm and just above the intergluteal fold. In the hydrocolloid dressing group, we used a sacral contour plate (Comfeel® Plus Sacral Contour Dressing, 18cm x 20cm; Cotoplast S/A, Denmark), fixed to the skin in a way that the large, wide straight forward remained centralized just above the intergluteal fold and in direction to dorsal region. Both groups benefit from other preventive measures for pressure ulcers based on the work dynamic of the adult intensive care unit, such as decubitus change, daily skin hydration, management of humidity in the skin, and use of static air mattress under clinical judgment of the responsible nursing as well as daily intake recommended by the physician.

To collect data we visited the sector daily and directly observed the patients and their medical records. We collected demographic information (sex, age and residence) and clinical data (date of admission to and discharge from the adult intensive care unit, diagnosis, personal background, type of discharge and severity index based on Acute Physiology and Chronic Health Evaluation disease classification system [APACHE II]), along with pressure ulcer data (assessment of sacral region/dressing, angle of the section of the bed, mattress type, frequency of replacement, use or not of disposable diapers, and urinary and fecal incontinence).

We performed descriptive statistical analysis of the data and made comparisons using Mann-Whitney U test of the difference variable of characterization between patients using polyurethane transparent film dressing and those using hydrocolloid dressing. Results were considered significant at a 5% level using the Statistical Package for the Social Sciences (SPSS), version 20.

Cost-effectiveness analysis entails a method for choosing health technology in which costs are expressed in values and results at clinical-epidemiological units. For this calculation, the cost of each alternative was estimated by the amount of the product and its cost to purchase. The price of transplant film dressing and hydrocolloid dressing was R$15.80 and R$68.00, respectively. The effectiveness was based on an intermediate outcome (mean number of days without pressure ulcer) and final outcome (proportion of patients without pressure ulcer), independent of the staging.

Next, a cost-effectiveness analysis was done for each intervention for intermediate and final outcomes. The cost-effectiveness ratio was defined by total costs (in R$ - Brazil currency) attributed to each dressing (polyurethane transparent film dressing and hydrocolloid dressing) over a denominator by intermediate and final outcomes.

Development of this study followed national and international ethical and legal aspects of research on human subjects.

**Results**

Patient and dressing characteristics are described in table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention GF</th>
<th>p-value</th>
<th>Intervention GH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>M</td>
<td>P25</td>
<td>P50</td>
</tr>
<tr>
<td></td>
<td>77</td>
<td>72</td>
<td>77</td>
</tr>
<tr>
<td>APACHE II (score)</td>
<td>27</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>21.48</td>
<td>19.35</td>
<td>21.48</td>
</tr>
<tr>
<td>Hospitalization in ICU (days)</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Follow-up (days)</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

GF - group that used polyurethane transparent film dressing; GH - group that used hydrocolloid dressing; M - median; P25 - 25 percentile; P50 - 50 percentile; P75 - 75 percentile; SIG - p-value for Mann-Whitney U test; APACHE II: Acute Physiology and Chronic Health disease Classification System; A-ICU - Adult Intensive Care Unit.
Table 2 shows cost-effectiveness analysis for the intermediate outcome and the mean number of days without pressure ulcers in the group that used polyurethane transparent film dressing and in the group that used hydrocolloid dressing.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Cost (R$)</th>
<th>Effectiveness (median days without PU)</th>
<th>Cost-effectiveness (R$/day without PU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF (n=15)</td>
<td>347.60</td>
<td>7.6</td>
<td>45.74</td>
</tr>
<tr>
<td>GH (n=10)</td>
<td>1,904.00</td>
<td>10.9</td>
<td>174.68</td>
</tr>
</tbody>
</table>

Table 3 describes the cost-effectiveness for the final outcome and proportion of patients who did not develop pressure ulcers.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Cost (R$)</th>
<th>Effectiveness (median days without PU)</th>
<th>Cost-effectiveness (R$/day without PU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF (n=15)</td>
<td>347.60</td>
<td>80</td>
<td>28.97</td>
</tr>
<tr>
<td>GH (n=10)</td>
<td>1,904.00</td>
<td>70</td>
<td>272.00</td>
</tr>
</tbody>
</table>

### Discussion

This study was based only on a cost-effectiveness analysis of two types of protective dressing that did not include the absorbent foam dressing with silicone border because this dressing type was not available in the institution investigated. In addition, our use of a small sample at a single institution limited our ability to infer and extrapolate our results. Another potential source of bias stemmed from the age difference between participants in the two groups (p=0.016) because age is considered an intrinsic risk factor for development of pressure ulcer. For this reason, the effectiveness in the group that used a polyurethane transparent film dressing was considered underestimated compared with that in the group that used a hydrocolloid dressing because the first group had more elderly patients. Therefore, polyurethane transparent film dressing can be considered extremely superior especially with the homogenization of age groups.

Despite the limitations mentioned, our study can contribute to the discussion about the use of dressings to prevent sacral pressure ulcers. This is particularly relevant because this topic requires further discussion and high-quality studies to support a scientific recommendation, without comparison of cost-effectiveness ratio between available options.

A study of 90 inpatients in an intensive care unit and a cardiology intensive care unit at a hospital in Thailand submitted patients to non-invasive mechanical ventilation; authors did not find a statistically significant difference in the effectiveness of hydrocolloid dressing and transparent film dressing. In addition, according to the final result these investigators concluded that the two dressing types can be used to prevent facial pressure ulcers caused by mechanical ventilation masks.

In our study we observed that hydrocolloid dressings were 1.4 times more effective for the intermediate outcome but that transparent films were 1.1 times more effective for the final outcome. This result indicates that both dressing types can help prevent sacral pressure ulcers.

The transparent film was 5.5 times cheaper than the hydrocolloid dressing because of its lower purchase cost and subsequent use in more patients. In addition, for both intermediate and final outcome, the transparent film was a more cost-effective alternative and enabled mean economic savings for these outcomes of R$128.94 and R$243.03, respectively. This means that hydrocolloid dressing was 3.8 and 9.4 times more expensive than transparent film.

A controlled clinical trial with 440 patients from an emergency service and intensive care unit at a hospital in Australia found that absorbent foam dressing with a silicone border prevents sacral and calcaneus pressure ulcers, and, consequently, resulted in an economic saving for the hospital. In this sense, it is important to consider the evaluation of absorbent foam dressing with a silicone border in comparison with transparent film dressing, which in our study was more cost-effective in preventing sacral pressure ulcer.

### Collaborations

Inoue KC and Matsuda LM contributed to the conception of the project, data analysis and interpretation,
drafting the manuscript, critical review for intellectual content and approval of final version to be published.

**Conclusion**

Although hydrocolloid dressing was more effective in intermediate outcome, this study data suggest that use of polyurethane transparent film dressing has advantages to prevent sacral pressure ulcers (final outcome). However, this results need to be further investigated because patients who were hospitalized in intensive care units for long periods and received hydrocolloid dressing may be influenced for the high use of dressing and also for the occurrence of pressure ulcers in the group.

The transparent film dressing was more cost-effective than hydrocolloid dressing to prevent sacral pressure ulcers among patients in intensive care unit. The transparent film dressing was 3.8 and 9.4 times less expensive than hydrocolloid dressing for intermediate and final outcomes.

Economic and clinical outcome differences occurred between the dressings used for sacral pressure ulcers. This can support decisions about the use of these resources in clinical practice. However, other studies are warranted to expand the knowledge about this type of technology. In addition, more accurate cost-effectiveness analyses should be obtained including analyses with other products.

**References**

Evaluation of quality of Risk Classification in Emergency Services

Avaliação da qualidade da Classificação de Risco nos Serviços de Emergência

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Raphaela Calinca Vidor⁴
Laura Misue Matsuda⁵

Abstract

Objective: To assess, on the basis of the perspective of nursing professionals, the structure, process, and results of a screening system, Embracement with Risk Classification, integrated in some Brazilian emergency services.

Methods: This cross-sectional study included 151 nursing professionals who completed the Instrument for Assessment of Embracement with Risk Classification. We measured the mean ranking of each item and representativeness of the structure, process, and result dimension.

Results: Only the dimension “result” of a single emergency service was evaluated as fair. The remaining dimensions, for all other services investigated, were considered poor.

Conclusion: Results indicated improvements in the quality of care delivered and prioritization of severe cases. However, improvements in the flow of against-reference system are still needed.

Keywords
Safety management/classification; Emergency service, hospital; User embrace; Nursing, team; Nursing assessment

Descritores
Gerenciamento de segurança/classificação; Serviço hospitalar de emergência; Acolhimento; Equipe de enfermagem; Avaliação em enfermagem

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Conflicts of interest: none reported.
Introduction

Risk classification screening involves a complex decision making process. For this reason, different systems have been developed worldwide to support nurses in better classifying the severity of each case.\textsuperscript{(1,2)} In general, these classification systems aim to reduce the time that patients have to wait in hospital emergency departments by prioritizing more severe cases in which an obscure prognosis can lead to a delay in treatment.\textsuperscript{(1)}

Internationally, the most used screening systems for risk classification are the Australian Triage Scale, Canadian Emergency Department Triage and Acuity Scale, Manchester Triage Scale, and the Emergency Severity Index.\textsuperscript{(1)} In Brazil, the government has been recommending the screening system Embracement with Risk Classification since 2004.

Embracement with Risk Classification entails the systematization of risk classification process, which is based on four levels of severity, with emphasis on actions, developed by the health team to embrace the patient and his/her caregiver in order to provide humanized care. This approach constitutes a way to redefine the screening process, which commonly ends in the patient admission, to enable inclusive action at all health care settings.

Protocols or guidelines that support severity classification in Embracement with Risk Classification are defined by objective and subjective parameters, times, and flow that can be changed according to the criteria of each institution.

Independently of the system used, screening of risk classification is an important aspect of health care.\textsuperscript{(3)} When screening is done by experienced nurses, it contributes to patient safety and enables rationing of resources for health care.\textsuperscript{(4)} However, positive results from implementing a screening system of risk classification requires adequate and continual evaluation of structure and work processes.

Quality measures of risk classification screening systems have been investigated, including the analysis of such indicators as a confidence index for the screening scale, the time that patients have to wait to receive care, and admission or adverse reactions rates, among others.\textsuperscript{(5)} Such measures, although important, often limit the global assessment of quality of emergency service, because of the single-focused evaluation of tools used for risk classification screening in relation to patients’ outcomes.

Although complex, the interaction among factors that make up the assessment of health quality has been supported in structure, process, and results dimensions, also known as Donabedian’s triad model, as proposed by Avedis Donabedian.\textsuperscript{(6)}

It is important to determine improvements needed, if any exist, in the services that incorporated the Embracement with Risk Classification, based on nursing professionals’ perspectives, especially because the nurse is the responsible for the risk classification procedure during screening, which is based on protocols previous discussed and defined along with medical team. In addition, nursing professionals are responsible to deliver care for patients during hospitalization and may define accurately weakness and possible strategies for the Embracement with Risk Classification.

Identifying problems or inadequacies can support the development and establishment of local actions from managers and professionals in order to increase the quality of care offered by the service. The quality monitoring is characterized by continual surveillance that enables early detection and correction of distortions.\textsuperscript{(6)} For this reason, our study aimed to assess, on the basis of the perspective of nursing professionals, the structure, process, and results of Embracement with Risk Classification in Brazilian emergency services.

Methods

This exploratory study with a quantitative approach was carried out between March and May 2013 at the emergency service of four hospitals in the State of Paraná, Brazil, randomly designated as I, II, III, and IV.

Emergency service I was part of a large philanthropic hospital, service II was part of a large private non-profit hospital and services III and IV...
were part of medium-sized general public hospitals. These services (I, II, III and IV) implemented the Embracement with Risk Classification in 2011, 2010, 2009 and 2007, respectively.

We conducted a stratified random sampling, by a drawing, of 60% of nursing professionals (nurses, nursing technician, and assistant) who worked in the emergency service for 3 months or more. In cases that professionals were on legal leave, regardless of the reason, a new drawing was done. There were no refusals or withdrawals.

A total of 151 nursing professionals participated in the study. Of these, 19 (12.6%) worked at emergency service I, 24 (15.9%) at hospital emergency service II, 38 (25.2%) at hospital emergency service III, and 70 (46.4%) at hospital emergency service IV.

Data were collected during individual interviews in a private environment at participants’ workplace using the Instrument for Assessment (composed of two parts) of the Embracement with Risk Classification. Part I was designed for obtaining sociodemographic and profession data from participants; part II pertained to assessment of Embracement with Risk Classification.

Part II was composed of 21 items on a Likert scale of five levels equally divided into Donabedian’s dimensions: structure (items 1-7), process (items 8-14), and result (items 15-21). Each item score ranged from 1 to 5. Responses scored from 1 or 2 were considered discordant, those scored 3 were considered null or indifferent, and those scored 4 or 5 were considered concordant.

The Statistical Package for the Social Sciences (SPSS), version 20, was used for descriptive statistical analysis; we calculated absolute and percentage frequency as well as means and standard deviations.

Initially, data from part II that corresponded to the negative scale form (items 3, 4, 5, 7, 10, 14, 16, 19, and 20) were inverted (became positive) to measure a general score, which is required for statistical treatment. To analyze items for the assessment instrument, we measured the mean ranking on the Likert scale obtained by the mean for each item/dimension, subsequently divided by number of respondents. Results of this operation with values closest to a score of 5 were interpreted as a high level of professional satisfaction and when closest to a score of 1, as the lowest level of satisfaction.

Next, as recommended by authors of the Instrument for Assessment of Embracement with Risk Classification, we verified the representativeness of the assessment of each dimension from the mean score of its respective items: excellent, 31.5-35 points; fair, 26.2-31.4 points; poor, 17.5-26.1 points; and insufficient, 7-17.4 points.

Development of this study followed national and international ethical and legal aspects of research on human subjects.

Results

Table 1 shows characteristics of the participants according to the respective emergency service.

<table>
<thead>
<tr>
<th>Variable</th>
<th>SHE I n(%)</th>
<th>SHE II n(%)</th>
<th>SHE III n(%)</th>
<th>SHE IV n(%)</th>
<th>All n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>7(36.8)</td>
<td>9(37.5)</td>
<td>10(26.3)</td>
<td>21(30.0)</td>
<td>45(29.8)</td>
</tr>
<tr>
<td>Male</td>
<td>12(63.2)</td>
<td>15(62.5)</td>
<td>28(73.7)</td>
<td>49(70.0)</td>
<td>106(70.2)</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary education</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1(1.4)</td>
<td>1(0.7)</td>
</tr>
<tr>
<td>Secondary education</td>
<td>11(57.9)</td>
<td>8(33.3)</td>
<td>29(76.3)</td>
<td>38(52.9)</td>
<td>85(56.3)</td>
</tr>
<tr>
<td>College</td>
<td>5(26.3)</td>
<td>5(20.8)</td>
<td>4(10.5)</td>
<td>11(15.7)</td>
<td>25(16.6)</td>
</tr>
<tr>
<td>Graduate education</td>
<td>3(15.8)</td>
<td>10(41.7)</td>
<td>5(13.2)</td>
<td>20(28.6)</td>
<td>38(25.2)</td>
</tr>
<tr>
<td>Master degree</td>
<td>-</td>
<td>1(4.2)</td>
<td>-</td>
<td>1(1.4)</td>
<td>2(1.3)</td>
</tr>
<tr>
<td>Professional category</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>4(21.1)</td>
<td>15(62.5)</td>
<td>7(18.4)</td>
<td>19(27.1)</td>
<td>45(29.8)</td>
</tr>
<tr>
<td>Technical</td>
<td>15(78.9)</td>
<td>9(37.5)</td>
<td>31(81.6)</td>
<td>49(70.0)</td>
<td>104(68.9)</td>
</tr>
<tr>
<td>Assistant</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2(2.9)</td>
<td>2(1.3)</td>
</tr>
<tr>
<td>Age (years)*</td>
<td>30.8±4.97</td>
<td>30.1±7.35</td>
<td>37.3±8.09</td>
<td>37.0±8.87</td>
<td>35.3±8.54</td>
</tr>
<tr>
<td>SHE time (years)*</td>
<td>3.8±3.15</td>
<td>2.2±1.76</td>
<td>3.9±3.74</td>
<td>3.7±5.06</td>
<td>3.5±4.15</td>
</tr>
</tbody>
</table>

SHE: Hospital Emergency Service; *Mean ± Standard Deviation

Table 2 shows, on the basis of each service, the mean ranking for each item assessment and its respective sums. In addition, in this table, the mean score indicated that nursing team considered all Donabedian’s dimensions at all services as poor, with the exception of the dimension “result” for emergency service III, which was considered fair.
Concerning the variable time working as a nursing professional, all participants had experience in the area. At services I and III, these professionals may have already worked with Embracement with Risk Classification, which enabled a more precise assessment about the subject studied.

In the assessment of Embracement with Risk Classification, we verified that no item reached a mean maximum satisfaction score (5 points) and that no dimension was evaluated as excellent. This finding indicates that the emergency services studied still have room for improvement.

In general, the mean ranking of all items for assessment of Embracement with Risk Classification was close to 3–4 points, indicating neutrality and concordance, respectively, about the execution or existence of the item in the emergency service. Even with difficulties related to the implementation and execution of Embracement with Risk Classification in the locations studied, the results can be related to nursing professionals’ positive perception of this assessment tool.

Ethnographic research done with 15 nurses in an emergency service at a Danish hospital also found participants’ positive perception of the screening process; those participants mentioned feeling safe after implantation of the screening process in the service where they worked. (8)

The structure dimension was considered poor in all services; although physical changes made helped increase humanization of care, attention to comfort and safety needs of caregivers was still lacking.

Changes in physical structure that require changes to the building can be difficult to execute. However, it is possible to adopt less onerous solutions that can improve the adequacy of the location by assuring more comfort for patients and their families, such as those as privacy, lighting, and preventing excess noise. (9,10) In this sense, decreasing problems and improving the environment and embracement of caregivers in an emergency service can also lead to the adoption of measures for relaxation and entertainment while waiting the diagnosis and/or assessments.

### Table 2. Assessment of Embracement of Risk Classification

<table>
<thead>
<tr>
<th>SHE</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item/Dimension - Variable</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>MR</td>
</tr>
<tr>
<td>1 Comfort of user / caregiver</td>
<td>3.1</td>
<td>2.6</td>
<td>2.6</td>
<td>3.4</td>
<td>3.1</td>
</tr>
<tr>
<td>2 Embrace environment</td>
<td>3.9</td>
<td>3.3</td>
<td>3.3</td>
<td>4.0</td>
<td>3.8</td>
</tr>
<tr>
<td>3 Periodic training</td>
<td>2.6</td>
<td>3.0</td>
<td>3.0</td>
<td>3.2</td>
<td>3.0</td>
</tr>
<tr>
<td>4 Privacy in consultations</td>
<td>3.2</td>
<td>3.6</td>
<td>3.6</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>5 Embracement of caregiver</td>
<td>2.4</td>
<td>2.9</td>
<td>2.9</td>
<td>2.8</td>
<td>2.7</td>
</tr>
<tr>
<td>6 Sign of environment</td>
<td>3.1</td>
<td>3.5</td>
<td>3.5</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>7 Communication between team</td>
<td>2.7</td>
<td>3.5</td>
<td>3.5</td>
<td>3.7</td>
<td>3.6</td>
</tr>
<tr>
<td>Structure dimension (PM)</td>
<td>21.0</td>
<td>22.5</td>
<td>22.2</td>
<td>23.8</td>
<td>22.9</td>
</tr>
<tr>
<td>8 Safety and comfort of user</td>
<td>3.6</td>
<td>3.6</td>
<td>3.6</td>
<td>4.0</td>
<td>3.9</td>
</tr>
<tr>
<td>9 Assessment of non-severe cases</td>
<td>4.2</td>
<td>3.1</td>
<td>3.1</td>
<td>4.2</td>
<td>4.1</td>
</tr>
<tr>
<td>10 Knowledge of management of ACCR</td>
<td>2.5</td>
<td>2.6</td>
<td>2.6</td>
<td>3.4</td>
<td>3.1</td>
</tr>
<tr>
<td>11 Relationship between leaders/subordinates</td>
<td>3.0</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
<td>3.2</td>
</tr>
<tr>
<td>12 Discussion on flowchart</td>
<td>2.5</td>
<td>3.1</td>
<td>3.1</td>
<td>3.0</td>
<td>2.9</td>
</tr>
<tr>
<td>13 Trained team</td>
<td>3.1</td>
<td>4.0</td>
<td>4.0</td>
<td>3.6</td>
<td>3.5</td>
</tr>
<tr>
<td>14 Revalidation of cases waiting</td>
<td>3.6</td>
<td>2.6</td>
<td>2.6</td>
<td>3.3</td>
<td>3.1</td>
</tr>
<tr>
<td>Process dimension (PM)</td>
<td>22.5</td>
<td>22.2</td>
<td>23.6</td>
<td>24.8</td>
<td>23.8</td>
</tr>
<tr>
<td>15 Primary care for case severity</td>
<td>3.7</td>
<td>3.6</td>
<td>3.6</td>
<td>3.9</td>
<td>4.0</td>
</tr>
<tr>
<td>16 Care humanization</td>
<td>3.2</td>
<td>3.5</td>
<td>3.5</td>
<td>3.6</td>
<td>3.5</td>
</tr>
<tr>
<td>17 Integration in health team</td>
<td>3.6</td>
<td>3.5</td>
<td>3.5</td>
<td>3.7</td>
<td>3.6</td>
</tr>
<tr>
<td>18 Information on waiting time</td>
<td>3.6</td>
<td>2.6</td>
<td>2.6</td>
<td>3.9</td>
<td>3.7</td>
</tr>
<tr>
<td>19 Prioritization of severe cases</td>
<td>4.0</td>
<td>3.7</td>
<td>3.7</td>
<td>4.5</td>
<td>4.3</td>
</tr>
<tr>
<td>20 Against-reference</td>
<td>2.4</td>
<td>3.5</td>
<td>3.5</td>
<td>2.5</td>
<td>2.6</td>
</tr>
<tr>
<td>21 Satisfaction with results of ACCR</td>
<td>3.4</td>
<td>2.8</td>
<td>2.8</td>
<td>3.7</td>
<td>3.5</td>
</tr>
<tr>
<td>Result dimension (PM)</td>
<td>23.9</td>
<td>23.1</td>
<td>26.2</td>
<td>25.8</td>
<td>25.2</td>
</tr>
</tbody>
</table>

MR - Mean ranking; MS - Mean Score; SHE - Hospital Emergency Service; ACCR - Embracement with Risk Classification

### Discussion

This study found gaps in operationalization of Embracement with Risk Classification that affirm the need for continuous assessment of this system for establishing discussion and actions that help improve care in emergency services. However, results presented in this study cannot be extrapolated because of such limitations as a small number of participants and services assessed and the diversity of risk classification protocols and infrastructure.

Based on participant characteristics, we found that participants’ level of education shows enhance in the qualification of nursing professional that was higher than number reported by interviewed nurses (n=45, 29.8%) and indicated that nursing technicians had also graduated. Finally, some of the institutions in this study offered a career plan that provided additional compensation to employees as an incentive for participation in educational strategies, including undergraduate courses.
Although assessments for the process dimension were better than those presented in the structure dimension, all services were also evaluated as poor.

We highlight the concordance of responses concerning the item related to assessment of non-severe cases in emergency services (item 9, MR=4.1 points) with responses to the item asking whether professionals who use Embracement with Risk Classification feel safe and comfortable in their work environment (item 8, MR=3.9 points).

In addition, we observed a tendency toward neutrality in answers concerning discussions about flowcharts, knowledge of management regarding Embracement with Risk Classification, revalidation of cases in the waiting room, and leaders and subordinates. These data show weakness of Embracement with Risk Classification in the process dimension because when poor relations between leaders and subordinates can compromise communication between professionals on the team. For this reason, discussions about flowcharts were probably limited and, as a consequence, result in a lack of understanding about behavior with Embracement with Risk Classification, including concerning strategies that can contribute to reassessment of cases in the waiting room.

It is important to highlight that problems in communication process among members of multidisciplinary team can result in adverse events and impact negatively patients’ health. This requires the adoption of strategies to contribute for team work promotion and turn the communication easier among different health professionals.\(^{(11)}\) The performance of activities and success of implementation of a screening system require that nurses develop assessment and communication skills associated with knowledge of ethical-legal and technical-scientific principles that guide the profession.\(^{(5)}\) In addition, to implement changes, leaders must develop spaces for dialogue with their team and embrace improvement proposals.

Concerning reassessment of cases waiting for medical care at services II (MR=2.6 points) and III (MR=2.6 points), both institutions should help nurses become familiar with Embracement with Risk Classification and understand the importance of observation and follow-up progress of those who wait for health care. Although reassessment consumes more work time and can lead to professional dissatisfaction in the context of current worker shortages,\(^{(8)}\) it is important to consider that risk classification is a dynamic process that involves periodic reassessment of risk of patients waiting for care because a patient’s clinical condition can worsen over time.\(^{(1-3)}\)

With regard to the result dimension, we highlight that only emergency service III was assessed as fair. In other services, this dimension was considered poor, but was still ranked higher than were the structure and process dimensions. On the basis of these results suggesting improvement of care quality, we believe that implementation of Embracement with Risk Classification has the potential to transform care even in locations and condition that are not favorable.

For all evaluated services using Embracement with Risk Classification, severely ill patients were prioritized for care (item 19, MR=4.3 points), and primary assistance was assigned according to severity of the case and do not by order of arrival (item 14, MR=4.0 points). However, we verified the need to improve the against-reference system, mainly in emergency services I (item 20, MR=2.4 points) and IV (item 20, MR=2.9 points). These data surely deserve special attention from managers because patients who require less complex care and in fact could be seen in a primary care setting still seek care in an emergency department. This leads to overbooking in the emergency services, increased health-related costs, and reduced care quality.\(^{(12)}\)

Despite this, we recognize that all patients who sought emergency care need to be screened and classified to guarantee that they receive adequate assistance and, in this way, reduce risks of adverse events; this also would allow assessment of the system to guarantee best practices.\(^{(5)}\) In this sense, it is important to widen the discussion on reasons for dissatisfaction of nursing professionals referrals and against-reference system, which presupposes fragility in basic care and lack of integration in health care network.
Conclusion

Nursing professions indicated that all Donabedian's dimensions were poor, mainly the items part of the structure dimension. Although Embracement with Risk Classification promotes improvements in care quality by prioritizing severe cases, there is still significant room for improvement, especially against-reference system in the evaluated services.

Collaborations

Inoue KC, Bellucci Júnior JA, Papa MAF, Vidor RC e Matsuda LM contributed with drafting the manuscript, critical review relevant for intellectual content and approval of final version to be published.

References

Contamination of tourniquets for peripheral intravenous puncture

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Evandro Leão Ribeiro¹
Marinésia Aparecida do Prado¹

Abstract

Objectives: To identify the presence of contamination on tourniquets for peripheral intravenous puncture and to characterize the profile of the *Staphylococcus* spp. and the isolated yeasts.

Methods: Cross-sectional study in which 18 tourniquets for peripheral intravenous puncture in use at a hospital were analyzed. The tourniquets were immersed in BHI broth for 24h and cultivated in selective media for isolation and identification of *Staphylococcus* spp. and yeasts. The disk-diffusion method was employed to analyze the susceptibility profile of the *Staphylococcus* spp. to the antimicrobial agents.

Results: The growth of some microorganism was identified on 13 (72.2%) tourniquets: 11 (52.4%) coagulase-negative *Staphylococcus*, two (9.5%) *Staphylococcus aureus*, four (19%) *Rodothorula mucilaginosa*, three (14.3%) *Candida albicans*. 61.5% of the *Staphylococcus* spp. were oxacillin-resistant. The team professionals did not mention protocols for cleaning, disinfection or controlled replacement of these materials at the institution.

Conclusion: The contamination of tourniquets by pathogenic microorganisms was identified, with a resistance profile to the antibiotics that are frequently used in hospitals.

Keywords
Nursing care; Nursing, practical; Nursing research; Tourniquets/adverse effects; Equipment contamination; Staphylococcal infections

Descritores
Cuidados de enfermagem; Enfermagem prática; Pesquisa em enfermagem; Torquiquetes/efeitos adversos; Contaminação de equipamentos; Infecções estafilocócicas

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Introduction

Healthcare-Associated Infections (HAIs) represent a great problem for the safety and quality of life of health service users. In addition, their impact can result in death, extended hospitalization, disabilities, a great financial burden for the health institutions and a high cost for patients and their families. The mortality rates related to the HAIs vary with the topography, baseline disease, etiology, among others. It is estimated that there are great variations in the lethality coefficients, between 9.0 and 58.0%, with high rates of bloodstream infections, reaching 40.0%. (1)

Bloodstream infections (BSI) figure among the infections most commonly associated with healthcare. It is estimated that about 60% of nosocomial bacterial infections are associated with some intravascular device. The catheter-related BSI include cases in which the same microorganism isolated in the culture of the device segment is identified in the bloodstream, without another apparent source for the presence of the bacteria. (3)

Bloodstream infections, mainly when catheter-related, figure among the most frequent healthcare-associated infections and have been related with high mortality rates, extended hospitalization and higher financial burden. (4) The pathogens most commonly reported in BSI include coagulase-negative Staphylococcus, Staphylococcus aureus, enterococci and Candida spp. Infections by resistant microorganisms are also highlighted, such as methicillin-resistant Staphylococcus aureus and Candida spp. resistant to fluconazole, resulting in higher mortality rates and extended hospitalization to treat these infections. (3)

Candida species have emerged as important pathogens, associated with almost 80.0% of all nosocomial fungal infections and with high mortality rates. (5) Although Candida albicans is the most isolated yeast in BSI, other species, such as Candida parapsilosis, have emerged as causes of BSI in hospitalized, weakened patients and particularly in low-weight newborn infants. (5,6)

To prevent BSI, taking care of the installation and maintenance of the vascular access is essential. (3) One of the devices used to install the peripheral venous access is the tourniquet, a collective device for which no specific decontamination recommendations are available. Studies appoint the need to reconsider care with tourniquets that are used indiscriminately among the patients without proper decontamination, which can be considered a risk factor for peripheral venous access infection. (7,8)

As tourniquets are collective devices that are essential to install a peripheral venous access and in view of the lack of specific recommendations for their decontamination, the potential risk of these devices needs to be assessed as a dissemination source of pathogens that are epidemiologically important for HAIs, which is the contribution expected from this study. This study was aimed at identifying the presence of contamination on tourniquets for peripheral intravenous puncture and at characterizing the profile of the Staphylococcus spp. and yeasts isolated.

Methods

A descriptive and cross-sectional study was undertaken at a maternal-infant referral hospital in the state of Goiás (Brazil). The data were collected during one week in August 2012. All hospital sectors that use tourniquets for peripheral intravenous puncture in their care procedures were selected as data collection units, as well as the professional responsible for these devices in the respective sectors.

After receiving the participants’ consent, an interview was held with the help of a previously assessed structured script, involving 12 health professionals responsible for peripheral intravenous puncture tourniquets at each hospital unit. The script was aimed at collecting information on the decontamination, storage, use and replacement processes of these articles at the institution.

Next, all tourniquets being used were collected for microbiological analysis, totaling 18 tourniquets from the pediatric and maternal Emergency Care sector, maternal Intensive Care Unit, Surgical Center, Maternity, Gynecology/Obstetric Clinic and Clinical Analysis Laboratory. The tourniquets were
individually stored in sterilized recipients and transported at room temperature to the laboratory of the Institute for Tropical Pathology and Public Health of Universidade Federal de Goiás (IPTSP/UFG) for microbiological analysis. The professional received a new tourniquet to replace the device collected for the research.

At the laboratory, the tourniquets were immersed in individual flasks of BHI (Brain Heart Infusion) broth and incubated at 35°C for up to 48h. At the same time, a new tourniquet was also cultivated as negative control, under the same conditions as the devices collected that were used at the hospital. Samples with microbial growth were seeded in salted agar mannitol and tryptic soy agar with 4% of NaCl and 6 µg/mL of oxacillin (TSA oxa) for isolation and identification of Staphylococcus spp. Next, they were incubated at 35°C for up to 48h. TSA oxa medium was used to screen for the isolation of oxacillin-resistant strains. The standard strain S. aureus ATCC® 25923 was used for quality control of the tests done.

After the macro and microscopic analysis of the colonies grown in the selected media, biochemical standard identification tests were done: mannitol fermentation test, catalase, coagulase and DNase detection tests. The isolated Staphylococcus spp. were assessed to identify the susceptibility profile to 12 antimicrobial agents, using the disk-diffusion method. Microorganisms showing oxacillin and/or cefoxitin resistance (marker of resistance to oxacillin) on the antibiogram were submitted to the E-test®, using oxacillin strips to detect the minimum inhibitory concentration and confirm the resistance to oxacillin.

Samples with microbial growth in BHI broth were also seeded in 5.0 mL of inclined Sabouraud Dextrose agar with 0.1mg.mL⁻¹ of cloramphenicol, kept at room temperature for 15 days to investigate the growth of fungal colonies. The yeast colonies that developed in Sabouraud Dextrose agar at room temperature after the 15 days were identified by means of physiological tests (formation of germ tube) and biochemical characteristics, including the assimilation of carbon and nitrogen sources (auxanogram), carbohydrate fermentation tests (zymo-

gram) and micromorphology in corn meal agar with Tween 80. A standard strain was applied as quality control for the identification tests (Candida albicans ATCC® 10231).

As the outcome variable, the study showed the contamination of the tourniquets by microorganisms of epidemiological importance (Staphylococcus spp. and yeasts) for HAIs. The data were analyzed using descriptive statistics with simple frequency of the categorized variables, presented as percentages.

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

### Results

All health professionals (n=12) participated in the interview who were responsible for the 18 peripheral intravenous puncture tourniquets used at the hospital. Concerning the interviewees’ educational background: six (50.0%) were baccalaureate nurses, two (16.7%) nursing technicians and four (33.3%) laboratory technicians.

It was observed that 83.3% of the tourniquets were used collectively by more than one professional at the same hospital service for the purpose of peripheral intravenous puncture of any patient. All responsible service professionals confirmed that there was no standard protocol for the decontamination of these tourniquets at the institution. This resulted in a range of routines among the services, predominantly using 70% alcohol, which eight (66.7%) subjects mentioned, while one of the participants (8.3%) mentioned not using any decontamination measure of these devices. In addition, the non-standardized use of 70% alcohol is highlighted, mentioning: before and after the reuse of the tourniquets (02/ 16.7%), only after the use (02/ 16.7%), once per period (01/ 8.3%) and once per day (03/ 25.0%).

Concerning the microbiological analysis, no microbial growth was found on the tourniquet used as a negative control. Out of 18 tourniquets collected that were used at the hospital, 13 (72.2%) showed the growth of some of the microorganisms inves-
tigated. Ten (55.6%) displayed growth of *Staphylococcus* spp. and seven (38.9%) of yeasts, while four (22.2%) showed the concomitant growth of two microorganisms. Twenty-one microorganisms were isolated, being 13 *Staphylococcus* spp. and eight yeast-forming fungi, as described in table 1.

In this study, the nursing team stood out as the primary responsible for the peripheral intravenous puncture tourniquets used at the hospital (66.7%). Historically, nursing is the team most frequently accountable for the planning, administration and supervision of intravenous therapies, and therefore carries a great responsibility for the prophylaxis and control of bloodstream-related infections. Although this seems to be a simple activity, it demands specific care and the strict observation of preventive measures to guarantee patient safety.\(^\text{(9)}\)

The absence of the sanitary standardization of effective measures for the decontamination of peripheral intravenous puncture tourniquets may have contributed to the different ways in which the health professionals handled this device. Alcohol at 70% was the most used product (66.7%). It is known that alcohol preparations are effective for intermediary disinfection, inactivating the vegetative forms of bacteria, enveloped viruses, mycobacteria and fungi.\(^\text{(10)}\) The indiscriminate use of 70% alcohol with an excessive burden of organic matter is not successful to eliminate microorganisms from any surface, as the organic matter turns into a mechanical barrier that impedes or reduces the action of the alcohol on the microorganisms.\(^\text{(10,11)}\)

In the practical use of the tourniquets, the absence of any proven effective and safe measure to decontaminate these devices is observed, which have contact with different microorganisms on the patients’ skin, the health professionals’ hands and the surfaces where they are stored. Studies are needed to find not only clinical, but also technical and operational evidence on how to guarantee the decontamination of the tourniquets, besides the cost-benefit relation of reuse. At the hospital where the study was carried out, it was observed that various services used “fingers” from disposable gloves as a tourniquet for punctures in infants, an alternative improvised for a single-use device, which can be more costly in relation to a disposable device proposed specifically for this purpose. These are suppositions that also lack further research.

### Table 1. Prevalence of microorganisms isolated and identified on peripheral puncture tourniquets

<table>
<thead>
<tr>
<th>Microorganisms isolated</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coagulase-negative <em>Staphylococcus</em></td>
<td>11(62.4)</td>
</tr>
<tr>
<td><em>Staphylococcus</em> aureus</td>
<td>02(9.5)</td>
</tr>
<tr>
<td><em>Rodothorula mucilaginosa</em></td>
<td>04(19.0)</td>
</tr>
<tr>
<td><em>Candida albicans</em></td>
<td>03(14.3)</td>
</tr>
<tr>
<td><em>Candida parapsilosis</em></td>
<td>01(4.8)</td>
</tr>
</tbody>
</table>

### Table 2. Antimicrobial susceptibility profile of *Staphylococcus* ssp. isolated from tourniquets

<table>
<thead>
<tr>
<th>Antibacterial agents</th>
<th>Isolated n(13)</th>
<th>Total R (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S</td>
<td>I</td>
</tr>
<tr>
<td>Oxacillin</td>
<td>05</td>
<td>NA</td>
</tr>
<tr>
<td>Penicillin</td>
<td>00</td>
<td>NA</td>
</tr>
<tr>
<td>Mupirocin</td>
<td>10</td>
<td>NA</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>07</td>
<td>01</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>11</td>
<td>00</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>13</td>
<td>00</td>
</tr>
<tr>
<td>Gentamycin</td>
<td>08</td>
<td>00</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>12</td>
<td>01</td>
</tr>
<tr>
<td>Trimethoprim-sulfamethoxazole</td>
<td>09</td>
<td>00</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>09</td>
<td>01</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>06</td>
<td>01</td>
</tr>
<tr>
<td>Linezolid</td>
<td>12</td>
<td>NA</td>
</tr>
<tr>
<td>Quinupristine-dalfopristine</td>
<td>13</td>
<td>00</td>
</tr>
</tbody>
</table>

S - sensitivity; I - intermediary resistance; R - resistant; NA - not assessed

Out of 13 microorganisms isolated, eight (61.5%) *Staphylococcus* spp. were resistant to oxacillin/cefoxitin using the disc-diffusion method (screening). All eight microorganisms isolated were identified as coagulase-negative *Staphylococcus* (CoNS) and showed resistance to oxacillin, confirmed by the *E*-test. The minimum inhibitory concentration of oxacillin detected in the *E*-test ranged between 0.75µg/mL and > 256µg/mL.
Among all tourniquets analyzed, 07 (38.9%) showed the growth of yeast-forming fungi. Eight microorganisms were isolated and identified as *Rhodotorula mucilaginosa* (50.0%), *Candida albicans* (37.5%) and *Candida parapsilosis* (12.5%). Candidiasis is one of the main opportunistic fungal infections in human beings, caused by *Candida* yeasts. Their etiological agent can grow and multiply at high temperatures (37ºC) and produce lipases, proteinases, biofilms, allergic manifestations and depression of cell immunity in the host, characteristics that grant these yeasts a high level of pathogenicity.\(^{(12)}\)

*Rodothorula* spp. yeasts are also considered opportunistic microorganisms related to bloodstream infections, whose most common species is *Rodothorula mucilaginosa*. These yeasts were considered as non-pathogenic for years but, in recent decades, their pathogenic potential has increased, especially in immunodepressed patients, often related to the presence of venous catheters, prostheses, grafts, endocarditis, peritonitis and meningitis.\(^{(13,14)}\)

The infections caused by *Candida* spp. and *Rodothorula mucilaginosa* fungi can be related to the presence of venous catheters and have been described as microorganisms that cause bloodstream infections.\(^{(14)}\) Tourniquets are essential devices to install peripheral lines, collect blood and apply intravenous therapy, and are mostly manufactured from porous material that facilitates fungal adhesion.

As regards the bacteriological analyses of the tourniquets, 84.6% of the isolated *Staphylococcus* were characterized as CoNS. This group colonizes the skin and mucous tissues of humans and other animals, and was long considered as saprophytes with a reduced capacity to cause human infections. In recent years, however, they have been related to important nosocomial infections, mainly in weakened and elderly patients and low-weight infants.\(^{(15,16)}\)

In addition, some species produce a slime layer of polysaccharides that increases the bacterial adhesion to the different surfaces and is related to the formation of biofilms.\(^{(17,18)}\)

The susceptibility profile of the *Staphylococcus* revealed that, of all isolated strains, 61.5% were oxacillin-resistant. This is an important phenotype, which predicts resistance to the group of beta-lactam antibiotics, including cephalosporins and carbapenem products. Oxacillin resistance is mostly due to the production of penicillin-binding proteins (PBPs) with low levels of affinity with the beta-lactam antibiotics (PBP2a). This protein is coded by the gen *mecA*, which is inserted in a mobile genetic element present in the bacterial chromosome called *SCCmec* (*Staphylococcal cassette chromosome mec*).\(^{(19,20)}\)

All oxacillin-resistant *Staphylococci* isolated in this research belong to the group CoNS. This data is in line with recent studies that appoint this group as emerging nosocomial microorganisms resistant to various antimicrobials.\(^{(16-18)}\)

It is also important to highlight that, among the isolated bacterial agents, penicillin resistance amounted to 100.0%. Some microorganisms (38.5%) were resistant to penicillin through the production of beta-lactamase (penicilinase). This resistance phenotype is expanded to all penicillinase-labile penicillin, such as ampicillin, amoxicillin, piperacillin and ticarcillin. These data strengthen that penicillin resistance is widely disseminated in the hospital context, so that the use of this antibacterial agent in the treatment of staphylococcus infections is no longer recommended.\(^{(20)}\)

Another important fact was the *Staphylococcus*’s resistance to other antibacterial agents, such as erythromycin (46.2%), ciprofloxacin (38.5%) and gentamycin (38.5%). Oxacillin-resistant strains, particularly those isolated in hospitals, frequently have genes linked to their chromosome that are resistant to several non-beta-lactam antibacterial agents.\(^{(21)}\)

Studies have proved the colonization of these devices by pathogenic microorganisms due to the reuse of contaminated tourniquets, inappropriate decontamination practices or the professionals’ lack of hand washing.\(^{(7,8)}\)

No cleaning, disinfection or controlled replacement routine of the peripheral intravenous punct-
ture tourniquets was identified at the place of study. These research results demonstrate that peripheral intravenous puncture tourniquets are widely used by the nursing teams and can be contaminated by pathogenic microorganisms that act as fomites in healthcare environments.

**Conclusion**

The contamination of the tourniquets by pathogenic microorganisms was identified, with a resistance profile to antibiotics that are frequently used in hospitals.

**Collaborations**

Batista KCO contributed to the construction and execution of the project, analysis and interpretation of the data and elaboration of the article. Tipple AFV contributed to the construction of the project, analysis and interpretation of the data, writing of the article and approval of the final version. Leão-Vasconcelos LSNO and Ribeiro EL contributed to the construction of the project, analysis and interpretation of the data and elaboration of the article. Prado MA contributed to the construction of the project and critical review of the intellectual content of the article.

**References**


Resistance of bacteria isolated from equipment in an intensive care unit

Resistência de bactérias isoladas em equipamentos em unidade de terapia intensiva

Igor Vasconcelos Rocha¹
Patrick de Mélo Ferraz¹
Thaísa Gabriela Silva de Farias¹
Sibele Ribeiro de Oliveira¹

Abstract

Objective: Evaluate drug resistance of bacteria isolated from equipment placed close to patients in an Intensive Care Unit of a hospital in Caruaru/Pernambuco, Brazil.

Methods: This is a cross-sectional study. The samples were collected with swabs moistened with Trypticase Soy Broth, which were then cultured in sheep blood agar and MacConkey agar. The phenotypic identification performed was based on the morphology of the strains and biochemical results. The drugs resistance analysis was based on Kirby-Bauer’s Disk Diffusion protocol.

Results: A rate of 94.4% of the analyzed equipment was contaminated. The most frequently isolated microorganisms were: Acinetobacter sp., Staphylococcus aureus and Pseudomonas sp. Just about 75% of Acinetobacter sp. was resistant to piperacillin associated to tazobactam, meropenem and levofloxacin. Similarly, 36.3% of S. aureus showed resistance to oxacillin and 10% of Pseudomonas sp. was resistant to the drugs tested.

Conclusion: Most of the microorganisms presented high levels of resistance to the drugs.

Resumo

Objetivo: Avaliar a resistência microbiana a medicamentos de bactérias isoladas de equipamentos próximos aos pacientes da Unidade de Terapia Intensiva.

Métodos: Trata-se de um estudo transversal. As amostras foram coletadas com swabs umedecidos em Trypticase Soy Broth, semeadas posteriormente em Ágar Sangue de Carneiro e MacConkey. A identificação fenotípica ocorreu com base na morfologia das cepas e resultados bioquímicos. A análise da resistência aos medicamentos foi baseada no método de disco-difusão de Kirby-Bauer.

Resultados: Apresentaram-se contaminados 94,4% dos equipamentos analisados. Os microorganismos isolados mais frequentes foram: Acinetobacter sp., Staphylococcus aureus e Pseudomonas sp. Cerca de 75% de Acinetobacter sp. apresentaram resistência à piperacilina associada a tazobactam, meropenem e levofloxacina. Da mesma forma, 36,3% de S. aureus apresentaram-se resistentes à oxacilina e 10% dos isolados de Pseudomonas sp. foram resistentes aos medicamentos testados.

Conclusão: A maioria dos isolados apresentaram elevadas taxas de resistência microbiana aos medicamentos.

Keywords
Nursing service, hospital; Equipment contamination; Drug resistance, microbial; Cross infection/prevention & control; Intensive care units

Descritores
Serviço hospitalar de enfermagem; Contaminação de equipamentos; Resistência microbiana a medicamentos; Infecção hospitalar/ prevenção & controle; Unidades de terapia intensiva

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

Healthcare-associated Infections (HAI) are responsible for thousands of deaths every year around the world. In Brazil, this problem increases in terms of numbers as well as complexity, causing economic and social disruption with high levels of morbidity and mortality.\(^{1,2}\)

In Intensive Care Units (ICU), the contamination of equipment by bacteria is common, turning them into reservoirs of these microorganisms, enabling the colonization and cross infection of patients, complicating prognosis and favoring HAI outbreaks, mostly by microorganisms multiresistant to antibiotics commonly applied in therapeutics,\(^{3}\) which implies severe limitations to the treatment of hospital infections, posing a great threat to public health.\(^{4}\)

Different organisms are related to contaminations in hospital environments and HAI processes,\(^{5}\) but the main pathogens include oxacillin-resistant *Staphylococcus aureus* (ORSA), vancomycin-resistant *Enterococcus* sp. (VRE) and, more recently, extended-spectrum beta-lactamases (ESBL) and carbapenem-resistant *Acinetobacter baumannii*.\(^{6-9}\)

Bacterial resistance is natural and unavoidable,\(^{3}\) but the frequent and undistinguished use of antimicrobials (mainly broad-spectrum drugs) are crucial factors for the development and acceleration of this process.\(^{3,10}\)

Given these facts, the purpose of this study was to isolate and determine the drug resistance profile of bacteria isolated from ICU equipment in a hospital in Caruaru-PE.

**Methods**

This descriptive and cross-sectional study was developed in the Intensive Care Unit of a hospital located in Caruaru, in the Northeast of Brazil, from January to December 2013.

Convenience sampling was applied, in which 54 pieces of equipment (right and left side rails and height adjustment buttons from the beds, infusion pump buttons, individual light switches and cardiac monitor shelves) distributed among the nine beds present in the general ICU (Figure 1) were selected for collection. The inclusion criterion was samples from surfaces whose beds were occupied by their respective patients.

The collected data were typed, validated and processed in the software Excel 2010 (Microsoft Office\(^*\)). Descriptive analysis was applied to obtain the percentage of samples.

The samples were collected six hours after the last time the hospital beds had been cleaned (corresponding to two hours after the end of the visiting period), so as not to interfere in the routine activities on site. Sterile swabs were used moistened with Trypticase Soy Broth (TSB) medium. Immediately after the collection, when the swabs were spun around their axis over the previously selected equipment, they were again stored in the medium and incubated at 36 ± 0.5°C during 24 hours.

After the growth in TSB, the samples were seeded in sheep blood agar and MacConkey agar and also incubated at 36 ± 0.5°C during 24 hours.
Gram staining was performed, followed by the identification of the genera and/or species of the bacteria, according to macro and microscopic characteristics of the colonies and biochemical test results. For the identification of bacteria from the family Enterobacteriaceae, the carbohydrate fermentation test was used in Triple Sugar Iron (TSI), as well as biochemical tests using the Sulfide Indole Motility (SIM), Simmons’ citrate and Christensen’s Urea Agar growth mediums. Tests based on Oxidase and Polymyxin B were used for the identification of glucose-non-fermenting Gram-negative bacteria. The identification of Staphylococcus sp. was performed through catalase, DNase and Novobiocin tests. Streptococcus sp. were identified through the characteristics of hemolytic activity, the use of Bile esculin agar, Brain Heart infusion (BHI) + NaCl 6.5% and optochin tests.

The drugs resistance analysis was based on Kirby-Bauer’s Disk Diffusion protocol in Müeller-Hinton agar, as proposed by the Clinical and Laboratory Standard Institute (CLSI) 2013.\(^{11}\)

**Results**

It was observed that 94.4% of the analyzed equipment was contaminated by one or more bacterial species. The most numerous isolated bacteria were Acinetobacter sp., Staphylococcus aureus, Coagulase-negative Staphylococci (CoNS), Staphylococcus saprophyticus, Enterococcus sp., Klebsiella pneumoniae and Streptococcus viridans, as presented in table 1. Gram-positive bacilli were found in 33.3% of the beds.

Among the Acinetobacter sp. isolated, 75% were resistant to imipenem, levofloxacin and piperacillin associated with tazobactam. 37.5% of the isolated microorganisms from this genus were resistant to ticarcillin, 31.2% to amikacin, 18.7% to ciprofloxacin, tetracycline and ceftazidime and 12.5% to gentamicin. 6.25% of the isolated microorganisms were found to have an intermediate level of resistance to ceftazidime and 12.5% to tobramycin.

With regard to the isolated Staphylococcus aureus, 72.7% were resistant to erythromycin, 63.6% to penicillin, 54.5% to clindamycin and ciprofloxacin and 18.8% to gentamicin. None of the isolated Staphylococcus aureus turned out to be resistant to cefoxitin. 9% of them had an intermediate level of resistance to oxacillin, clindamycin, erythromycin and ciprofloxacin. 36.3% were resistant to oxacillin (ORSA).

Among the Coagulase-negative Staphylococci strains, 71.4% and 54.1% were resistant to erythromycin and clindamycin, respectively. All these strains were susceptible to gentamicin, with 14.2% of them having the intermediate resistance phenotype to clindamycin. 42.8% were resistant to penicillin and 14.2% to tetracycline and cefoxitin.

The biggest number of cases of resistance to oxacillin is this study occurred in the isolated strains of Staphylococcus saprophyticus, which reached resistance levels in 85.7% of the samples, followed by 71.4% of resistance to erythromycin and clindamycin, 42.8% resistant to ciprofloxacin, 42.6% to cefoxitin, 28.5% to tetracycline and 14.2% to penicillin.

As regards the mechanism of inducible resistance to clindamycin, 12% of the Staphylococcus

### Table 1. Distribution of bacteria isolated on equipment

<table>
<thead>
<tr>
<th>Microorganism</th>
<th>S1 n(%)</th>
<th>S2 n(%)</th>
<th>S3 n(%)</th>
<th>S4 n(%)</th>
<th>S5 n(%)</th>
<th>S6 n(%)</th>
<th>Total n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acinetobacter sp.</td>
<td>03(18.7)</td>
<td>04(25)</td>
<td>03(18.7)</td>
<td>01(6.25)</td>
<td>01(6.25)</td>
<td>04(25)</td>
<td>16(28.57)</td>
</tr>
<tr>
<td>S. aureus</td>
<td>04(36.3)</td>
<td>02(18.1)</td>
<td>01(9)</td>
<td>01(9)</td>
<td>02(18.1)</td>
<td>01(9)</td>
<td>11(19.64)</td>
</tr>
<tr>
<td>Pseudomonas sp.</td>
<td>01(10)</td>
<td>01(10)</td>
<td>02(20)</td>
<td>01(10)</td>
<td>01(10)</td>
<td>04(40)</td>
<td>10(17.5)</td>
</tr>
<tr>
<td>S. coagulase negativa</td>
<td>0(0)</td>
<td>0(0)</td>
<td>01(14.2)</td>
<td>03(42.8)</td>
<td>02(28.5)</td>
<td>01(14.2)</td>
<td>07(12.5)</td>
</tr>
<tr>
<td>S. saprophyticus</td>
<td>0(0)</td>
<td>02(28.5)</td>
<td>03(42.8)</td>
<td>0(0)</td>
<td>01(14.2)</td>
<td>01(14.2)</td>
<td>07(12.5)</td>
</tr>
<tr>
<td>Enterococcus sp.</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>01(33.3)</td>
<td>01(33.3)</td>
<td>03(5.35)</td>
<td>03(5.35)</td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>01(100)</td>
<td>01(1.78)</td>
</tr>
<tr>
<td>S. viridans</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>01(100)</td>
<td>01(1.78)</td>
</tr>
<tr>
<td>Total isolated</td>
<td>08(14.2)</td>
<td>0(0)</td>
<td>10(17.8)</td>
<td>07(12.5)</td>
<td>08(14.2)</td>
<td>14(25)</td>
<td>56(100)</td>
</tr>
</tbody>
</table>

S1 - right rail; S2 - left rail; S3 - height adjustment buttons from the beds; S4 - infusion pump buttons; S5 - individual illumination switches; S6 - cardiac monitors’ shelf; n - number of isolated bacteria; % - percentage of isolated bacteria.
sp. had the positive phenotype. This was detected through the disk approximation test with erythromycin and clindamycin (Figure 2), in which 66.6% corresponded to Coagulase-negative S. and 33.3% to S. aureus.

Figure 2. Inducible clindamycin resistance phenotype in S. aureus. E - erythromycin; C - clindamycin

Only 5.35% of the isolated strains corresponded to Enterococcus sp., 33.3% of which had intermediate levels of resistance to penicillin and ampicillin. None of the isolated strains were resistant to vancomycin.

A rate of 17.85% of the isolated strains corresponded to Pseudomonas sp., none of which turned out to have a significant level of resistance to the tested antibiotics (gentamicin, levofloxacin, aztreonam, ceftazidime, tobramycin, amikacin, ciprofloxacin, meropenem, chloramphenicol, cefoxitin and ticarcillin + clavulanic acid), while 10% of them were resistant and 20% presented intermediate levels of resistance to piperacillin + tazobactam; and 10% also had intermediate levels of resistance to ticarcillin + clavulanic acid and aztreonam.

Only one specimen of bacteria from the Enterobacteriaceae family (Klebsiella pneumoniae) was isolated in the study performed. Resistance was detected to ciprofloxacin, tetracycline, ampicillin, chloramphenicol and gentamicin, intermediate resistance to piperacillin + tazobactam and susceptibility to meropenem and tobramycin, and a negative result was obtained for Extended-Spectrum Beta-Lactamase (ESBL) production.

Discussion

Part of the results reported in this study (be it the occurrence of genera and/or species of bacteria or their antimicrobial resistance profiles) corroborate what is described in the scientific literature, although comparisons sometimes tend to be inaccurate, since the sampling and microbial detection methods vary considerably among different studies.(2)

The high number of Acinetobacter sp. isolated may have been due to its high level of nutritional and metabolic versatility, which allows this genus to use a large variety of substrates as carbon sources, remaining active for days or weeks in hospital environments,(12,13) which highlights the importance of their detection in such places, as this microorganism is directly involved in various ICU-related clinical complications,(2) and also in mechanisms of acquired resistance to carbapenem antibiotics.(4)

Despite the existence of studies(2,4,6,13) on the genus Acinetobacter as an HAI agent from clinical samples, there is a lack of statistical data on the prevalence of this bacterium on hospital equipment. Besides that, the occurrence(4,13,14) of Acinetobacter sp. with multiresistant profiles is also considerable, which shows the need for more complex studies to determine the behavior of these strains in this kind of environment.

As regards the resistance profile of S. aureus strains to oxacillin (ORSA), a low number of cases was detected compared to the number of Gram-positives, although the result turned out to be superior when compared to a similar study, in which only 11.8% of the isolated strains had this resistance profile.(15) When the resistance of S. aureus strains to cefoxitin is analyzed, the results described in this study were similar to those of a study performed with biological materials, in which no strains with this resistance profile were reported.(16)

As for the Coagulase-negative Staphylococci strains, no studies on their resistance profile in ICU
equipment were found, but a study from 2006\textsuperscript{17} reported lower resistance levels to erythromycin and clindamycin in biological samples: 68.7\% and 63\% respectively.

The occurrence of \textit{S. saprophyticus} described in this study was superior when compared to studies from Libya, performed in 2014, in which only 3.3\% of the analyzed pieces of hospital equipment were contaminated with this bacterial species.\textsuperscript{18} Although the authors did not publish data on the antimicrobial resistance profile of \textit{S. saprophyticus}, the levels for the genus \textit{Staphylococcus} corresponded to 71.4\% and 38.1\% for erythromycin and ciprofloxacin, respectively,\textsuperscript{18} corroborating the importance of their detection.

Despite the small number of \textit{Staphylococcus} sp. strains with positive phenotype to induced resistance to clindamycin, this finding ought to be considered with special attention since the environment in question is one in which the patients are immunocompromised. Thus, the small number of occurrences must not be underestimated, as these bacteria have a great potential to cause hospital infections.\textsuperscript{2,3,5}

The low occurrence of vancomycin-resistant \textit{Enterococcus} sp. strains differs from a study performed in the US using biological samples,\textsuperscript{19} in which the estimated rate of resistance to this drug in ICU was of 17.7\%. In Brazil, the first report of this phenotype dates back to 1998 and, in Latin America, the rise in the number of cases of this kind of resistance happened in countries like Chile, Uruguay and Argentina.\textsuperscript{20,21}

The presence of \textit{Pseudomonas} sp. strains as reported in this study corroborates what is reported in similar studies,\textsuperscript{22-24} based on the analysis of equipment from different hospital environments, including ICU. In a hospital environment, the biggest sources of contamination from this microorganism are breathing equipment, hemodialysis systems, sinks and cleaning apparatus. The relevance of \textit{Pseudomonas} sp. as a potential hospital pathogen depends on the bacterial species and is associated to its relative resistance to the drugs, as well as to its reduced susceptibility to the antiseptics and disinfectants used in these environments.\textsuperscript{25,26} The drugs resistance profile of \textit{Pseudomonas} sp. here described corroborates previous studies performed with biological material,\textsuperscript{27} in which the major part of the antibiotics tested on \textit{Pseudomonas aeruginosa} turned out to be effective against most of the isolated strains. The presence of these strains with mutually similar drug resistance profiles suggests the dissemination of a clone in the hospital environment; a fact that is probably related to cross-contamination mechanisms, although more extensive studies would be needed to confirm its dispersion in the ICU environment.

With regard to the percentage of isolated strains belonging to the \textit{Enterobacteriaceae} family, the results obtained in this study differ from what is reported in studies performed in equipment from hospital environments,\textsuperscript{28} where 30.3\% were found to be contaminated by strains of this family. On the other hand, the antimicrobial resistance analysis of these strains in this study corroborates what is reported in the scientific literature: the massive presence of resistance to aminoglycosides and third-generation cephalosporins.\textsuperscript{7,29}

When ESBL-production is considered, the results described in this study differ from those reported by Weber \textit{et al.}\textsuperscript{30} and Judge \textit{et al.},\textsuperscript{28} in which a total of 22.2\% of \textit{Enterobacteriaceae} strains isolated on equipment from ICUs beds were ESBL-producing.

\section*{Conclusion}

Most of the isolated strains had high rates of antimicrobial resistance to the drugs, which poses a great threat to public health.

\section*{Collaborations}

Rocha IV, Ferraz PM and Farias TGS declare that they contributed to the research planning, analysis and interpretation of data and actively participated in the writing of the paper and final approval of the version for publication. Oliveira SR collaborated in the research planning, writing of the paper,
References


Psychological adaptation to and acceptance of type 2 diabetes mellitus

Adaptação psicológica e aceitação do diabetes mellitus tipo 2

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Abstract

Objective: To evaluate individuals’ psychological adaptation to type 2 diabetes mellitus throughout acceptance of the disease and its relation with perceived stress and values of glycated hemoglobin (A₁c) before and after group educational intervention.

Methods: Quasi-experimental study developed at outpatient unit that included 77 participants who fulfilled inclusion criteria. The study instruments were a questionnaire that obtained sociodemographic variables and the Acceptance of Disease Scale and Perceived Stress Scale, both applied during interviews before and after group education intervention using Diabetes Conversations Maps.

Results: Interviewed patients showed improvements in the acceptance of the disease after educational intervention. We observed an inverse relation between acceptance of the disease, perceived stress, and the mean glycated hemoglobin (A₁c) value before and after the intervention.

Conclusion: Acceptance of type 2 diabetes can improve after a group educational intervention. A high score for acceptance of the disease was related to a low score for perceived stress and lower mean glycated hemoglobin (A₁c) value.

Keywords
Adaptation, psychological; Diabetes mellitus, type 2; Patient acceptance of health care; Nursing care

Descritores
Adaptação psicológica; Diabetes mellitus tipo 2; Aceitação pelo paciente de cuidados de saúde; Cuidados de enfermagem

Clinical Trials registry number: NCT01387633
Introduction

The concept of “disease acceptance” entails the process of psychological adaptation wherein individuals become more active in their own care and learn to optimistically and positively face limitations imposed by the disease.\(^{(1)}\)

The acceptance of disease provides a way to evaluate psychological adaptation in the face of demands from the disease’s clinical manifestations and treatment.\(^{(2)}\) The literature points out other ways to assess psychological adaptation to a disease, such as quality of life, well-being, self-esteem, social participation, and accomplishment of social functions.\(^{(3)}\)

In particular in the context of non-transmissible chronic diseases, the process of adaptation consists of psychological, social and physiological adjustment throughout the course of the disease, resulting in an interaction between demands of the disease and treatment and the individual’s skill to respond to these demands.\(^{(4,5)}\)

Upon receiving a diagnosis of a non-transmissible chronic disease, such as type 2 diabetes mellitus, people confront new situations that require an individual assessment and must choose how to deal with such situations. So begins the psychological adaptation process.\(^{(6)}\) The strategies chosen to deal with this new life situation can generate physiological and psychological responses that are considered maladaptive and inefficient.\(^{(1)}\)

In type 2 diabetes mellitus, the adaptive physiological response can be evaluated by using glycemic control, which constitutes the main objective of treatment.\(^{(7,8)}\)

To obtain glycemic control, people with type 2 diabetes mellitus must be adapted to the demands imposed by the disease and by the treatment, which are sources of stress in daily life. These include signs and symptoms of disease, diet, regular exercise, oral medicines, insulin application, auto-monitoring of glycemia, and periodic medical follow-up.\(^{(9,10)}\)

In the adaptation process for type 2 diabetes mellitus, patients must acquire self-care skills and use efficacious ways to manage stress related with the disease and treatment.\(^{(10)}\) The education program with cognitive-behavioral approach has been used to promote needed behavioral changes and influence the perception of stress.\(^{(10)}\)

The health team’s ability to supply clear and consistent information about type 2 diabetes mellitus and its treatment facilitate adaptation to the disease, whereas stressful life events were considered barriers that could modify the perception of stress and self-care behavior.\(^{(6)}\)

A greater perception of stressful life events by patients with diabetes mellitus was also associated with elevated levels of glycated hemoglobin (A1c).\(^{(11,12)}\)

Our study evaluated the psychological adaptation of individuals with type 2 diabetes mellitus through acceptance of the disease and the relationship of adaptation with reported stress and glycated hemoglobin (A1c) values measured before and after a group educational intervention.

Methods

This quasi-experimental study was developed in an outpatient unit at a teaching hospital in São Paulo, Brazil. Initially, we included 114 individuals with diabetes mellitus type 2 who were recruited from June 2011 to May 2013.

The sample was selected through weekly review of all records from the health team care to apply inclusion/exclusion criteria. Participants were recruited from June 2011 to July 2012. We included men and women who were receiving drug therapy with insulin and oral antidiabetic medications (monotherapy and/or associations) who were able to communicate verbally and did not have chronic complications in an advanced stage. We excluded patients who had participated in other intervention studies, were undergoing hemodialysis treatment, had amaurosis, had experienced sequelae of stroke or heart failure, had previously undergone amputation or had an active ulcer in the lower limbs, were in a wheelchair or were confined to a bed, or were unable...
to understand or verbally respond to the interview questions or to participate in the group educational intervention.

Recruiters approached patients while they were waiting to receive medical care. Patients were informed about the aim of the study and guarantee of confidentiality of their information, those agreeing to participate were directed to rooms designated for data collection. Participants received the consent form, which was read aloud to them, and signed it.

Of 144 participants who initially agreed to participate in the study in T0, 37 leave the study for following reason: death, no attendance in group education meetings, refusal for the need of taking care of family member, refusal for transport difficulties, refusal because they have work during, had traffic accident, had an amputation of lower limb, refusal because they start hemodialysis treatment, had a wound in lower limb, and had a stroke.

The final sample in T12 included 77 patients who attended all group education meetings. Participants with type 2 diabetes mellitus who agreed to participated responded the study instruments in two phases: before begin educational interventions, after signed the consent form (T0), and after 12 months from the beginning of the study (T12), through interviews previously conducted by trained researchers, with a mean duration of 20 minutes.

Sociodemographic data of the sample were obtained using a structured instrument. To evaluate the degree of disease acceptance, we used an Acceptance of Disease Scale,(1) translated and validated version in European Portuguese.

To evaluate the perceived stress, we used the Perceived Stress Scale, translated and validated version in Brazilian Portuguese, which is a Likert-type instrument. This latter instrument total score is the sum of points for the 14 questions, which can range from 0 to 56; the higher the score, the greater the perception of stress. Glycated hemoglobin (A1c) values were collected from participants medical records at T0 and T12.

Before data collection began, we conducted a pilot study with 15 participants to assess the appearance and content of the instruments. After the pilot study, we saw the need for cultural adaptation and analysis of the psychometric properties of the Acceptance of Disease Scale among patients with type 2 diabetes mellitus for the Brazilian Portuguese language because of the changes in item 6 of the scale. The cultural adaptation and analysis of the psychometric properties of the Acceptance of Disease Scale were done after interviewing 80 participants with type 2 diabetes mellitus who were not included in the study and were followed up in the same outpatient unit.

The Acceptance of Disease Scale was a Likert-type instrument composed of 8 items that expressed success in the admission of feelings of incapability, dependency, and inutility in the face of the disease and treatment. Answers on the scale have options: 1, completely agree; 2, agree; 3, neither agree nor disagree; 4, disagree; and 5, completely disagree. A score of 1 indicates lower acceptance and of score of 5 indicates higher acceptance. Seven questions use this format, and one question is addressed in the opposite site (item 6: “My health did not make feel incapable”); for this question, 1 means high acceptance. The maximal score obtained on this scale is 40 points, corresponding to high acceptance of the disease, and the minimal score is 8, corresponding to non-acceptance of the disease.

Parallel to the preparation of the field and training of interviewers, for 6 months we conducted meetings for training and discussion of standards in using Diabetes Conversation Maps. This educational tool was developed by the American Diabetes Association and Healthy Interactions Inc.(13)

We used maps that approached the following contexts of learning: Map 1: how the body and diabetes work; Map 2: healthy eating and exercise; Map 3: blood glucose monitoring; Map 4: reaching insulin goals.

The educational intervention was conducted in agreement with presuppositions of Albert Bandura’s Social Cognitive Theory(14) by the use of Diabetes Mellitus Conversion Maps.

The intervention was developed in four meetings with open groups of no more than
eight participants. Meetings occurred on Mondays from 12:30 p.m. and 2:00 p.m. at rooms of the Outpatient unit for Education in Diabetes of the Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto at Universidade de São Paulo. Each meeting followed a previous described protocol, i.e., themes proposed for each Conversation Map began and ended at the same meeting, this approach was justified because the modality used was open groups.

We used open groups because dates of meeting were different of dates of patients’ return consultation, or even because participants preferred to participate in meeting on differently dates of their medical consultation.

All data collected were analyzed using the Statistical Package for Social Sciences (SPSS) program, version 21.0. The reliability of the Acceptance of Disease Scale was verified using three calculations: internal consistency, estimated by the Cronbach alpha for reliability; item-total correlation; and Pearson’s correlation coefficient. The strength of correlation was classified as follows: weak (r<0.3), moderate (0.3<r<0.6), or strong (r>0.6). The level of significance adopted was 0.05. Scores of disease acceptance at T_0 and T_12 were compared by using the Wilcoxon test. Correlations between variables were verified by Spearman correlation coefficient. Differences were considered significant at \( p<0.05 \).

Development of this study followed national and international ethical and legal aspects of research on human subjects.

**Results**

Of 114 participants who began the study, 62 (54.4%) were women, 83 (72.8%) were married/cohabited, and 91 (79.8%) were from Ribeirão Preto (SP) or that region. The mean participant age was 59.5 years (standard deviation, 8.7). Most individuals were retired/pensioners (48.2%), followed by those who did unpaid work at home (18.4%). The mean duration of education was 4.9 years (standard deviation, 4.2) and the mean family income was R$ 1,765.40 (standard deviation, R$1,347.40). Mean time since diagnosis was 15 years (standard deviation 8.2).

The sample of 80 individuals in the study of cultural adaptation and analysis of psychometric properties of the Acceptance of Disease Scale was extremely similar to the participants in our study with regard to sociodemographic and clinical variables.

In the pilot study, we identified the need to change one item that some respondents had difficulty comprehending; the change was suggested by the interviewers. Hence, item 6, originally worded as “My health does not make feel inadequate” was changed to “My health does not make feel useless”. We believe that using the word “useless” is more common in the Brazilian context of the health-disease process than the word “inadequate”.

After analysis of apparent validity and context, we interviewed 80 individuals with type 2 diabetes mellitus to evaluate the reliability of the Brazilian version of the Acceptance of Disease Scale. In the analysis of reliability, evaluated by Cronbach alpha for reliability, we obtained a value of 0.81. If item 1 is removed, the Cronbach alpha will increase from 0.81 to 0.82. When any one of the other items is removed, this coefficient will decrease from 0.81 for values that ranged from 0.76 to 0.81. Concerning the correlation item-total, we obtained values of 0.31 to 0.68, all of which were positive (Table 1).

On the basis of results for the analysis of reliability, conducted with three measures, we suggest that the Brazilian version of the Acceptance of Disease Scale was reliable (Table 2).

After study of cultural adaptation and analysis of psychometric properties of the Acceptance of Disease Scale, we analyzed scores for disease acceptance in individuals with type 2 diabetes mellitus and their relationship with scores for perceived stress and glycated hemoglobin (A1c) values at T_0 and T_12.

Before participation in the group educational intervention, the mean score for disease acceptance among the 114 patients enrolled in the study was
Psychological adaptation to and acceptance of type 2 diabetes mellitus

24.6. After the educational intervention, the score was 26.2. This difference was statistically significant (p<0.0001) according to the Wilcoxon test and suggested that the sample had improved acceptance of the disease after the intervention.

Among the variables for perceived stress and disease acceptance, we also observed a statistically significant inverse relationship at T0 and T12. This finding suggests that the greater the perceived stress among patients with type 2 diabetes, the lower the psychological adaptation (Table 3).

We found a statistically significant inverse relationship between disease acceptance and mean glycated hemoglobin (A1c) value at T0 and T12: the greater the acceptance of the disease the lower the mean glycated hemoglobin (A1c) level. This finding might indicate a better physiologic adaptation between individuals who had the best score for acceptance of the disease (Table 3).

Table 1. Cronbach alpha reliability and item-total correlation of Brazilian version of the Acceptance of Disease Scale

<table>
<thead>
<tr>
<th>Items of Brazilian version of the Acceptance of Disease Scale (α=0.81)</th>
<th>Item-total correlation</th>
<th>Cronbach alpha if the item is removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>To me, accepting limitations of my disease is difficult</td>
<td>0.31</td>
<td>0.82</td>
</tr>
<tr>
<td>Because of my health I can’t do things I’d like to do</td>
<td>0.55</td>
<td>0.78</td>
</tr>
<tr>
<td>Sometimes my disease makes me feel useless</td>
<td>0.68</td>
<td>0.76</td>
</tr>
<tr>
<td>Health problems make me more dependent on others than I’d like to</td>
<td>0.54</td>
<td>0.79</td>
</tr>
<tr>
<td>My disease makes me feel like a burden to my family and friends</td>
<td>0.66</td>
<td>0.77</td>
</tr>
<tr>
<td>My disease does not make feel useless</td>
<td>0.36</td>
<td>0.81</td>
</tr>
<tr>
<td>I’ll never be self-sufficient at such a level to feel happy</td>
<td>0.44</td>
<td>0.80</td>
</tr>
<tr>
<td>I often think that people feel uncomfortable staying with me because of my disease</td>
<td>0.66</td>
<td>0.77</td>
</tr>
</tbody>
</table>

Table 2. Pearson’s correlation coefficients between items of the Acceptance of the Disease Scale

<table>
<thead>
<tr>
<th>Items</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>p-value</td>
<td>r</td>
<td>p-value</td>
<td>r</td>
<td>p-value</td>
<td>r</td>
<td>p-value</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.30(0.007)*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.15(0.184)</td>
<td>0.56(0.000)*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.22(0.052)</td>
<td>0.35(0.001)*</td>
<td>0.50(0.000)*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0.32(0.003)*</td>
<td>0.30(0.006)*</td>
<td>0.49(0.000)*</td>
<td>0.48(0.000)*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.23(0.044)*</td>
<td>0.30(0.008)*</td>
<td>0.31(0.004)*</td>
<td>0.17(0.126)</td>
<td>0.30(0.009)*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0.08(0.942)</td>
<td>0.36(0.001)*</td>
<td>0.47(0.000)*</td>
<td>0.34(0.002)*</td>
<td>0.37(0.001)*</td>
<td>0.20(0.078)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.25(0.023)*</td>
<td>0.36(0.001)*</td>
<td>0.60(0.000)*</td>
<td>0.44(0.000)*</td>
<td>0.74(0.000)*</td>
<td>0.24(0.034)*</td>
<td>0.30(0.007)*</td>
<td>1</td>
</tr>
</tbody>
</table>

*p-value <0.05; r = Pearson’s correlation coefficient

Table 3. Disease acceptance of individuals with type 2 diabetes mellitus and its relationship with perceived stress score and glycated hemoglobin (A1c) values (Hb A1c) before (T0) and after (T12), the group educational intervention

<table>
<thead>
<tr>
<th>Variable</th>
<th>X Hb A1c T0</th>
<th>r*</th>
<th>p-value</th>
<th>X Hb A1c T12</th>
<th>r*</th>
<th>p-value</th>
<th>Perceived Stress Scale T0</th>
<th>r**</th>
<th>p-value</th>
<th>Perceived Stress Scale T12</th>
<th>r**</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance of the disease Scale</td>
<td>-0.23</td>
<td>0.03*</td>
<td>0.36</td>
<td>0.00***</td>
<td>-0.47</td>
<td>&lt;0.00***</td>
<td>-0.49</td>
<td>&lt;0.00***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*r indicates Spearman partial correlation coefficient, adjusted for change in medication; **r indicates Spearman correlation coefficient; ***p<0.05 statistically significant

Discussion

This study was limited by its quasi-experimental design, which did not involve a control group or randomization and not enable the establishment of cause and effect relationships.

The results presented will help improve nursing teams’ knowledge of adaptation of individuals with type 2 diabetes mellitus to the disease and its treatment, which may include in nursing care planning the group educational interventions and promotion of disease acceptance that in the our study was inversely correlated with stress perceived and glycated hemoglobin (A1c) values. The disease acceptance scores are inversely proportional to the mental discomfort and negative emotions experienced by the patient.(15)

The sample consisted of adults with low levels of education and income. The patients were
retired (mean age, 61.5 years) and featured a slight majority of women (51.2%). Such results are similar to those of a study used to construct the Acceptance of Disease Scale(1) and a review study of epidemiologic data on type 2 diabetes in Brazil.(16)

In this study, we verified the reliability of the Brazilian version of the Acceptance of Disease Scale through internal consistency estimated by the Cronbach alpha for reliability. The Cronbach alpha is considered a good measure of internal consistency; values must range from 0.70 to 0.95.(17) The value found in our study was 0.81, which suggested that Brazilian version of the Acceptance of the Disease Scale is reliable.

Similar alpha values were found in the study of original instrument construction in English ($\alpha=0.83$), despite possible cultural difference between the nationalities of these studies that can influence the reliability.(1,18)

In assessment of reliability by Pearson’s correlation coefficient, we observed a statistically significant correlation from weak to moderate among items, except between items 1 and 3, 1 and 4, 1 and 7, 4 and 6, and 6 and 7. A possible reason for lack of significant correlation between items 4 and 6 and between 6 and 7 can be the inverse analysis of item 6, which was worded differently than the other items.(1) Another explanation for the lack of correlation between these items can be the low education of participants, which may have influenced their interpretation of the items of the scale.(1)

For disease acceptance, the score may range from 8 to 40; the mean score in our study was 24.6 at T$_0$ and 26.2 at T$_{12}$. There is no gold standard to establish a referral parameter. However, studies concerning large values indicate a tendency toward better acceptance of the disease.(1,2,18,19) We infer that no definite tendency exists in the studied sample, but there was statistically significant improvement after the educational intervention in groups with a cognitive-behavioral approach.

A descriptive study that evaluated the acceptance of disease between individuals with diabetes mellitus by using the same scale as in the present study reported a similar mean score,(2) suggesting disease acceptance among people with diabetes mellitus, even when this acceptance is moderate.

A literature review reported that disease acceptance was related to a variety of clinical and sociodemographic variables, therefore the acceptance constitutes an important element of the holistic and medical care.(15)

Disease acceptance was inversely related to perceived stress and glycated hemoglobin ($A_1c$) at T$_0$ and T$_{12}$, suggesting that a high score for acceptance was related to a lower score for perceived stress and lower mean glycated hemoglobin ($A_1c$) level. Other studies found a direct relationship between acceptance of the disease, social support, self-efficacy, health-related quality of life, and religion. An inverse relation was seen between acceptance of the disease, depression, and anxiety.(2,9,15,18-22)

Conclusion

Scores for disease acceptance improved after performance of a group educational intervention based on a cognitive-behavioral model. High scores for disease acceptance were related to lower scores for perceived stress and lower mean of glycated hemoglobin ($A_1c$) level.

Acknowledgements

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Collaborations

Bertolin DC and Pace AM contributed to the conception of the study, analysis and interpretation of data, drafting of the manuscript, critical review relevant for intellectual content and approval of final version to be published. Cesarino CB; Ribeiro RCHM and Ribeiro RM contributed drafting the manuscript, critical review relevant for intellectual content and approval of final version to be published.
References


Work process and its impact on mental health nursing professionals

Processo de trabalho e seu impacto nos profissionais de enfermagem em serviço de saúde mental

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Márcia Aparecida Ferreira de Oliveira1
Paula Hayasi Pinho1
Rejane Maria Dias de Abreu Gonçalves1

Abstract
Objective: To analyze the work process and its impact on nursing professionals in a mental health service for the care of drug users.

Methods: Cross-sectional study including nursing professionals in a community mental health service. The research instrument was the SATIS-BR and a questionnaire with analysis categories of the work performed. Dialectic hermeneutics was used for the qualitative data. Data were processed and analyzed using the Statistical Package for the Social Sciences.

Results: The work overloads identified have interfered with the satisfaction experienced by workers and reflected in their physical and mental health.

Conclusion: In their work process, nursing professionals were exposed to all work overloads, with mental burnout more intense than the physical, reflecting in dissatisfaction with the work activity and in workers' physical health.

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Nursing/psychology staff; Burnout professional; Occupational health; Mental health; Mental health services

Resumo
Objetivo: Analisar o processo de trabalho e seu impacto nos profissionais de Enfermagem em serviço de saúde mental destinado à atenção aos usuários de substâncias psicoativas.

Métodos: Estudo transversal que incluiu os profissionais de enfermagem em um serviço de saúde mental comunitário. O instrumento de pesquisa foi o SATIS-BR e um questionário com as categorias de análise do trabalho realizado. Para os dados qualitativos, empregou-se a hermenêutica dialética. Os dados foram processados e analisados no programa Statistical Package for Social Sciences.

Resultados: Foram identificadas sobrecargas de trabalho que interferiram na satisfação percebida pelos trabalhadores e refletiram em sua saúde física e psíquica.

Conclusão: Os profissionais de Enfermagem, em seu processo de trabalho, estiveram expostos a todas as cargas de desgaste, sendo o desgaste psíquico mais intenso que o físico, o qual refletiu na insatisfação com a atividade laboral e na saúde física dos trabalhadores.

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

The working process is a social practice directed to a particular object that should be transformed into a product by making use of tools to achieve a particular purpose. Its basic elements are the agents, objects, instruments, activity and purpose. In nursing, the organization and division of labor refers to the work object, the means and instruments. In this sense, nurses should be able to set priorities and goals, subsequently assessing the results achieved.

Despite the growing interest in studying the workers’ health, there is little discussion about the impact of work for nursing professionals at national and international levels, and even less in the context of mental health. A bibliographic search in the Virtual Health Library from the year 2011 resulted in 15 articles related to the work impact for nursing professionals. However, only five of them dealt with the phenomenon experienced in mental health services.

Thus, the guiding question in this study was about the overload to which nursing professionals are exposed in a community mental health service, in order to reflect on the work process and its impacts, and the individual and institutional strategies that can minimize these impacts.

The aim of the study was to analyze the work process and its impact on nursing professionals of a mental health service for the care of users of alcohol and other drugs. The initial hypothesis was the prevalence of mental burnout in relation to physical burnout in nursing workers.

Methods

This is a cross-sectional study conducted in a mental health service specialized in the provision of comprehensive care for users of alcohol and other drugs, part of the Psychosocial Care Network of the Secretariat of the State of São Paulo, in southeastern Brazil. Data were collected between August and November 2013.

The unintentional sample comprised eight nursing professionals formally employed in the institution for over a year, who were not away from their professional activities. These were the eligibility criteria for participation in the study.

For analysis of the work impact referred by participants was used the semistructured instrument called the Scale of Patients’ Satisfaction with Mental Health Services, known as SATIS-BR in Brazil (Evaluation of the Users Satisfaction Scale Brief in English).

A self-administered script with issues relating to the theme was elaborated to obtain data about the work process. Data were organized into the following analysis categories: work object; work purpose; means and instruments of work; and organization and division of work.

Quantitative data were transcribed and submitted to participants to confirm the information obtained by using the Statistical Package for the Social Sciences® (SPSS), version 19. For qualitative data was used the dialectic hermeneutics because it allows the articulation between data collected and the theoretical framework of the study, in order to find the fundamentals related with the issues and formulated goals.

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

Results

Among nursing professionals, 62.5% were men, and the age ranged between 26-54 years, with 37.5% aged 25-30 years. Regarding education, only 25% of nurses had postgraduate education in the area of mental health.

Concerning the sub-theme ‘work object’, the workers considered the users as people with cognitive changes reflected in their behavior, impacting negatively on their daily, social and family lives. For them, users needed support and understanding from the service workers and family. The treatment should be systematized in co-responsibility with users and the family, in a unique treatment plan to meet the individual needs of each user.
Similarly, nursing professionals pointed the methods as ‘work purpose’, indicating humanization, and individual and group care as tools. From the perspective of participants, the work aimed to stimulate self-esteem and autonomy, promote coping mechanisms, the ability to build social relationships and improve cognitive ability, contributing to the psychosocial rehabilitation of users.

From the perspective of ‘means and instruments’ of the production process of health services, the professionals mentioned the following workers and services provided to users: reception centers, medicines, referrals and therapeutic workshops.

Regarding the “organization and division of work” in service, the tasks were divided according to the functions of each professional, namely: coordination, administrative staff, technical staff and support staff (general services), and, finally, the community.

When asked about the overload resulting from care to users, 75% of nursing professionals stated they were moderately overloaded. In the same context, 62.5% considered that their work partially affected their general physical health. An indication of this was the increase in problems or physical complaints that appeared after beginning the professional activity in the mental health area.

Regarding the emotional stability of nursing professionals, 50% of them said that working with users has not affected much, while for 37.5% it has affected in part. In general, participants claimed they would feel less emotionally exhausted if they worked in another area.

Dissatisfaction with the job was more evident for 50% of nursing professionals, who stated they often considered changing their work field. However, for 62.5% of the nursing professionals participating in the study, the impact of mental health work did not interfere in family relationships. For the majority, their social life was not affected by their type of work.

Participants have mentioned the following factors as causes of overload: disorganization of the work process, emotional burnout, relationship between professionals and insufficient amount of professionals.

Table 1 shows the work overloads to which nursing professionals were exposed in the workplace.

<table>
<thead>
<tr>
<th>Work overloads</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate lighting</td>
<td>4(11.1)</td>
</tr>
<tr>
<td>Exposure to moisture</td>
<td>3(8.3)</td>
</tr>
<tr>
<td>Multiple functions</td>
<td>3(8.3)</td>
</tr>
<tr>
<td>Heavy working hours</td>
<td>2(5.6)</td>
</tr>
<tr>
<td>Physical burnout</td>
<td>1(2.8)</td>
</tr>
<tr>
<td>Distance traveled within the institution</td>
<td>1(2.8)</td>
</tr>
<tr>
<td>Weight manipulation</td>
<td>1(2.8)</td>
</tr>
<tr>
<td>Standing for long periods</td>
<td>1(2.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mental overloads</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental burnout</td>
<td>5(13.8)</td>
</tr>
<tr>
<td>Verbal abuse</td>
<td>4(11.1)</td>
</tr>
<tr>
<td>Fear of physical aggression</td>
<td>4(11.1)</td>
</tr>
<tr>
<td>Sexual harassment</td>
<td>2(5.6)</td>
</tr>
<tr>
<td>Devaluation by the other team members</td>
<td>1(2.8)</td>
</tr>
<tr>
<td>Lack of immediate supervision</td>
<td>1(2.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Biological overloads</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure to cigarette smoke</td>
<td>3(8.3)</td>
</tr>
</tbody>
</table>

Some work overloads have prevailed among others, namely those related to the physical structure (19.4%), the working hours and dynamic of work (13.9%), mental burnout (13.8%), fear of physical aggression (11.1%) and verbal abuse (11.1%).

The work aspects that resulted in lower burden for nursing professionals were the performance of their role, flexibility of shifts, decision-making in team, and participation in internal and external activities to the unit.

Despite the evident overload to which nursing professionals were exposed, the institution participating of this study did not offer alternatives for relieving the stress suffered by them. In this sense, they sought coping strategies individually outside the work environment, such as physical activity practice and family life, among others.

Participants have mentioned the reduction of weekly working hours and the increase in number of workers in the nursing team as strategies to minimize the work overloads.
Discussion

The limitations of the study results are related to its design and realization in a single mental health service, not allowing the generalization of results.

By analyzing the work process of the nursing team of a service specialized in the care for psychoactive substances users, the results of this study have added knowledge about the conceptions of these workers on the overloads to which they perceived to be exposed. This enabled a qualitative leap in the work process and, consequently, in the health of nursing professionals and the care for mental health users. The study signaled to managers and mental health workers the work overloads generated in the work process, as well as strategies to minimize them, which therefore must reflect on the degree of satisfaction and retention of nursing workers in their labor fronts.

Among the sociodemographic results, the prevalence of male professionals in the nursing staff of the unit drew attention, since this is uncommon in the profession.

The training in postgraduate courses (Lato Senso type, equivalent to specialization) stood out in the sociodemographic findings, accounting for one-third of the participating nurses. This data is observed in most services that serve drug users.

The prevailing physical loads in the present study were the exposure to moisture and inadequate lighting. These were also related to infrastructure deficiencies. The physical plant was considered unsuitable to host a mental health service because of inadequate natural lighting; inadequate ventilation, without windows in most rooms; the existence of moisture on the walls; and no emergency exit. The physical resources offered by infrastructure, combined with the emotional resources provided by workers acted as important generators of work stress. Thus, mental health services must combine physical resources with the work demands in order to decrease the work overloads to the health of nursing staff, since organizational aspects may play a more significant role for the professional burnout than individual aspects.

The heavy working hours and multiple functions have also been mentioned as physical loads to which nursing professionals were exposed, consisting work overload and generating negative impacts on the workers’ health.

A study with health professionals had the objective to identify the organizational and personal factors predictive of professional engagement and occupational stress of the nursing staff and other health professionals. It showed that the workload, mental health, and job satisfaction were correlated with the energy for work. Professional effectiveness was the best predictor of job satisfaction. Therefore, if the workload is not excessive, and professionals feel emotionally balanced and resolute in their professional activity, there should be greater satisfaction in their daily labor routine.

With respect to biological loads, the interviewed nursing professionals reported exposure to cigarette smoke due to lack of an appropriate area where smokers could use tobacco, a situation caused by infrastructure deficiency.

As the prevalence of tobacco use among people with mental disorders is high compared to other diseases, conflicts between patients/users in disputes for a cigarette are very common in the daily life of all types of mental health services, in addition to the health risks caused by the smoke resultant of burning its components.

Since 2009, the Brazilian tobacco public policies at state and federal levels have focused on the promotion of smoke free environments. In this sense, the managements of mental health services should develop strategies locally, so users can exercise their citizenship regarding the freedom to smoke and the respect to non-smokers. Frequently, in these spaces there are no areas reserved for smokers, turning non-smokers into passive smokers.

The perceived mental loads were fear of physical aggression, mental burnout, verbal abuse and sexual harassment. The constant attention to threats and fear experienced in the workplace caused emotional exhaustion and made workers feel a greater mental overload.
The experience of psychiatric comorbidity with psychotic clinical picture may result in physical aggression, which led many participants to think that by working in another sector they would be less exposed to overloads. Consequently, they often considered changing their work field in order to decrease the impacts resultant of mental health work.

A study with 69 psychiatric nurses working at a hospital and in an Irish community service revealed that professionals remained in a moderately stressful environment. The work overloads were centered on organizational issues and not on those related to patients or users. The main triggers of professional burnout were lack of resources, workload and organizational/process structures. Both groups showed average levels of emotional burnout, low levels of depersonalization, and average levels of personal fulfillment.(5)

The work overload generates dissatisfaction with work and the profession, and may lead nursing professionals to think of changing jobs or even professional activity.(6) There is evidence that this occurs more frequently with nurses working in hospital environments. A study showed that professionals working in hospitals had higher scores of depersonalization and nurses working in community services had a greater sense of personal fulfillment.(5-12)

The exposure to conflict situations and living with violence in the workplace can contribute to the psychological burden on nursing professionals. A protective measure against the violence of patients can be implemented by the service management with appropriate therapeutic support.(13,14) Moreover, the construction of a pleasant atmosphere in the workplace contributes to the prevention of professionals’ emotional exhaustion.(1)

Many nursing workers identify themselves with the professional activity they develop, but feel with few internal resources to cope better with unexpected situations that arise in the daily service, such as a discussion between users starting unexpectedly or aggressive actions of users with other professionals or themselves. For not knowing how to handle these demands, the physical and/or mental loads are more perceived.

In this sense, organizations and administrations should invest in training for mental health professionals to work skills related to emotional intelligence and make them more resilient in face of the demands, accepting them better without generating loads of mental burnout.(7,15)

The lack of coping strategies offered to professionals by the institution made it more difficult to implement other strategies capable to provide support and ways to minimize the overloads experienced in the work routine. The implementation of actions aimed at the supervision and involving the emotional aspect of professionals, discussions of cases attended and about the work itself are strategies to teach nursing professionals to handle overload situations in the workplace and share experiences with other members of the interdisciplinary team.(4,16,17)

Organizational solutions such as increasing the number of nurses, better training these professionals, as well as reducing the number of hours worked and process automation positively impact the perception of work overload.(15)

A study carried out in Wales (UK) with 817 nurses in community mental health services aimed at correlating clinical supervision and emotional burnout found that among participants who responded to the questionnaire (n = 260), 73% had clinical supervision in their workplace and 40% had it in a previous job. The results showed that 36% suffered strong emotional exhaustion, 12% showed depersonalization and 10% experienced low levels of personal fulfillment. In the study, 66% of professionals received six or more sessions of clinical supervision. After application of the Manchester Clinical Scale instrument, there were higher scores, indicating lower levels of emotional exhaustion and depersonalization. Thus, the results showed that prolonged clinical supervision can positively impact on emotional burnout levels of nurses.(18)

The profile of the unit manager tends to influence the perception of work overload and emotional burnout of workers.(3,6,16) There is evidence that when the professional manages the unit jointly with the health team, other workers,
patients and families, through meetings of the technical team, management board and assemblies with predetermined frequency, empowering all actors in the service, there is greater individual satisfaction of the nursing professionals with work, and lower perception of physical and mental burden of everyday labor. Hence the relevance of the unit manager having a good profile for the role. An autocratic profile certainly reflects on interpersonal relationships, in the perception of satisfaction and work overload and, consequently, on the quality of care to users.

Finally, the results of this study suggested that interdisciplinary work; the expansion of the workforce and training of nurses; the bonding between professionals and users that contributes to greater emotional exchanges; and the characteristics of intrasectoral and intersectoral mental health work in community services may constitute factors that minimize the perception of work overload. Moreover, the level of job satisfaction is associated with higher or lower perception of overloads generated by work activities.(4,15,16)

Conclusion

In their work process, nursing professionals were exposed to all work overloads, with mental burnout more intense than the physical, reflecting in dissatisfaction with the work activity and in the physical health of workers.

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Collaborations

Souza IAS and Pereira MO declare that contributed in the stages of the study design, analysis, data interpretation, article writing, critical review of the relevant intellectual content and final approval of the version to be published. Oliveira MAF participated in the study design, article writing, critical review of the relevant intellectual content and final approval of the version to be published. Pinho PH and Gonçalves RMDA collaborated in writing the article, relevant critical review of the intellectual content and final approval of the version to be published.

References


Social representations of community-acquired infection by primary care professionals

Representações sociais da infecção comunitária por profissionais da atenção primária

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Andreia Rodrigues Moura da Costa Valle
Maria Eliete Batista Moura

Abstract
Objective: Understand the social representations formulated by primary health care professionals in relation to community-acquired infection and analyze how these representations influence infection control and quality of care.
Methods: Exploratory, qualitative research conducted among 16 health professionals, selected by simple sampling. For data collection, a semi-structured form was used. The data were processed and analyzed by Descending Hierarchical Classification.
Results: Four classes were obtained: Primary health care in the management of community-acquired infections; the role of health education in infection prevention and control; the concept of community-acquired infection and risk factors; prevention and control measures for community-acquired infections.
Conclusion: The social representations of community-acquired infection are organized on the basis of professional practice, in which participants recognize the difficulties in conceptualizing the term, and list risk factors and prevention and control measures, reflecting on the quality of care provided.

Keywords
Community-acquired infections; Infection; Health personnel; Psychology, social; Primary care nursing

Resumo
Objetivo: Apreender as representações sociais elaboradas pelos profissionais da Atenção Primária sobre infecção comunitária e analisar como tais representações influenciam no controle da infecção e na qualidade da assistência.
Métodos: Pesquisa exploratória, qualitativa, realizada com 16 profissionais da saúde, selecionados por amostragem simples. Para coleta dos dados, utilizou-se formulário semiestruturado. Os dados foram processados e analisados pela Classificação Hierárquica Descendente.
Resultados: Foram obtidas quatro classes: Atenção Primária em saúde na gestão das infecções comunitárias; O papel da educação em saúde na prevenção e no controle das infecções; O conceito de infecção comunitária e fatores de risco; Medidas de prevenção e controle das infecções comunitárias.
Conclusão: As representações sociais sobre a infecção comunitária se organizam a partir da prática profissional, na qual os participantes reconhecem as dificuldades em conceituar o termo, elencar fatores de riscos e medidas de prevenção e controle, refletindo na qualidade da assistência prestada.

Keywords
Community-acquired infections; Infection; Health personnel; Psychology, social; Primary care nursing

Descritores
Infecções comunitárias adquiridas; Infecção; Profissional de saúde; Psicologia social; Enfermagem em atenção primária

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Introduction

The problem of infectious diseases dates back to the beginning of mankind, and today constitutes an important public health concern. Such diseases have a tremendous impact upon society, and are responsible for increased morbidity and mortality worldwide.\(^{(1)}\)

Infections have a multifactorial etiology, and are related to intrinsic and extrinsic factors that involve human endogenicity and environmental conditions, respectively. Thus, social and environmental determinants, such as educational level, poverty, lack of information, poor housing, and inadequate sanitation, are linked to the development of infections, especially in the home environment.\(^{(2)}\)

Since 1970, infections have been categorized as either community-acquired or hospital-acquired. Those detected in samples taken within the first 48 hours of hospitalization or in incubation at the time of a patient’s admission, provided they are not related to a previous stay in the same hospital, are categorized as community-acquired infections. Infections detected in samples taken more than 48 hours after the admission or discharge of a patient are classified as hospital-acquired infections.\(^{(3)}\)

This definition, based on a time frame recommended by the Centers for Disease Control and Prevention, is justified by the time needed for bacteria to develop an infection in a human host, requiring, therefore, specific tests to prove this diagnosis.\(^{(3,4)}\)

In primary care, the diagnosis of infection for clinical purposes is often carried out empirically, based on signs and symptoms reported by the patient, and not according to a bacterial culture or antibiogram. Furthermore, Brazil does not have a surveillance system for community-acquired infection, which makes it difficult to ascertain the real status of the problem at a national level.\(^{(5)}\)

Primary care plays an important role in the prevention and control of infections in the community. This care model is composed of a university- or high school-educated multidisciplinary team, which is essential for creating and strengthening infection prevention and control practices. Consequently, these professionals must understand the problem as applied to this reality, as well as the risk factors and prevention and control practices.\(^{(6)}\)

In light of the above, the object of study of this paper is the social representations of community-acquired infection by primary care professionals. The goal was to understand the social representations formulated by primary care professionals in relation to community-acquired infection and analyze how these representations influence infection control and quality of care.

Methods

This is an exploratory descriptive study with a qualitative approach, conducted among four primary health care teams, in a public outpatient clinic in a state capital in the Northeast Region of Brazil.

The health teams were composed of four doctors, four nurses, four dental surgeons, four nursing technicians, four oral health assistants, and 24 community health workers. The study population consisted of 16 professionals from the four family health strategy teams, selected using the simple random sampling method, as follows: four nurses, four physicians, four community health workers, and four nursing technicians.

For inclusion in the study, each professional should be a member of one of the teams and have worked at least one year in this service. The data collection took place in July 2014. Individual interviews were conducted with the subjects, guided by a semi-structured script, with 16 open questions that explored the knowledge and practices of professionals in their daily routines in the community. The interviews were held in a reserved room and lasted an average of 20 minutes. Ethical criteria and the confidentiality of the interviews were respected.

For data processing and analysis, IRAMUTEC (Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires)\(^{(7)}\) software was used, which was designed in France by Pierre Ratinaud in 2009 and began being used in Brazil in 2013. It
enables different kinds of statistical analysis of the text corpus and tables of individuals using words. To perform traditional lexical analyses, the software identifies and reformats the text units, which are transformed from Initial Context Units into Elementary Context Units. A vocabulary study is then performed, where words are reduced based on their roots (stemming). A dictionary is created from the reduced forms and active and supplementary forms are identified. The steps followed during this stage of the study are outlined below.

For text analysis, the Descending Hierarchical Classification method was used, wherein the texts were classified according to their respective vocabularies and the set of texts was divided by the frequency of reduced forms. Based on the matrices, which crossed segments of texts and words (repeated X² tests), the Descending Hierarchical Classification method was applied to obtain a stable and definitive classification. Through this classification, the analysis sought to obtain text segment classes which, in addition to manifesting similar vocabulary between them, had vocabulary that was different from the text segments of the other classes. The relationship between classes is illustrated in the dendrogram (Figure 1).

Figure 1. Thematic structure of the social representations of community-acquired information by the primary care team. ECU - Elementary Context Units.
The social representations of community-acquired infection by primary health care professionals were defined from the detailed analysis of the interviews and the creation of categories based on the testimonies that were processed. Social representations are built from concepts, statements, and experiences, and become intimate and changeable for each person. These characteristics enable the analysis of social representations of groups such as health professionals to simultaneously demonstrate the behaviors of different professional classes and the actual operational scenario.

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

**Results**

Of the 16 participants, 12 were women and the mean age was 28 years. Mean time of service was eight years. The majority had more than one job (8.75%), university level education, and more than five years of training.

IRAMUTEC recognized the division of the corpus into 99 elementary text units, with use of 88.88% of the corpus. Based on the analysis by Descending Hierarchical Classification, efforts were made to identify and analyze the textual domains, as well as interpret meanings, giving them names with their respective significations in classes, as follows.

**Primary health care in the management of community-acquired infections**

According to the findings, the management of community-acquired infections in the community is complicated due to difficulties in instituting control measures appropriate to that reality. In the testimonies, the most mentioned words were in reference to Family Health Strategy, highlighting its role in the prevention and control of these infections.

**The role of health education in infection prevention and control**

The content understood in this class denoted a concern on the part of professionals regarding the role of primary care in the development of health education practices in the community. The representations understood by the subjects demonstrated the concern of professionals to promote the health of those under their responsibility in the Basic Health Unit, mainly through health education practices.

**The concept of community-acquired infection and risk factors**

The concept of community-acquired infection was not well constructed by the professionals, referring only to the negation of hospital infection. When asked about risk factors, the interviewees demonstrated a lack of knowledge about them. Most professionals did not follow a holistic line of construction of knowledge, but rather listed it in a unidirectional way that did not cover all of the possible factors that contributed toward risk of infection.

**Prevention and control measures for community-acquired infections**

The main prevention and control measures for community-acquired infections, drawn from the testimonies, referred to the control of risk factors and adjustment of the environment.

**Discussion**

Understanding the social representations of community-acquired infection by primary care professionals limits the scope of the results to the universe of participants. Thus, in knowing these representations and the interactions between the individual and the social, the results should provide key elements for understanding the reality of the group.

The need to minimize the length of hospital stays as well as reduce costs led to greater value being given to home care in health prevention and promotion, in accordance with the reality of the community, which was considered an infection risk environment. The incidence of community-acquired infections is high throughout the world.

A study conducted in the United States noted a significant increase in the incidence of communi-
social representations of community-acquired infection by primary care professionals

The fact that a community is a closed environment can facilitate the spread of infection. In addition, there are increasing numbers of older people with chronic diseases, who are more vulnerable and also prone to have indwelling devices. These are factors that favor the increased incidence of community-acquired infection, particularly related to multidrug-resistant bacteria.\(^{10,11}\)

Among the risk factors, the primary ones were those involving the domestic environment, such as lack of basic sanitation, patients with acute illnesses and complex medical conditions, difficulties in performing self-care, increased use of medical devices in the home, and patients’ social and/or economic factors.\(^{11}\)

In Brazil, the Hospital Infection Control Program was implemented in 1998,\(^{10}\) which defined the conceptual bases of hospital-acquired and community-acquired infection, in addition to regulating the implementation of Hospital Infection Control Committees throughout Brazil. However, this ordinance does not include prevention of community-acquired infections, since it does not specify the need for creating a management body in the community.

In the hospital environment, there is better infection management, including preparation of manuals and ordinances. However, incipient infection control in the community is seen as the main obstacle to instituting control measures appropriate to that reality.\(^{12}\)

Infection prevention and control measures are essential for managing the risk of infection in the community.\(^{11,13}\) The implementation of infection prevention and control strategies, including education and training of staff, with an emphasis on correct hand hygiene, maintenance of aseptic techniques, and the following of standard precautions and effective methods for dealing with environmental factors, have proven to be effective.\(^{5,14}\)

Once familiar with these measures, the health team is able to empower the local population through health education strategies and placing greater importance on health promotion, which make preventive measures and the fight against disease more effective.\(^{15-17}\)

Concerns and care in the community are important, and health professionals should properly assess the environment where care is provided. The infections most frequently reported by professionals in the daily routine of the Basic Health Unit were characterized as preventable by simple control measures, such as provision of information and personal health and hygiene measures. Community-acquired infection control involves three main areas: hand hygiene, safe use of personal protective equipment, and proper disposal of sharps.\(^{12}\)

The field of social representations of community-acquired infection by primary care professionals, based on the Descending Hierarchical Classification - that is, the relationship between classes - demonstrates that the concept of health professionals regarding community-acquired infection, even if not well developed, determines the implementation of actions in the management of primary care, with an emphasis on health education related to infection control in the community, especially in households. However, infection prevention and control measures related to environmental and personal conditions can help reduce the prevalence of community-acquired infections, through the adoption of a policy of improved housing and sanitation.

**Conclusion**

The social representations related to community-acquired infection are organized on the basis of professional practice, in which participants recognize the difficulties in conceptualizing the term, and list risk factors and prevention and control measures, reflecting on the quality of care provided.

**Collaborations**

Sousa AFL, Queiroz AAFLN, and Oliveira LB contributed to the writing of the article, in addition to a relevant critical review of the intellectual content and final approval of the version to be published. Valle ARMC and Moura MEB collaborated on the...
study concept, analysis, data interpretation, writing of the article, and final approval of the version to be published.

**References**

Prevalence of digestive signs and symptoms and associated factors among rural workers

Prevalência de sinais e sintomas digestórios em trabalhadoras rurais e fatores associados

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Tatiele Roehrs Gelati¹

Abstract

Objective: To determine the prevalence of digestive signs and symptoms in rural workers and identify frequently associated factors.

Methods: This cross-sectional study included 182 rural and horticultural farm workers aged 18 years or older. To assess internal data consistency, the Cronbach’s alpha coefficient was used. To compare means between groups, student’s t-test was used for independent samples. The Mann–Whitney test was used in cases of asymmetry.

Results: The prevalence of digestive signs and symptoms was 31.9%. The signs and symptoms included epigastric pain (27.4%), regurgitation (18.1%), bloating (9.9%), nausea (9.9%), and vomiting (6.0%).

Conclusion: The prevalence of digestive signs and symptoms reported by rural workers was high and was associated with being older than 60 years, using agricultural pesticides, and being of Italian descent.

Keywords
Signs and symptoms, digestive; Rural workers; Public health nursing; Occupational health nursing; Nursing assessment.

Descritores
Sinais e sintomas digestórios; Trabalhadores rurais; Enfermagem em saúde pública; Enfermagem do trabalho; Prevalência

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Introduction

Gastric disorders include clinical signs and symptoms that suggest possible infections and/or gastric diseases,\(^1\) which comprise epigastric pain, halitosis, bloating, weight loss, postprandial fullness, nausea, regurgitation, satiety, and vomiting. These clinical manifestations are perceived and measured by individuals who present them and can help nurses and other healthcare professionals to diagnose their morbidities, associated factors, and disease risk.

Sociodemographic factors such as gender, age, and education, among others, combine individual profiles and are associated with environmental factors, such as food culture (including food preparation and consumption habits), working conditions (physical and mental demands and time spent performing work), workload and frustration level at work, and use of pesticides in cultivation. These factors may exacerbate morbidities, which appear as symptoms, and their origins can be confirmed by clinical diagnosis.

In addition to the factors associated with individuals, environment, and labor, use of pesticides can cause clinical complications, including inflammation, gastritis, esophagitis, and stomach cancer. Evidences of the associations between gastric disorders and pesticide application by rural workers have been reported in the literature.\(^2-6\) A study involving individuals who applied pesticides reported gastrointestinal symptoms, including nausea, vomiting, severe abdominal pain, and retrosternal pain or discomfort. These symptoms were attributed to gastrointestinal irritation produced by the release of phosphine into the stomach.\(^2\) Gastric disorders have also been reported in cases of mild intoxication with the pesticide Abamectin.\(^3\) In addition, genetic research on gastric cancer in patients affected by the disease indicated a higher frequency of cancer in patients living in rural environments. Increased exposure to various pesticides in the field could explain the higher rate of gastric cancer in these patients.\(^4\)

A common infection associated with gastric disorders and occurrence of morbidities is infec-

\(^1\) \(Helicobacter pylori\)
Prevalence of digestive signs and symptoms and associated factors among rural workers

The objective of this study was to determine the prevalence of digestive signs and symptoms in rural workers and to identify frequently associated factors.

**Methods**

This cross-sectional study included 182 rural workers in the state of Rio Grande do Sul, which is located in southern Brazil. The total number of rural workers was not reported by official, state, and municipal sources involved in rural activities. Therefore, the sample was non-probabilistic and convenient; in other words, the search for rural workers was conducted in residences and rural areas were informed by the Technical Assistance and Rural Extension Company of Rio Grande do Sul.

This procedure allowed the construction of a study sample with a larger number of rural workers considering the following inclusion criteria: residence in rural areas where work was conducted, minimum age of 18 years, and work in the area of fruit and vegetable farming.

For data collection, structured interviews were conducted with rural workers and included independent sociodemographic variables (age, ethnicity, marital status, literacy, education level, monthly income, ancestry, and type of residence) and work conditions (length of employment in rural activities, property size, daily working hours, robust variable-hours versus years, application of agricultural pesticides, use and length of use of personal protective equipment, physical and mental effort for execution of field and domestic work, and level of frustration in rural and domestic activities). The dependent variable was the occurrence of digestive signs and symptoms (epigastric pain, regurgitation, bloating, nausea, and vomiting).

To assess the internal consistency of answers, i.e., data reliability, the Cronbach’s alpha coefficient was used. The value found was 0.850, which was within the expected values (between 0.80 and 0.90). This condition confirmed the reliability of the measuring instrument applied to rural workers.

Quantitative variables were expressed as means and standard deviations or medians and interquartile ranges. Categorical variables were expressed as absolute and relative frequencies. To compare means between groups, student’s t-test was used for independent samples. The Mann-Whitney test was used in cases of asymmetry. For the comparison of frequencies, Pearson’s chi-square test or Fisher’s exact test were used. For the adjustment of confounding factors, Poisson regression analysis was performed. The criterion for the inclusion of the variable into the model was a p-value <0.20 in the bivariate analysis. The measure used was the prevalence ratio together with the 95% confidence interval. The significance level was 5% (p ≤ 0.05), and the analyses were performed using IBM Statistical Package for Social Sciences software, version 21.0.

The execution of this study adhered to national and international standards of ethics in research involving humans.

**Results**

The mean age of 182 rural female workers was 48.9 years, with a predominance of Caucasians (167, 91.8%); 160 (87.9%) were married, and 120 (65.9%) had not completed elementary school. In addition, 58 (31.9%) women reported having work-related gastric disorders, including epigastric pain (50, 27.4%), regurgitation (33, 18.1%), bloating (18, 9.9%), nausea (18, 9.9%), and vomiting (11, 6.0%). The qualifiers related to the severity of these disorders were mild for 21 women (36.2%), moderate for 16 (27.6%), severe for 18 (31.0%), and very severe for 3 (5.2%).

In addition, 36 (19.8%) reported being involved in the application of agricultural pesticides. Of these, 24 (66.6%) had gastric disorders. During pesticide application, workers reported the use of personal protective equipment, including head protection (4, 2.2%), water-repellent coat (3, 1.6%), faceshield (2, 1.1%), water-repellent pants (2, 1.1%), and ear protection (1, 0.5%).
During the univariate analysis of sociodemographic variables and working conditions among rural workers with or without gastric disorders, the variables such as ethnicity; marital status; literacy; education level; monthly income; Portuguese, German, and Uruguayan descent; type and size of the property, daily work hours; robust variable (hours versus years); use of personal protective equipment; and application of agricultural pesticides had no significant association. An association was identified (p < 0.20) for the variables age (p = 0.174), being of Italian descent (p = 0.162), type of residence (p = 0.121), and length of employment in rural work (p = 0.191).

Poisson regression analysis indicated that workers aged ≥60 years had a 57% greater probability of developing gastric disorders and that the workers of Italian descent had 70% greater prevalence of gastric disorders compared with workers of other descents (Table 1).

### Table 1. Sociodemographic variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>PR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥60 years</td>
<td>1.57 (1.01-2.44)</td>
<td>0.046</td>
</tr>
<tr>
<td>Italian descent</td>
<td>1.70 (1.06-2.72)</td>
<td>0.027</td>
</tr>
</tbody>
</table>

With regard to the requirements of domestic and rural work, the monovariate analysis indicated that the female workers with gastric disorders had more demanding physical requirements (p = 0.003), temporal requirements (p = 0.026), and increased frustration levels (p < 0.001) during rural work compared with those who did not present these disorders. For the workers who performed domestic work, the frustration level was significantly associated with gastric disorders (p = 0.003).

After adjustment, the rural workers who also performed domestic activities were 52% less likely to have gastric disorders compared with those who did not perform these activities.

The workers with an additional point in the temporal requirements in their workload in the field had a 5% higher prevalence of work-related gastric disorders. The workers with an additional point in the frustration level related to the workload in the field had a 5% higher likelihood of developing gastric disorders (Table 2).

### Table 2. Domestic and rural work

<table>
<thead>
<tr>
<th>Variables</th>
<th>PR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performed domestic work</td>
<td>0.48 (0.24-0.93)</td>
<td>0.030</td>
</tr>
<tr>
<td>Temporal requirements in the rural work</td>
<td>1.05 (1.00-1.09)</td>
<td>0.038</td>
</tr>
<tr>
<td>Level of frustration related to workload in the field</td>
<td>1.05 (1.02-1.09)</td>
<td>0.003</td>
</tr>
</tbody>
</table>

The limitations of the results of this study are related to its cross-sectional design, which did not allow the establishment of cause and effect relationships.

The results indicated that rural female workers aged 60 years or older had a 57% increase in the probability of developing gastric disorders. This result approximated the general characteristics of organic functionality related to increased age for onset of gastric symptoms. A previous study of a rural population aimed to determine the prevalence of *H. pylori* infection and its role in the pathogenesis of gastrointestinal diseases reported the same disorders identified in the present study, in addition to other complications, including epigastric pain, nausea, vomiting, early satiety, bloating, postprandial fullness, regurgitation, weight loss, and melena, in both men and women. In addition, the highest prevalence occurred in the age group of 41-50 years, which is similar to the results of the present study.

Age is an important biological marker. Moreover, long-term infection with *H. pylori* increases the risk for developing gastric cancer; in addition, it is one of the most common infections and may be responsible for nearly 75% of the cases of gastric cancer worldwide. It should be stressed that this is not a case of constructing approximations but instead considering how to confirm these possibilities in new studies and clinical follow-up for this group of workers who present a high prevalence of gastric disorders in order to identify other symptoms indicative of gastric diseases.
Another relevant factor, despite the lack of statistical significance, was the association between pesticide application and gastric disorders among rural workers. The findings of this study indicate that out of the 36 women who reported applying pesticides, 24 (66.6%) had at least one gastric disorder. Pesticides are identified in the literature as a risk factor for the health of the rural population worldwide. A study conducted on rice farmers in Malaysia reported stomach pain and vomiting as harmful health outcomes resulting from the use of pesticides. Another study that evaluated potential health risks to the population exposed to contaminated water in pesticide disposal sites showed that gastric cancer was among the outcomes of such exposure. This finding indicates that pesticides do not only impair the health of the workers who apply them but also the population groups who are exposed near the application sites. Accordingly, the group of 34 workers who reported not applying pesticides but who had gastric disorders worked at sites where pesticides were applied.

One of the measures to minimize the risk of pesticide exposure is the use of personal protective equipment. A study conducted in Brazil with rural workers investigating pesticide use and exposure levels showed that more than 50% of the workers rarely or never used personal protective equipment. Another study comparing differences between genders in relation to knowledge, practices, and symptoms of intoxication resulting from pesticide handling indicated that women (especially those with lower education levels) had little knowledge of the pesticides, in addition to risky behavior when handling them, which contributes to increased risk of poisoning. In addition, women used less personal protective equipment when handling pesticides compared with men. Of note is the similarity of this profile with that of rural female workers evaluated in the present study, who had incomplete elementary school education and made inadequate use of personal protective equipment.

It is known that use of personal protective equipment alone does not eliminate the risk of absorbing pesticides and consequent development of gastric disorders. A study conducted in nine hospitals using a secondary collection method involving 586 patients after ingestion of agricultural pesticides highlighted the need for chemical studies in order to reduce gastrointestinal absorption of these harmful substances. Another factor associated with the development of gastric disorders among rural workers was being of Italian descent. Accordingly, the women of Italian descent had a 70% greater prevalence of digestive signs and symptoms compared with the prevalence among women of other descent. A study conducted in Italy on energy and nutrient consumption at the national level reported excessive intake of certain foods, such as fats and alcohol, and decreased consumption of fiber and vitamins. A study conducted in Iran on the relationship between diet and gastric cancer showed that consumption of animal fat, such as meat, milk, and fatty cheeses, can increase the risk of this disease.

The promotion of healthy eating habits is a strategy recognized as positive for the health conditions of the population in general, particularly for gastric disorders and gastric diseases. In this respect, without focusing on the nutritional components of food, the present findings indicate that women who performed domestic activities, such as cooking, were 52% less likely to have gastric disorders compared with those who did not perform these activities.

Domestic work, in most cases combined with other activities, has been reported in the literature as a stress factor. However, in the present study, it was identified as a protective factor for gastric disorders. This finding underscores the effort to correlate food culture with its behavioral effects.

Moreover, the findings indicate that time spent in rural activities increases both the prevalence of gastric disorders and the level of frustration in relation to these activities by 5%. Results of a study of Bangladeshi garment factory workers showed that the length of daily work and frustration at work contribute to the development of health problems, including gastric disorders characterized by gastric pain, nausea, and vomiting.

Digestive signs and symptoms are subjective indicators and should be considered in all instances.
where they are identified, whether in the investigatory process, as in the present study, or in health assistance and diagnosis of gastric diseases. These disorders indicate potential organic changes and are clinical markers that can lead to other lines of investigation in future studies, including whether different causes and consequences can be suspected for gastric diseases based on the female workers’ gastric symptoms and associated factors.

However, the prevalence of gastric disorders in a group of women whose work is recognized socially and scientifically as having the potential to accelerate organic decline and development of disease requires attention. Interventions can be conducted in these groups to predict such outcomes or minimize their consequences with the view toward promoting healthier behaviors and improving quality of life.

**Conclusion**

The prevalence of digestive signs and symptoms reported by rural workers was high and was associated with being aged 60 years or older, use of agricultural pesticides, and being of Italian descent.

**Collaborations**

Cezar-Vaz MR contributed to the design and supervision of the project, execution of the study, analysis and interpretation of data, manuscript preparation, and critical review of the intellectual content. Bonow CA contributed to the collection, analysis, and interpretation of data, manuscript preparation, and critical review of the intellectual content. Couto AM and Gelati TR contributed to manuscript preparation and critical review of the intellectual content.

**References**


Evaluation of nursing skills to promote health during pediatric consultations in emergency rooms

Avaliação das competências de enfermeiras para a promoção em saúde durante atendimentos pediátricos em unidade de emergência

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Maria Josefin da Silva
Priscila de Souza Aquino
Lorena Barbosa Ximenes

Abstract

Objective: To evaluate nursing skills in health promotion during assistance for children at emergency unit using the risk classification.

Methods: This cross-sectional study included nurses responsible for intake screening of children based on risk classification at an emergency unit. We classified the procedures conducted by the nurses according to the guidelines for intake with risk classification according to the health promotion competency framework in the Galway Consensus Conference Statement. In the skill analysis, nurses were followed-up by two observers. For interobserver reliability analysis we used the Kappa index measuring agreement ranging from 0 to 1 (with 0 showing no agreement and 1 showing total agreement).

Results: The competencies identified in nurse 1 had perfect agreement (K=1.0), in nurse 2 had moderate agreement (K=0.5), and in nurse 3 showed poor agreement (K=0.2). The Galway competencies showing the most agreement were assessment/diagnosis and partnership.

Conclusion: Competencies for health promotion developed by the nurses who participated in the study were assessment/diagnosis, partnerships, planning and assessment.

Keywords
Pediatric nursing; User embracement; Nursing assessment; Triage; Health promotion

Descritores
Enfermagem pediátrica; Acolhimento; Avaliação em enfermagem; Promoção da saúde

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Introduction

Health promotion can be defined as a process for training people to self-manage health determiners. It is also characterized as a set of essential competencies and skills that involve integrating knowledge, attitudes, and practices from many professionals which are needed to reduce the impact that social, environmental, and economic changes can have on individual and public health.\(^1,^2\)

In this context of health promotion, the hospital can be an institution with the potential to promote health and well being among professionals and users. In addition, hospitals that promote health are those that not only guarantee quality care, but also adopt strategies for training professionals, patients, and families with the goal of making them active and involved in self-management of the health-disease process.\(^3\)

For this reason, it is fundamental to build a workforce that is able to establish and implement health promotion in these environments, including continuous professional education to develop competencies.\(^1,^3\) Competencies are defined as applying specific knowledge and technical skills to guarantee the performance standard of an action required in a specific context.\(^3\)

The use of instruments is important in critically analyzing competencies developed by professionals while implementing health policy strategies, in terms of identifying the standard care quality in hospital units that promote health.\(^3\) Therefore, professionals working in the hospital context can use the competency model for health promotion which is established in the Galway Consensus Conference Statement, by catalyzing change, leadership, assessment/diagnostics, planning, implementation, evaluation, advocacy, and partnerships\(^5\) in order to support the implementation of an intake strategy with risk classification.

Intake with risk classification is defined as a new culture of care focused on communication and dialog between users, professionals, and managers using qualified listening, favoring the establishment of bonds and co-responsibility of the individuals involved in resolving health needs. This intake also permits reorganization of the health network, guaranteeing integral and equal care for the entire population.\(^4\)

This strategy can be considered a device for health promotion, since care should be prioritized according to clinical complexity according to pre-established protocols,\(^4\) not a first-come-first-served basis. In this sense, intake with risk classification is an important tool for hospitals promoting health, especially in pediatric care, because professionals serving this population must be more attentive to the concerns and the opinions of children as individuals who are able to express their subjectivity, and who wish to be heard.\(^5\)

It is known that among the established guidelines for intake with risk classification, the nurse's evaluation of the patient should be conducted based on scientific evidence and be guided by protocols, not only by intuition or previous clinical experiences. Risk classification protocols are tools that guide the professional's clinical judgment during evaluation of the level of complexity, and determine that patient's level of priority; for this reason, the protocols should be rigorously followed in order to avoid errors in classifying and referring the child.\(^5\)

Along these lines, studies indicate the importance of using simple and easy-to-manage instruments in approaching patients in order to improve the work process in health, especially at health promoting hospitals.\(^6\) Therefore, nurses in pediatric emergency units need to use these technologies efficiently. Among these, the risk classification in pediatrics guide, which was constructed and validated to support the development of competencies in real practice, stands out.\(^6\)

In the emergency unit a nurse conducts multiple actions based on professional competencies with the aim of assuring individualized and humanized care. Consequently, the competencies indicate the professional's actions within their work reality, impacting their actions and decisions, so developing more competencies in practice is essential to constructing qualified and integral care.\(^7\)

The objective of this study was to evaluate nurses' skills for health promotion in child care at emergency units using the risk classification.
Methods

This cross-sectional study was carried out in July 2013 on nurses who cared for children at an intake with risk classification service within a children’s emergency care hospital in the city of Fortaleza, Ceará, northeast Brazil. We used a guide to risk classification in pediatrics that aimed to optimize nurse’s view of signs and symptoms based on level of complexity, according to the main complaint reported.

The study participants were three nurses working in pediatric care in an emergency room. They had at least one year of clinical experience in risk classification in pediatrics and had training in intake with risk classification.

The selection of consultations took place for convenience and consecutively, in which was included pediatric consultations whose mothers had the age of 18, had the child in an emergency situation to a lesser degree of complexity and waiting for nursing care in the emergency room. Each nurse was responsible for evaluating 10 children, creating a total of 30, following recommendations of another study.(8)

Data were collected by two researchers and occurred at two different times. Initially, nurses were approached in the intake area to explain the objective of the study and provide information about using the intake with risk classification guide. After the nurses who agreed to participate signed the terms of free and informed consent, they were interviewed with a form that gathered the following data: age, graduate degree, experience with risk classification in emergency pediatrics, use of guidelines in the protocol for intake with risk classification in pediatrics). Each nurse also received the intake with risk classification in pediatrics guide, along with a copy of the protocol.

Later, the nurses were simultaneously monitored by two researchers as they conducted the intake with risk classification. The mothers and accompanying adults who participated in the study signed the terms of free and informed consent after the fact, in other words, after the intake with risk classification was done, assuring confidentiality of their information.

We opted to request consent after observation because our study did not involve any moral or physical risk to the child or to the mother/accompanying adult, since our main goal was to observe the competencies developed by the nurses during care using the intake with risk classification guide. It should be noted that none of the mothers/accompanying adults refused to participate in the study.

A checklist was used to collect the data; this instrument was created and validated by three specialists in child health, and addresses the procedures conducted by the nurses in their work process according to the strategic guidelines for intake with risk classification. These guidelines were related to the Galway model for developing health promotion competencies, and are meant to identify the competencies (catalyzing change, leadership, assessment, planning, implementation, evaluation, advocacy, and partnerships) that were developed while assessing children in the intake with risk classification.(3)

Data were compiled in a spreadsheet (Microsoft Excel 8.0), and were processed and analyzed using Statistical Package for Social Sciences (SPSS), version 20.0. The analysis was done through a descriptive statistical approach, distributing absolute and relative frequencies to the categorical variables and means with standard deviation (SD) for continuous variables, shown in the characteristics of the nurses.

To analyze interobserver reliability, we used Kappa coefficients that corresponded to a measure of agreement ranging from 0 to 1 (with 0 showing no agreement and 1 showing total agreement).(9) Kappa coefficients analyze the intensity of agreement among observers based on the parameters of the Kappa index (0.00 to 0.20 being very poor agreement, 0.21 to 0.40 being poor agreement, 0.41 to 0.60 being moderate agreement, 0.61 to 0.80 being good agreement, 0.81 to 0.99 being almost perfect agreement, and 1.00 being perfect agreement). Acceptable values are considered > 0.70.(9)

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

Based on the profile of nurses participating in the study, we identified that they were aged 28-59 years, with mean experience in pediatric risk classification of 3.7 years (SD ± 0.94). All of the nurses had a graduate degree, and in the interview stated that they used the guidelines in the protocol for intake with risk classification in pediatrics during their interviews with mother/children.

With regard to the intake with risk classification guide, the nurses mentioned that no risk indicator was left out of the guide, but that some signs/symptoms presented by the children during intake, such as a wound with fever and itching/intense pruritus were not found within the guide. Nevertheless, two of the nurses indicated that the abbreviated guide was excellent for use during intake with risk classification, and that nurses working in the area will have little difficulty using the material. For this reason, all nurses considered the guide to be relevant to their practice and for delivering quality nursing care to the children in the emergency unit.

As for risk classification, most of the children (17; 56.7%) were classified as green, i.e., IV-less urgent, receiving medical evaluation within one hour or re-evaluation by the nurse every hour; 26.7% (08) of the children were classified as yellow, corresponding to III-urgent, requiring assistance within 30 minutes. A small percentage (05; 16.6%) were classified as blue, V-not urgent, receiving medical evaluation according to the order in which they arrived, or received a written referral to other health centers, guaranteeing service elsewhere.

Based on analysis of competencies presented by the nurses during intake with risk classification, the comparison between the observer assessments is shown in table 1. As can be seen, the competencies identified in E1 had perfect agreement (K=10), E2 had moderate agreement (K=0.5), and E3 had poor agreement (K=0.2). It should be stressed that interobserver reliability was evaluated by comparison of independent data (done independently by observers A and B), based on the principle that both were considered equally able to perform the task.

Discussion

Because this was a cross-sectional study, the results were limited with regard to longitudinal follow-up of care, particularly because these variables were measured at only one single time. However, this study contributed to identifying the importance of adequately performing intake with risk classification and guaranteeing that all competencies for health promotion are explained during assistance.

Therefore, it is possible to see improvement in delivery of health services using strategies that target care qualification, resolution in services, and guaranteeing user access. In this sense, adopting intake with risk classification using the guide, i.e., as a strategy for (re)organizing the work process, is seen to be an important tool for emergency services, and may guarantee integrality of care.

The use of clinical protocols to guide actions in urgent and emergency services is presented in the guidelines for implementing the intake with risk classification strategy. These protocols aim to organize...
demand into pre-established colors using criteria to assess risk according to complexity and severity while respecting individual differences and needs.\(^{(4)}\)

In this present study, by applying the abbreviated guide to risk classification in pediatrics we identified a higher prevalence of the green complexity (less urgent) followed by yellow, characterizing the care as having the appropriate need for urgency. This finding does not agree with a previous study if the clinical profile of children according to risk classification, which reported a high prevalence of yellow followed by green.\(^{(6)}\)

One of the nurse’s activities in emergency units is intake with evaluation and classification of risk, so training for this activity is fundamental, as is appropriate classification of the child (one of the competencies of the nurses who work in this environment). Consequently, evaluating the development of these competencies through guided actions based on the health promotion domains in the Galway consensus (catalyzing change, leadership, assessment/diagnostic, planning, implementation, evaluation, advocacy, and partnerships) allow professional practice to be strengthened and assured.\(^{(3)}\)

Of the eight competencies in the Galway consensus, the four with the greatest interobserver agreement during the application of the intake with risk classification guide were assessment/diagnosis, partnership, planning, and evaluation of actions after their execution. The other competencies (catalyzing change, leadership, execution and advocacy) were not performed by nurses from our study.

Although the “catalyzing change” competency was not identified in the present study, it indicates professional actions towards provide changes for the user. In this study, this competency was seen in nurse performance during intake with risk classification through developing competencies so that the mother/accompanying adult could prevent diseases, as well as explaining the objectives of risk classification for service.

Health promotion in humanized care requires intake to be conducted in a careful and integrative manner, allowing users to understand the levels of care and that the professional will refer patients to the appropriate service.\(^{(10)}\) The work process is comprised of its objectives, its end goals, and the professionals who act in the specific service, requiring interaction with the user during this process, and that the concept of health and disease should be shown during this exchange of subjectivities between those who delivery care and those who receive it,\(^{(10)}\) showing the importance of the search for changes in both the health service as well as in the posture of professionals and users.

Consequently, professionals working in intake with risk classification become responsible for informing users about the process of risk classification and waiting time according to clinical status, while at the same time guaranteeing the satisfaction of users and their families, avoiding problems during care due to lack of information.\(^{(10)}\) Furthermore, the risk classification process is considered dynamic, and aims to identify patients whose lives may be at risk; this allows resolution to be enlarged when incorporating risk evaluation criteria that consider the complexity of the health/disease phenomena, prioritization of care at the appropriate time and reduction in the number of avoidable deaths, sequelae, and hospitalization, assuring efficient care.\(^{(11)}\)

The “leadership” competency was also not identified in our study. This competency aims to guarantee the professional a strategy that should be followed during the process of intake with risk classification, which was configured in our study by how the communication process took place between the nurses, the mothers/accompanying adults, and the children. This ensures resolutional and integral care by using qualified listening.\(^{(10)}\) Intake with risk classification is a device for humanization that selects the most severe cases for immediate assistance, thereby establishing wait times for less severe cases.\(^{(10)}\)

The “assessment/diagnosis” competency was present among the actions conducted by the nurses in intake with risk classification, permitting the professionals to evaluate user needs as well as biologic determinants.\(^{(2)}\) In our study, this competency was identified through the interaction between the nurses and the mother/accompanying adult and child to collect information about the child’s health problem, the use of any type of assessment method.
Evaluation of nursing skills to promote health during pediatric consultations in emergency rooms

(physical examination/instruments) and identification of determinants of the problem and health needs (biological, social, and psychological).

In this way, professionals working in intake with risk classification should have a clinical vision, perceiving possible harm to user health and carefully evaluating this harm to avoid greater damage. Additionally, it is important to consider the subjectivity of the individual and clinical objectivity in order to adequately define emergency situations.\(^\text{10}\)

In relation to pediatric care in the emergency service, nurses who conduct risk classification should do a complete assessment and record major complaints in detail, know how to work in teams, have the critical reasoning and agility for decision making, and also have knowledge of the support network in order to correctly classify children and make appropriate referrals.\(^\text{11}\)

During this time after diagnostic evaluation, nurses need to develop their “planning” competency, which is defined as establishing goals based on assessment of needs.\(^\text{2}\) The planning competency was not observed in this study because we considered inclusion of the mother/accompanying adult in the assistance process as part of the planning, as well as explanation of the procedures and potential referrals to other services, and nurse use of models or individual scientific and practical background in decision making.

Therefore, in order to offer integral care to children, family participation must be considered. As a result, building integrality becomes recognized as practices that must consider the user as the individual to be assisted with respect for individual demands and needs,\(^\text{12}\) guaranteeing participation by the mother/accompanying adult in the intake process.

Effective participation by accompanying individuals is not just restricted to care after service, but participation in decision making and planning, with the support of the team.\(^\text{12}\) In this sense, it is important that the users be informed about the protocols used and the results expected from a specific action.\(^\text{12}\)

The process of implementing strategic plans in health aims to guarantee quality of care and improve health, and should be done through the “implementation” competency. In our study, this competency occurred by measuring the professional’s ability to implement protective actions by monitoring the quality of the intake process and management of the human resources and materials available in the hospital environment.\(^\text{3}\)

Implementation of health management models by professionals who are qualified and committed to health ethics and defense of life has become necessary to guarantee and health care rights for everyone.\(^\text{6}\) However, there are few devices which encouraging co-management or valuing and including workers and users in the health production process.

Furthermore, the current management model is based on the complaint-management model, which strengthens the view of disease to the detriment of sanitary responsibility and the gains in health which are proposed in the guidelines and norms for promoting health hospitals.\(^\text{4}\) This fact may be corroborated in the lack of development in the “implementation” competency among the nurses in this study.

The “assessment” competency was identified in our study as nurses demonstrated theoretical knowledge while explaining the child’s health condition and the intake with risk classification to the mother. We observed that the nurses demonstrated the capacity for self-assessment during their professional practice, and adopted competency-based practices.\(^\text{13}\)

This affirms that competence is knowledge in use, i.e., the ability to act in a real situation, which implies knowing the limits of one’s knowledge.\(^\text{14}\) This competence guarantees that the professional can identify goals met during implementation of health improvement programs, and can change implementation methods if the stated objectives are not achieved during this process.

The humanization program is a set of strategies designed to achieve care qualification and health management in the Brazilian Unified Health System, and is characterized as an ethical-aesthetic-political instrument for promoting co-responsibility and construction of bonds between professionals and users in healthcare and in defending life.\(^\text{4}\) In this sense, the humanization process in health agrees with the “advocacy” and “partnership” competen-
cies of the Galway consensus, favoring adequate access to hospital services with precise assessment.

The “advocacy” competence defends improving health and well-being in individuals and communities, reinforcing their abilities to strengthen themselves and conduct actions to defend health. While this competency was not identified in our study, it is considered important, since it permits representativeness that goes beyond clinical intervention and involves a proactive professional posture, together with families and communities in interdisciplinary and intersectoral actions. 

Partnership refers to the fact that professionals conduct their health actions in partnership with other colleagues or services. In our study, this competency was identified in patient referrals to other health professionals according to the risk presented when the intake was conducted by the nurses.

In this sense, the strategy of intake with risk classification applied alone does not assure improvement in care quality. Therefore, internal and external alliances are necessary, targeting partnership and construction of adequate flows according to the degree of risk presented during intake, and should be implemented into the care network.

To develop the “partnership” competency, nurses need to refer patients to other professionals/services when necessary in order to establish continuity of care and relationships with other services. This permits the creation of actions for referral and back-referral, guaranteeing that children are followed in the primary care network, if necessary, after the health problem is resolved in the emergency unit. The interaction between services reduces cases of re-admission and prevents the worsened conditions which result from lack of care.

Conclusion

The nurses in our study developed the following competencies: assessment/diagnosis, partnership, planning, and evaluation of actions. Although not all competencies were identified during care in this study, we believe that all competencies are important to guaranteeing quality, equal, integral, and resolute care, especially with regard to intake with risk classification in pediatric emergencies.

Collaborations

JEGLF Veras and AP Rodrigues contributed to the design of the project, analysis and interpretation of data, drafting the manuscript, and approval of proofs. MJ Silva and LB Ximenes contributed to the design of the project, critical review related to the intellectual content, and approval of proofs. PS Aquino contributed to the analysis and interpretation of data, critical review related to intellectual content, and approval of proofs.

References


Occurrence and factors associated with hypothermia during elective abdominal surgery

Ocorrência e fatores associados à hipotermia no intraoperatório de cirurgias abdominais eletivas

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Keywords
Hypothermia; Perioperative nursing; Intraoperative period; Operating room nursing; Digestive system surgical procedures

Abstract
Objective: To analyze the association between sociodemographic, clinical, surgical and environmental variables and the occurrence of hypothermia.

Methods: Cross-sectional and analytical study conducted with 105 adult patients of both genders. The Pearson’s coefficient showed a correlation between the patients’ temperature with the duration of the anesthetic-surgical period, the stay in the operating room, and the average temperature in the operating room.

Results: Of the 105 (100%) participants, 73 (69.5%) were female and 85 (81%) were adults. Hypothermia occurred in 98 (93.3%) patients. The average temperature was 36.1°C at the start of anesthetic procedure, with gradual decrease, reaching the average of 34°C. At the beginning of anesthetic induction, 29 (27.6%) patients had ear temperature <36 °C and 60 minutes after induction, 78 (85.7%) patients were hypothermic, with an average temperature of 35.2 °C. At the end of anesthesia, 93 (88.6%) patients had hypothermia with a minimum temperature of 31.4°C.

Conclusion: There was no significant correlation between the patient’s average temperature and the average temperature of the operating room. The variables of female gender, combined anesthesia, duration of the procedure and the length of stay in the operating room were statistically significant to predict hypothermia.

Resumo
Objetivo: Analisar a associação entre variáveis sociodemográficas, clínicas, cirúrgicas e ambientais e ocorrência de hipotermia.

Métodos: Estudo transversal e analítico, realizado com 105 pacientes adultos de ambos os sexos. O coeficiente de Pearson verificou a correlação entre a temperatura dos pacientes com a duração do período anestésico-cirúrgico, a permanência na sala de operações e a média de temperatura na sala cirúrgica.

Resultados: A hipotermia ocorreu em 98 (93,3%) dos pacientes. No início do procedimento anestésico, a média de temperatura foi de 36,1°C, com diminuição gradativa atingindo 34°C de média. No início da indução anestésica, 29 (27,6%) pacientes apresentavam temperatura auricular <36°C e, 60 minutos após a indução, 78 (85,7%) pacientes encontravam-se hipotérmicos e com temperatura média de 35,2°C. Ao final do procedimento anestésico, 93 (88,6%) pacientes tiveram hipotermia com valor mínimo de 31,4°C.

Conclusão: Não houve correlação significativa entre a média de temperatura do paciente e as médias de temperatura da sala cirúrgica. As variáveis sexo feminino, anestesia combinada, duração do procedimento e o tempo de permanência na sala cirúrgica foram estatisticamente significantes para predizer hipotermia.

Conflicts of interest: no conflicts of interest to declare.
Occurrence and factors associated with hypothermia during elective abdominal surgery

Introduction

Hypothermia is defined as a core body temperature <36°C and one of the most frequent complications in patients in the perioperative period (1-3). Studies show that between 60 and 90% of surgical patients have hypothermia in the intraoperative and postoperative periods (2-4).

Perioperative nursing searches the quality of care and safety of surgical patients. Thus, knowledge on the clinical manifestations and complications of adverse events resultant from the anesthetic-surgical procedure is essential for developing effective intervention plans. The implementation of heating measures and the prevention of hypothermia in surgical patients are essential to avoid these complications and reduce the patients’ hospital stay (4,5).

The association between hypothermia and changes of blood glucose with other predisposing factors in the intraoperative period may contribute to the quality of care to surgical patients. The objective of this study was to analyze the association between sociodemographic, clinical, surgical and environmental variables and the occurrence of hypothermia.

Methods

This is a cross-sectional analytical study conducted in the operating room of a large public teaching hospital with 292 beds. The surgical center consisted of 12 operating rooms and a post-anesthetic recovery room with ten beds. In 2014 were performed 1,815 abdominal surgeries (gynecological, gastrointestinal and general).

The participants were 105 patients who met the following inclusion criteria: undergoing elective conventional and/or minimally invasive abdominal surgery, aged 18 years or more, of both genders, and classified as ASA (American Society of Anesthesiologists) I and II. Exclusion criteria were: ear temperature <36°C or ≥38°C, patients with previous diseases (Parkinson, hypo and hyperthyroidism) or trauma affecting the regulation of body temperature, and patients classified as ASA III, IV, V and VI.

The unsystematic, convenience, sequential, nonprobability sampling was adopted, and all patients undergoing elective abdominal surgery in July, August and September 2014 who met the inclusion criteria participated in the study.

Figure 1 shows the analysis for obtaining the sample.

For data collection, an instrument was developed and submitted to face and content validation by experts in the subject. The instrument included the following variables - Sociodemographic: age, gender, weight, height; Age range: adult and elderly; Clinical: BMI, blood glucose, ASA and temperature; Surgical: anesthetic procedure, surgical type and approach, length of stay in the room, anesthetic time, hypothermia preventive measures and surgical positioning; Environmental: temperature and relative air humidity.

The sociodemographic, clinical and surgical variables were collected by observation of patients in the operating room, and by consulting their medical records and anesthesia records.

The temperature of patients’ ear and of the operating room, as well as the relative air humidity were measured at the time of admission to the room, at the beginning of anesthesia and at the start of surgery itself. Then, at every hour after anesthetic induction, until the time the patient left the operating room.

The temperature measurement was always taken in the same ear canal (outer ear) to minimize errors. An infrared tympanic thermometer G-TECH Premium® brand was used. To check the temperature and relative air humidity in the operating room, was used a calibrated thermo-hygrometer Inco-term® brand positioned beside the patient’s head, always on the same side where the ear temperature was taken.

The qualitative variables were analyzed using descriptive statistics, and for quantitative variables were used descriptive measures of centrality and dispersion.

The chi square test was used to investigate the association between the variables of gender, age range, body mass index, blood glucose upon admission to the operating room, blood glucose after sur-
Surgery, ASA classification, surgical approach, use of preventive measures for hypothermia, and the occurrence of hypothermia. The Analysis of Variance (ANOVA) was used to check if there was correlation between the occurrence of hypothermia and the type of anesthesia.

The Pearson’s correlation coefficient was used to see if there was correlation between the variable of patients’ mean temperature in the period with the variables of duration of anesthetic-surgical period, length of stay in the operating room, and average temperature in the operating room. The significance level in this study was p<0.05.

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

Results

From July to September 2014 were performed 120 elective abdominal anesthetic-surgical procedures. Of these, ten patients were excluded due to hypothermia upon admission to the operating room, and five for having a previous disease (hypothyroidism). Thus, the study sample consisted of 105 patients.

According to table 1, of the 105 (100%) patients who participated in the study, the average age was 43.9 years, ranging between 18 and 78 years.

Glycemic alterations at the time of admission to the operating room occurred in 56 (53.3%) patients. Of these, two (1.9%) had hypoglycemia and 54 (51.4%) hyperglycemia. At the end of surgical procedure, among the 76 (80.8%) patients with abnormal glucose, capillary hyperglycemia was identified in 75 (98.7%).

Regarding the occurrence of hypothermia, 98 (93.3%) patients had hypothermia at some point during the time in the operating room. Among the 105 patients, two (1.9%) received hypothermia preventive measures.

At the beginning of anesthetic induction, 29 (27.6%) patients had ear temperature <36°C and 60 minutes after induction, 78 (85.7%) patients were hypothermic, with average temperature of
Occurrence and factors associated with hypothermia during elective abdominal surgery

At the beginning of anesthetic procedure, the average temperature was 36.1°C, gradually decreasing with increasing duration of anesthesia, reaching the average temperature of 34°C in the fourth hour of anesthesia.

The average temperature of the operating room fell since the admission of patients, with fluctuations until their departure from the room. The relative air humidity ranged between 31 to 84% (Table 3).

Among the predictive variables analyzed, there was a statistically significant correlation (p = 0.026) between the occurrence of hypothermia and the variable of gender. Although the relative risk was not significant, the odds ratio was 6.57, with confidence interval between 1.20 and 35.94.

By analyzing the occurrence of intraoperative hypothermia as the cause of hyperglycemia at the end of surgical procedure, no statistically significant result was found (p = 0.21).

The association between the type of anesthesia and the occurrence of hypothermia was statistically significant (p <0.001), and although all patients had hypothermia, the averages of temperature were lower in those that received combined anesthesia.

### Table 1. Variables related to patients and the anesthetic-surgical procedure (n=105)

<table>
<thead>
<tr>
<th>Variables</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>73.0(69.5)</td>
</tr>
<tr>
<td>Male</td>
<td>32.0(30.5)</td>
</tr>
<tr>
<td>Age range</td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>85(81.0)</td>
</tr>
<tr>
<td>Elderly</td>
<td>20(19.0)</td>
</tr>
<tr>
<td>BMI classification</td>
<td></td>
</tr>
<tr>
<td>Low weight</td>
<td>8(7.6)</td>
</tr>
<tr>
<td>Normal</td>
<td>43(41.0)</td>
</tr>
<tr>
<td>Overweight</td>
<td>54(51.4)</td>
</tr>
<tr>
<td>ASA</td>
<td></td>
</tr>
<tr>
<td>ASA I</td>
<td>51(48.6)</td>
</tr>
<tr>
<td>ASA II</td>
<td>54(51.4)</td>
</tr>
<tr>
<td>Type of anesthesia</td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>61(58.1)</td>
</tr>
<tr>
<td>Local</td>
<td>27(25.7)</td>
</tr>
<tr>
<td>Combined</td>
<td>17(16.2)</td>
</tr>
<tr>
<td>Surgical approach</td>
<td></td>
</tr>
<tr>
<td>Conventional</td>
<td>49(46.7)</td>
</tr>
<tr>
<td>Minimally invasive</td>
<td>56(53.3)</td>
</tr>
<tr>
<td>Surgical positioning</td>
<td></td>
</tr>
<tr>
<td>Supine position</td>
<td>49(46.7)</td>
</tr>
<tr>
<td>Trendelemburg</td>
<td>29(27.6)</td>
</tr>
<tr>
<td>Reverse Trendelemburg</td>
<td>27(25.7)</td>
</tr>
</tbody>
</table>

BMI - body mass index; ASA - American Society of Anesthesiologists

### Table 2. Analysis of body temperature (n=105)

<table>
<thead>
<tr>
<th>Time of measurement</th>
<th>Mean ± SD</th>
<th>n</th>
<th>n(%)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>When being anesthetized</td>
<td>36.1±0.67</td>
<td>105</td>
<td>29(27.6)</td>
<td>34.5-37.3</td>
</tr>
<tr>
<td>When starting surgery</td>
<td>35.9±0.73</td>
<td>105</td>
<td>47(44.8)</td>
<td>34.0-37.3</td>
</tr>
<tr>
<td>60 minutes after anesthesia</td>
<td>35.2±0.77</td>
<td>91</td>
<td>78(85.7)</td>
<td>33.0-36.4</td>
</tr>
<tr>
<td>120 minutes after anesthesia</td>
<td>34.7±0.84</td>
<td>50</td>
<td>46(92)</td>
<td>32.7-36.2</td>
</tr>
<tr>
<td>180 minutes after anesthesia</td>
<td>34.6±0.74</td>
<td>26</td>
<td>26(100)</td>
<td>33.2-35.9</td>
</tr>
<tr>
<td>240 minutes after anesthesia</td>
<td>34.0±0.84</td>
<td>16</td>
<td>16(100)</td>
<td>31.7-35.3</td>
</tr>
<tr>
<td>At the end of anesthesia</td>
<td>34.7±0.95</td>
<td>105</td>
<td>93(88.6)</td>
<td>31.4-36.5</td>
</tr>
<tr>
<td>At the end of surgical procedure</td>
<td>34.8±0.94</td>
<td>105</td>
<td>93(88.6)</td>
<td>31.4-36.5</td>
</tr>
<tr>
<td>When leaving the OR</td>
<td>34.8±0.95</td>
<td>105</td>
<td>93(88.6)</td>
<td>31.4-36.7</td>
</tr>
</tbody>
</table>

SD - standard deviation

### Table 3. Distribution of the average body temperature of patients, the room temperature and relative air humidity of the operating room during the intraoperative period (n=105)

<table>
<thead>
<tr>
<th>Period evaluated</th>
<th>Patient temperature</th>
<th>OR temperature</th>
<th>Relative air humidity of OR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Range</td>
<td>Mean ± SD</td>
</tr>
<tr>
<td>When entering the OR</td>
<td>36.5±0.35</td>
<td>36.0-37.5</td>
<td>25.4±1.53</td>
</tr>
<tr>
<td>Onset of anesthesia</td>
<td>36.1±0.67</td>
<td>34.5-37.3</td>
<td>25.3±1.66</td>
</tr>
<tr>
<td>Beginning of surgery</td>
<td>35.9±0.73</td>
<td>34.0-37.3</td>
<td>25.1±1.65</td>
</tr>
<tr>
<td>1st hour</td>
<td>35.2±0.77</td>
<td>33.0-36.4</td>
<td>22.5±1.99</td>
</tr>
<tr>
<td>2nd hour</td>
<td>34.7±0.84</td>
<td>32.7-36.2</td>
<td>22.5±2.43</td>
</tr>
<tr>
<td>3rd hour</td>
<td>34.6±0.74</td>
<td>33.2-35.9</td>
<td>23.4±2.46</td>
</tr>
<tr>
<td>4th hour</td>
<td>34.0±0.84</td>
<td>31.7-35.3</td>
<td>22.8±2.93</td>
</tr>
<tr>
<td>End of surgery</td>
<td>34.7±0.95</td>
<td>31.4-36.5</td>
<td>23.4±2.30</td>
</tr>
<tr>
<td>End of anesthesia</td>
<td>34.8±0.94</td>
<td>31.4-36.5</td>
<td>23.7±2.15</td>
</tr>
<tr>
<td>When leaving the OR</td>
<td>34.8±0.95</td>
<td>31.4-36.7</td>
<td>24.1±1.95</td>
</tr>
</tbody>
</table>

SD - standard deviation; OR - operating room
In the bivariate analysis, when correlating the average temperature of patients with the anesthetic-surgical time and the length of stay in the operating room, was found a statistically significant (p < 0.001 and p = 0.02, respectively), moderate and negative correlation (-0.34 and -0.31, respectively). In other words, the greater the duration of the anesthetic-surgical procedure and the length of stay in the operating room, the lower the averages of body temperature.

Discussion

The study limitations were related to the unsystematic convenience sampling and the sample size, which limit generalizations to other populations. However, the methodological rigor and statistical analysis ensured the reliability of results.

The results contributed to reveal the prevalence and identify the risk factors associated with hypothermia during the intraoperative period in patients undergoing abdominal surgery. These data should support the planning of nursing actions to detect and prevent unintended hypothermia in the operating room, reduce the occurrence of complications related to this adverse event, promote the safety of surgical patients and quality of care.

The Pearson’s correlation coefficient showed that gender was statistically significant to predict hypothermia. Studies report that women have a thicker subcutaneous layer than men, leading to less heat loss, however, as women’s body surface is bigger and their muscle mass is smaller, the female gender becomes more susceptible to heat loss and, consequently, to hypothermia.\(^1,6\)

The present study corroborated the results of a study with adults in the immediate postoperative period conducted in 2012 at a university hospital in Cartagena (Murcia, Spain) that identified the variable of female gender as a predictive factor (p = 0.02) for the occurrence hypothermia.\(^6\) Despite the apparent vulnerability of the female gender to occurrence of hypothermia, only a few studies found a statistically significant relationship for this variable.

Although the variables of age and age range were not considered statistically significant in this study, several others have pointed that older people were more susceptible to present hypothermia in the perioperative period.\(^6-8\)

The metabolic activity and the thermoregulatory system have their activities reduced in the elderly population. Concomitant to this, there is a significant reduction in muscle mass and the amount of subcutaneous tissue, which acts as a thermal insulator and affects negatively the body heat production and retention, respectively.\(^7,9\)

Although in this study the body mass index has not shown a statistically significant relationship with hypothermia in the intraoperative period, this index is known to have a positive correlation with the body temperature of patients. Thus, the higher the body mass index, the higher the temperature.\(^6,8\)

Much of the heat produced by the body stems from the reactions involved in the conversion of molecules (including glucose) into energy for the cells. Therefore, malnourished patients with reduction of blood glucose levels produce less heat and tend to reduce the body temperature. However, no statistically significant results were found when comparing the occurrence of hypothermia and blood glucose values.\(^9,10\)

Hyperglycemia was the most frequent change in blood collections at the end of the surgical procedure. However, when correlating the occurrence of hyperglycemia at the end of surgery with hypothermia in the intraoperative period, the results found were not statistically significant.

Hyperglycemia is a complication of hypothermia. The low use of glucose by the body, the decreased renal loss of glucose, decreased insulin release and increased peripheral insulin resistance may lead to increased blood glucose levels. Furthermore, increased circulating catecholamines culminate in glycogenolysis, augmenting hyperglycemia.\(^10,11\)

The high frequency of hypothermia found in this study can be explained by not using hypothermia preventive measures in the pre- and intra-
operative periods. All patients were covered with sterile drapes, leaving only the upper limbs, head and neck exposed. However, this measure was not considered a hypothermia preventive intervention, because the use of these operative fields was intended only to maintain the surgical area free of contamination and not to maintain the temperature of patients.

The perioperative warming measures can be divided in active and passive. Active measures are more efficient for treating hypothermia and warming hypothermic patients than passive measures. By adopting warming measures in the perioperative period, there is a significant reduction in the occurrence of hypothermia during intraoperative and immediate postoperative periods. The most common measures in these studies were the use of cotton blankets in the preoperative period, heated forced air system, thermal blanket, infusion of heated intravenous and/or intracavitary fluids, heated waterbed, among others.²,¹²,¹³

In contrast, anesthesia has a direct effect on the central thermoregulatory system and on hypothalamic responses for body temperature control. The main effect of anesthetics is peripheral vasodilation, which causes an increase in heat loss to the environment, inhibits muscle tremor and peripheral vasoconstriction, accentuating the temperature reduction.⁹,¹⁴,¹⁵

In the present study, when correlating the average temperature of patients during the intraoperative period and the type of anesthetic used, statistically significant results were found for those who received combined anesthesia. Thus, combined anesthesia was a risk factor for the occurrence of hypothermia during surgery.

Combined anesthesia increases the chances of patients having hypothermia, because deficiencies in thermoregulatory mechanisms of general anesthesia add to the impaired ability to maintain compensating mechanisms such as tremors, peripheral vasoconstriction and thermal sensation, common in local anesthesia, contributing to lower mean temperatures.¹⁴,¹⁵

Hypothermia was also related to the duration of anesthesia, surgery, and the length of stay in the operating room. In this study, we correlated the average temperature of patients with the time duration of the anesthetic-surgical procedure and the length of stay in the operating room. The correlation of these variables with the average temperature of patients during this period was significant, similar to data found in other studies.¹,⁸,¹⁵

The prolonged time in the operating room, the duration of anesthesia and duration of surgery are factors that interfere with the body temperature of patients; the longer this duration time, the lower is the patients’ body temperature.¹⁵,¹⁶ A study conducted in the city of Porto (Portugal) with 340 patients in the immediate postoperative period showed that the duration of anesthesia was considered an independent predictor for the occurrence of hypothermia and for the increased time spent in the post-anesthetic recovery room.⁸

The duration of anesthetic-surgical procedure and the prolonged length of stay in the operating room were risk factors for hypothermia, and a reason may be related to prolonged exposure to the low temperatures of the operating room.

In this study, there were temperature variations in the operating room between 22.5 and 25.4°C, and a linear decline since admission to the operating room until the second hour of anesthesia. After this period, the average temperature rose again and the average relative air humidity remained between 51.4 and 54%. This result corroborates the American Society Perianesthesia Nurses (ASPAN) recommendations to maintain the temperature of the operating room between 20 and 25°C.¹

The average temperature and average relative air humidity in the operating room were not statistically significant when compared to the average temperature of patients in the intraoperative period.

Conclusion

The variables of age range, ASA classification, BMI, surgical positioning, type of surgical approach and glycemic alterations upon patients’ admission to the
OR were not predictive for the occurrence of hypothermia.

The occurrence of hypothermia was not a statistically significant factor to predict the incidence of hyperglycemia at the end of the anesthetic-surgical procedure, but it favored the occurrence of complications during surgery.

There was no significant correlation between the patient’s average temperature and the average temperature of the operating room. The variable of female gender was statistically significant to predict hypothermia, as well as combined anesthesia, the duration of the anesthetic-surgical procedure, and the length of stay in the operating room.

Acknowledgments
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Collaborations
Prado CBC participated in the project design, analysis and interpretation of data, article writing and critical and relevant review of intellectual content. Haas VJ contributed to the analysis and interpretation of data. Pires PS and Barichello E contributed to the critical and relevant review of intellectual content. Barbosa MH participated in the project design, analysis and interpretation of data, article writing and critical and relevant review of intellectual content, and final approval of the version to be published.

References
Protagonism of adolescents in preventing sexually transmitted diseases

Protagonismo de adolescentes na prevenção de doenças sexualmente transmissíveis

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Thiago Moura de Araújo²
Fabiane do Amaral Gubert³
Neiva Francenely Cunha Vieira³

Abstract
Objective: To analyze the protagonism of school adolescents in preventing sexually transmitted diseases.
Methods: This is a qualitative action-research study, which was developed with ten adolescents (aged 15-16 years) from a public school. The data were collected from focus groups, interviews, and observation, being analyzed by using the discourse analysis technique.
Results: The adolescents testimonies revealed that they participated in planning of the educational intervention, and defined and organized the school environment. In addition, they prepared materials and themes for use in the preventive actions against sexually transmitted diseases, which generated a feeling knowledge on the subject.
Conclusion: The participants in the study showed protagonism in the school environment by preparing activities for prevention of sexually transmitted diseases.

Keywords
Sexually transmitted diseases/prevention & control; Adolescent; Adolescent behavior; HIV infections/prevention & control; Sex education

Descritores
Doenças sexualmente transmissíveis/prevenção & controle; Adolescente; Comportamento do adolescente; Infecção por HIV/prevenção & controle; Educação sexual

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Conflicts of interest: the authors have no conflict of interest to declare.
Introduction

Establishing a horizontal relationship between health professionals and adolescents, by accepting them as protagonists in the process of constructing their personal and collective health and giving them a potential of emancipation, autonomy, and social responsibility, can allow a new form of approach in the health care.\(^{(1)}\)

When the dimension of adolescence is taken into account, meeting their current needs of development and expanding the alternatives to prevent vulnerable situations through education is essential. Assuming the challenge of applying participatory methodologies that promote the adolescents’ protagonism in planning and implementing actions it is also necessary.\(^{(2)}\)

In combating sexually transmitted diseases (STD), human immunodeficiency virus (HIV), and acquired immunodeficiency syndrome (AIDS) among adolescents, construction of strategies that bring them closer to the self-care, with focus on the risks of unprotected sexual intercourse, should be preferred. Thus, the importance of changing behavior, such as using condoms in all sexual intercourse, should be emphasized.\(^{(2,3)}\)

In the last 10 years, the age profile in cases of AIDS has changed to younger individuals, tending to an 11.8%-increase in the detection rate. The chronic character of AIDS and advances in drug therapy have led the population to leave preventive measures aside, and thus adolescents are more vulnerable to this type of behavior.\(^{(4)}\)

Investigation showing the importance of adolescents as protagonists in developing solutions to issues related to their health is necessary to both open spaces and facilitate processes that allow them to effectively participate in building strategies in the social dynamics of STD/HIV/AIDS prevention.\(^{(2,3,5)}\)

The objective of this study was to analyze the protagonism of adolescents in creating spaces in the school environment to prevent STD.

Methods

This qualitative study was developed in the period Jan-Jun 2013, in a public school in the city of Imperatriz, State of Maranhão, Northeast region of Brazil.

A convenient sample of ten adolescent students (younger than 18 years) regularly registered was included in the research because this intermediate phase of adolescence is considered to have a higher incidence of infection with STD/HIV/AIDS. Adolescents who did not participate in all steps were excluded from the research.

Interviews, focus groups, and participant observation were the techniques utilized to collect data. Interviews were conducted of an individual and semi-directed way, providing a socio-demographic characterization of adolescents. The interviews were audio-recorded (mean duration: 30 min). Later, their contents were fully transcribed.

The technique of the focus group had the participation of all subjects involved in the research, and was based on a script that addressed the following issues for discussion: What adolescents want to know about sexuality and STD/HIV/AIDS? How should educational intervention be called? What makes an environment warm and attractive to work with adolescents in health education? How should we organize the intervention site? What educational materials will be provided?

Adolescents of both sexes remained together during the development of focus groups because the unique gender experiences are considered important mechanisms to ponder and analyze the topic to be discussed.

The study took as its reference the Community-based Participatory Research (CBPR) in which investigation and collaboration occur simultaneously and equanimously between researchers and participants.\(^{(6)}\)

For data analysis, we used the discourse analysis technique,\(^{(7)}\) which allows addressing the sense of the text not only its content, to reveal the essence of each testimony.

In this analysis technique, reading and rereading by the researchers contributed to their understanding of the sense given to testimonials by the participants. Identification of participants in the
interviews and focus groups was coded with MA (male adolescent) and FA (female adolescent) to ensure confidentiality of information.

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

**Results**

The adolescents (aged 15-16 years) were single and some of them had a fixed partner. They lived with their biological parents and brothers/sisters and participated in the project “Health and Prevention in Schools” activities for at least 6 months.

During planning of the intervention, the adolescents suggested the location and environment preparation, educational material, topic for discussion, and identification of space. In addition, they proposed a denomination that both could identify the location and facilitate approaching of other adolescents to participate in educational activities.

After actively listening to the adolescents, some of their suggestions for construction of the educational intervention environment were listed. Thus, they were asked to propose words or elements that could express formation of the educational environment as a whole.

Preparation of the educational intervention had the participation of the adolescents, who followed the principles of the Community-Based Participatory Research (CBPR) in room planning, in terms of organization, layout and decoration (Figure 1). This showed their motivation and interest in collaborating with the educational activity, and allowed that the space could reflect the adolescent’s image and a sense of belonging could emerge, giving way for authoring and protagonism.

Besides composing the environment, adolescents reported the need to include educational material on STD/HIV/AIDS, which could be discussed at the time of intervention, in order to potentiate knowledge. The adolescents considered the use of condoms during sexual intercourse as a priority issue to be discussed in the intervention, with focus on adherence.

**Discussion**

The limits of the results of this study are related to its qualitative design, which has low reproducibility and representativeness. However, the school and participants in the study are very similar to the Latin American scenario, an issue that helps in supporting some information.

Previous publication did not analyze the content and quality of the protagonism of young people in developing spaces to prevent sexually transmitted diseases and thus help other young people. Health professionals in the Primary Care Units should pay attention to the potential of these young people to educate other subjects of the same age group, always in a contextualized, clear, and satisfactory way.

The participants had some knowledge about the subject and commitment to a shared construction
of intervention.\(^{(8,9)}\) This fact enabled us to understand the need for a different look to the experience of sexuality at this stage, which allowed the adolescents themselves propose strategies to bring and define subjects difficult to approach or with greater resistance to healthy behaviors.

The studies consulted in the literature have an approach based on epidemiologic data, which is adequate to healthcare professionals, but which ignores the universe of aspirations for autonomy of adolescents, so that they can decide on issues of their health.\(^{(8,10)}\) However, the practice of an active listening to adolescents about their expectations and needs in this theme allowed us not only learn but also form bonds and belief in the intervention goals.

Bonds favor differentiation of health professionals in relation to others in the health care of young people. Active listening to adolescents by health professionals is an approaching behavior that establishes a convivial relationship, because they convey messages related to body-mind imbalance and hear the real views and learning interests of these adolescents.\(^{(11)}\)

Analysis of adolescents’ opinions on identification of the space to carry out the educational intervention, revealed their concern in providing individualized care, when they suggested an environment that could be both welcoming and favorable to discuss the issue, with typical characteristics of adolescence. The juvenile protagonism offers rich possibilities to participate in the construction of their identities and strengthen the transformative power of adolescents and their peers regarding health.\(^{(12)}\)

Contextualizing the adolescents’ ideas, we can summarize that the school is an environment favorable to their health (since it offers a space for adolescents as persons), to the opportunity for their own care, and to the free report of their problems (since the school is attentive to what is meaningful to them, who can then position in relation to it). Therefore, introducing in the school environment welcoming elements (brought by the adolescents themselves), which may make sense in assiduity to their colleagues in the educational intervention, can indeed facilitate discussion on STD prevention.

Among the elements considered useful in learning, and to fit to the educational space, condom use was the element most mentioned by adolescents, especially when availability of information about its use is not compatible with its regular use. Although young people under 24 years have more information than those of earlier generations, they ignore condom use because they are not afraid of disease and trust in their partners.\(^{(13)}\)

The fact that adolescents use condoms only in their first sexual intercourse, leaving them to the first signs of confidence in their partners, is the great current challenge regarding prevention. Besides providing information, approaching and knowing the adolescents’ universe is necessary to discover the existing causes of divergence between knowledge and behavior.\(^{(13)}\)

In reports by adolescents, we find that providing delivering educational materials to prevent sexually transmitted diseases does not ensure that healthy sexual practices are acquired. Giving immediate responses is necessary to open discussion and acquire knowledge. However, some authors state that other factors should be related to apply theory to practice.\(^{(14)}\)

Therefore, in the present study the objective of the space for educational intervention was to create a reference location to prevent sexually transmitted diseases in school, which makes the concern of the participating adolescents relevant. It was also possible to notice that the suggestions by the adolescents in identifying the location of intervention showed their concern of not labeling those who could seek it, as being sexually active or intending to initiate his/her sexual life.

Many adolescents may find barriers during health education actions, for example, collective environments for discussion on sexuality, shyness, difficulty in expressing doubts, and little interaction with the educator.\(^{(15,16)}\)

For effectiveness of health education actions, the health professionals need to recognize the autonomy, assimilation capacity, and previous knowledge of adolescents, through dialogue, respect, and shar-
ing of knowledge, using the elements as proposed by the adolescents. References that may identify the adolescents’ sexual life, such as naming the educational intervention with titles associated with sexuality, can generate feelings of rejection and resistance to participate in the educational moment.

Working with the protagonist of adolescents contributes to affirmation of their emancipatory ideas, starting from respect to the other and different ways of exerting their sexuality, and facilitating discussion through questions, opinions, and values of adolescents. Therefore, it may contribute to an expansion of their own self-protection capabilities.

The concern about listening all peers, openly and without judgment, is a common characteristic as observed in the juvenile protagonism. The practice of listening allows an adolescent feel comfortable to put his/her questions and problems (which are typical during this period) before another adolescent, extending this practice before health professionals.

Adolescent listening is not an ordinary listening or technique, but listening to direct, guide, and search for a solution, using the available resources, not to judge. Active listening contributes to extend the adolescents’ concepts of sexuality, which are generally restricted only to the sexual intercourse, brings new knowledge, thus allowing to share experiences and give subsidies for responsible choices.

Conclusion

The participants in this study presented protagonism, carrying out activities to prevent sexually transmitted diseases in the school environment.

Collaborations

Costa ACPJ and Vieira NFC declare that they contributed to the study design, collection, analysis, and interpretation of data, and final approval of the version to be published. Araújo MFM; Araújo TM, and Gubert FA contributed to the interpretation and analysis of data, critical review of the relevant intellectual content, and final approval of the version to be published.

References


Functional limitation and disabilities of older people with acquired immunodeficiency syndrome

Limitações funcionais e incapacidades de idosos com síndrome de imunodeficiência adquirida

Gylce Eloisa Cabreira Panitz Cruz¹
Luiz Roberto Ramos²

Abstract

Objective: To evaluate functional ability of older people with human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS).

Methods: This cross-sectional study using observational epidemiological inquiry collected data through interviews and from medical record of 142 older people with HIV/AIDS age 60 to 81 years. Participants were evaluated for cognitive functionality, mental health and activities of daily living domains. We conducted absolute and relative analyses of continuous variables and associations of independent variables.

Results: Among the study participants, 82.39% had AIDS, 35.2% had more than 9 years of formal education, and 35% were still using cannabis. HIV was transmitted during heterosexual intercourse in 71.7% of participants and through sex with multiple partners in 70.3%. Adherence to antiretroviral therapy was satisfactory. Functional loss was significant among those age 70 years or older from both sexes.

Conclusion: Functional loss of older people with HIV/AIDS did not differ from results found in the literature among the HIV-negative aging population.

Keywords
Public health nursing; Disabled persons; Nursing care; Functioning; Acquired immunodeficiency syndrome; Aged

Descritores
Enfermagem em saúde pública; Pessoas com deficiência; Cuidados de enfermagem; Funcionalidade; Síndrome de imunodeficiência adquirida; Idoso

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Conflicts of interest: none reported.
Introduction

Aging is a dynamic and progressive process that can trigger the decline of older people’s functional ability to perform, with autonomy and independence, activities of daily living (ADLs) and instrumental activities of daily living (IADLs).

Strong evidence shows that a number of chronic diseases, including acquired immunodeficiency syndrome (AIDS) associated with depression and cognitive dysfunction, can lead to functional limitations and disabilities of people living with human immunodeficiency virus (HIV) or AIDS, especially those age 50 years or older.(1,2)

Hence, an important clinical change in the demography of older population in the past few decades has focused attention on people with HIV and those living with AIDS.

This scenario has special challenges for patients, health professionals and society as a whole. Fortunately, because of highly active antiretroviral therapy, the option of a healthy life and the manner in which older people define successful aging, many elderly persons have successfully faced HIV and AIDS. In practice, successful aging is characterized by time of life, biologic health, cognitive efficiency, mental health, social competence, productivity, personal control and satisfaction with life.(3,4)

However, adverse effects of antiretroviral therapy and clinical progression of AIDS associated with aging can increase with age and reduce the chance of success. Part of this is because AIDS is a transmissible chronic disease and older people with HIV/AIDS can have their autonomy and independency compromised, along with limitations in functional domains.

This study evaluated the functional ability of older people with HIV and AIDS by considering performance in cognitive function, mental health/humor and ADLs and IADLs.

Methods

This cross-sectional descriptive study was based on an observational epidemiologic inquiry with a quantitative approach carried out from 2008 to 2012 at the Reference and Treatment Center for STD/AIDS in the city of São Paulo. Data were collected through interviews and from participants’ medical record.

Inclusion criteria were age 60 years or older and confirmed HIV diagnosis at the Reference and Treatment Center for STD/AIDS. The convenience sample consisted of 142 older individuals age 60 to 81 years. The sample error was 5%; we calculated 90% confidence intervals.

Cognitive function was evaluated by using the Mini-Mental State Examination. This neuropsychological test contains 30 questions; each question is worth 1 point. To classify as a cognitive deficit, without a definite diagnosis, the cut-off is ≥23 points.(5)

To evaluate mental health (humor), we used the Brazilian version of the Short Psychiatric Evaluation Schedule. This questionnaire is composed of 15 yes-or-no questions, with each question worth 1 point; the total score is obtained by summing the positive responses.

We used a cut-off point of ≥6 for the sum of psychiatric symptoms, such as dysthymia (mild depression), without confirmed diagnostic precision.(6)

To evaluate independency in ADLs, we applied the Brazilian OARS Multidimensional Functional Assessment Questionnaire and Brazilian version for Older Americans Resources and Services. This instrument is composed of 15 domains: 8 for ADLs (lying in/getting out of bed, eating, grooming, walking on a level surface, bathing, dressing, going to the toilet in time, and trimming toenails) and 7 for IADLs (climbing a flight of stairs, taking medicines on time, walking near the home, shopping, preparing meals, using public transportation, and cleaning the house). Respondents were considered dependent if they could not perform seven or more activities.(7)

The Statistical Package for the Social Sciences (SPSS), version 17.0, was used for absolute and relative analyses of collected data. Variables that characterized social and demographic aspects were identified. Measures of variability were calculated, as well as standard deviation, mean, and medium,
besides widening of minimal and maximal values in distribution of simple frequency of continuing samples variables. The Fisher exact test was performed for the association of independent variables.

Development of this study followed national and international ethical and legal aspects of research on human subjects.

Results

Table 1 reports social and demographic variables among our study sample of older people with HIV/AIDS.

Table 1. Sociodemographic characteristics of older people with HIV/AIDS

<table>
<thead>
<tr>
<th>Variables</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>80(56.3)</td>
</tr>
<tr>
<td>Female</td>
<td>62(43.7)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>109(74.7)</td>
</tr>
<tr>
<td>70-81</td>
<td>33(25.3)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>44(31.4)</td>
</tr>
<tr>
<td>Single</td>
<td>41(29.2)</td>
</tr>
<tr>
<td>Married</td>
<td>25(17.5)</td>
</tr>
<tr>
<td>Legal separated</td>
<td>19(13.1)</td>
</tr>
<tr>
<td>Divorced</td>
<td>13(8.8)</td>
</tr>
<tr>
<td>Years of formal education</td>
<td></td>
</tr>
<tr>
<td>Illiteracy</td>
<td>18(12.7)</td>
</tr>
<tr>
<td>1-4</td>
<td>27(19.0)</td>
</tr>
<tr>
<td>8</td>
<td>47(33.1)</td>
</tr>
<tr>
<td>9-12</td>
<td>22(15.5)</td>
</tr>
<tr>
<td>13-16</td>
<td>23(16.2)</td>
</tr>
<tr>
<td>≥17</td>
<td>5(3.5)</td>
</tr>
<tr>
<td>Diagnosis</td>
<td></td>
</tr>
<tr>
<td>AIDS</td>
<td>117(82.3)</td>
</tr>
<tr>
<td>HIV</td>
<td>25(17.7)</td>
</tr>
<tr>
<td>Age at the diagnosis</td>
<td></td>
</tr>
<tr>
<td>40-50</td>
<td>33(23.2)</td>
</tr>
<tr>
<td>51-60</td>
<td>93(65.4)</td>
</tr>
<tr>
<td>≥61</td>
<td>16(11.4)</td>
</tr>
</tbody>
</table>

The sample consisted of 71.7% of older people who acquired HIV through heterosexual intercourse; 70.3%, through intercourse with multiple sex partners; 48.6%, by partner who had had sex with multiple partners; 30.4%, by HIV-positive partners; 16.7%, through bisexual intercourse; 11.6%, by blood transfusion; 10.5%, through homosexual intercourse; 8.7%, by the use of injected drugs; 2.2%, as sex workers; and 0.7%, through a contaminated syringe.

A total of 38.3% of participants lived alone, 24.1% with their children, 18.4% with a partner, 9.3% with parents, and 9.9% with friends or relatives. Of all participants, 18% were still sex workers.

Most participants were receiving antiretroviral therapy (82.3%). Of those in treatment, 83.7% were age 60 to 69 years old; 94.4% reported knowing how to use the therapy without any difficulty; 85.8% said that they never abandoned the treatment, and only 11.4% mentioned that the therapy caused difficulties in some of their daily life activities, particularly the eventual adverse reactions. Almost 13% of participants had initiated the therapy 20 years ago; 46.6%, 15 years ago; 22.4%, 10 years ago; and 18.1%, less than 10 years ago. Older people age 70 years and older reported less adherence to the therapy and difficulty using it.

Concerning smoking, 52.1% of participants reported that they never smoke, 29.6% were smokers and 18.3% were former smokers. Almost 42% of the older people consume alcohol, 38.7% never consumed alcohol, and 19.7% had stopped drinking alcohol. The most-consumed alcoholic beverage was beer (75.9%), followed by wine (27.6%) and distilled beverages (19%).

Almost 32% of participants had consumed one or more than two types of drugs (87.5% had consumed cannabis; 66.7%, cocaine; 20.8%, crack; and 12.5% injected drugs). Those who currently did not consume any type of drug were 65%; 35% were still using cannabis.

Frequently reported chronic non-transmissible diseases were hypertension (52.5%), depression (23.4%), cataract (21.3%), diabetes (19.0%), joint diseases (19%) and bronchitis (17%).

Almost 65% of participants (both sexes) reported fair satisfaction with life; 21.8%, little satisfaction with life; and 13.3%, high satisfaction with life.

Assessment of cognitive function using the Mini-Mental State Examination showed that 28.1% of participants had probable cognitive deficit; 22.5% achieved a score of 30; 29.2%, a score of 29 to 27; and 19.7%, a score between 26 and 24. No cognitive losses were seen.
In mental health/humor tracking, 24.1% of older people scored 6 or more points. The analysis of descriptive measures showed that the mean was 4 points, with a standard deviation of 3.8 points. Thirty-eight percent of participants reported headache; 36.5%, reported agitated sleep and difficulty sleeping; 34.5% and 30.5%, respectively, did not feel well or happy most of the time; 25.5% sometimes felt they were useless; and 21.3% felt alone despite having a family/partner.

Assessment of ADLs and IADLs showed that 61.62% of older people did not mention any difficulty performing the 15 ADLs; 16.5% reported having some difficulty performing one to three ADLs; 9.1%, four to six; and 12.7%, seven or more.

Results of the Mini-Mental State Examination are shown in table 2 including select analysis of the association of independent variables.

**Table 2. Statistical description of Mini-Mental State Examination (MMSE), Short Psychiatric Evaluation Schedule (SPES) and Brazilian OARS Multidimensional Functional Assessment Questionnaire (BOMFAQ)**

<table>
<thead>
<tr>
<th>Scales</th>
<th>Score</th>
<th>Gender n(%)</th>
<th>General p-value</th>
<th>Age n (%)</th>
<th>General p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>Male</td>
<td>60-69</td>
<td>≥70</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMSE</td>
<td>≥24</td>
<td>38(61.3)</td>
<td>64(80.0)</td>
<td>102(71.8)</td>
<td>85(78.0)</td>
</tr>
<tr>
<td></td>
<td>≤23</td>
<td>24(38.7)</td>
<td>16(20.0)</td>
<td>40(28.2)</td>
<td>24(22.0)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>62(100.0)</td>
<td>80(100.0)</td>
<td>142(100.0)</td>
<td>109(100.0)</td>
</tr>
<tr>
<td>SPE</td>
<td>0-5</td>
<td>62(75.5)</td>
<td>45(73.8)</td>
<td>107(75.9)</td>
<td>80(74.1)</td>
</tr>
<tr>
<td></td>
<td>≥6</td>
<td>18(24.5)</td>
<td>16(26.2)</td>
<td>34(24.1)</td>
<td>28(25.9)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>80(100.0)</td>
<td>61(100.0)</td>
<td>141(100.0)</td>
<td>108(100.0)</td>
</tr>
<tr>
<td>ADLs</td>
<td>Independent</td>
<td>0</td>
<td>54(67.5)</td>
<td>33(53.2)</td>
<td>87(61.3)</td>
</tr>
<tr>
<td></td>
<td>Partial dependency</td>
<td>1-6</td>
<td>16(20.0)</td>
<td>21(33.9)</td>
<td>37(26.0)</td>
</tr>
<tr>
<td></td>
<td>Dependent</td>
<td>≥7</td>
<td>8(12.5)</td>
<td>10(12.9)</td>
<td>18(12.7)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>80(100.0)</td>
<td>62(100.0)</td>
<td>142(100.0)</td>
<td>109(100.0)</td>
</tr>
</tbody>
</table>

**Discussion**

Limitations of this study are mainly related to the cross-sectional design, which does not enable us to establish a cause-and-effect relationship among variables, the loss of some older people who were not included in the study. Such loss might lead to the overestimation of the functional level of elderly persons.

Contribution of the study results and their applicability to nursing practice are directly related to their ability to provide directions for future studies, including basic epidemiologic study of the incidence and prevalence of dependency in ADLs and IADLs associated with cognitive changes rates and mental health among older adults with HIV and AIDS. In addition, this study encourages preventive actions and infection control and has generated information that can be used for care and health promotion among aging individuals with AIDS.

Our study had a predominance of aging men age 60 to 81 years. Most participants were widowed or symptomatic singles who were infected mainly during heterosexual intercourse or through sex with multiple partners. More than 60% of participants reported that infection occurred when they were 51 to 60 years old, and 9.7% reported infection at age 61 years or older. Mean age when infection occurred was 56 years (standard deviation, 6.9 years). Studies conducted in the United States showed similar results and pointed out that with the advent of highly active antiretroviral therapy, the trend in the upcoming years will be toward a mean age at time of infection of 60 years.\(^{(3,8)}\)

We observed that 35.2% of participants had more than 9 years of formal education, 33.1% had up to 8 years of formal education, and 12.7% were illiterate. Scientific observation shows that people with high school or college education are likely to have more access to information related to HIV infection and, for this reason, have better internal and external resources to live with their serologic condition.\(^{(9,10)}\)
In our sample, some participants with HIV/AIDS lived alone or with parents, others were still sex workers, and some used cannabis; however, we found no studies including these variables to make a comparison.

Management of antiretroviral therapy in our sample showed that adherence was 82.3% within those age 60 to 69 years, with a mean duration of treatment of 15 years. This result is similar to the adherence found in the literature showing that older people can guarantee significant control of syndrome manifestation and, at the same time, their longevity as HIV-positive individuals.\(^{(11-13)}\)

Effectiveness of adherence to antiretroviral therapy shows a borderline reliability of patients in relation to offering treatment as a way to improve quality of life, in addition to the significant relationship between use of antiretroviral therapy and not being affected by an opportunistic disease.\(^{(6,8,11)}\)

It is believed that despite the viral suppression provided by the antiretroviral therapy, the level of systemic persistent immune activation and inflammation is low. This contributes to acceleration of the aging standard of HIV-positive patients. The effects of aging can also be accelerated by the toxicities of long-term antiretroviral therapy and related lifestyle factors, such as smoking, alcohol consumption, drug use and co-infection by cytomegalovirus and hepatitis C virus. This theoretical association of HIV with aging has been widely discussed because of the increase of comorbidities associated with normal aging in HIV-infected cohorts, including cardiovascular disease, renal impairment, cognitive impairment, decrease of bone mineral density, malignancy, and fragility.\(^{(4,11)}\)

We found that older people with HIV/AIDS also presented comorbidities, with a higher prevalence of hypertension, depression, joint disease, and diabetes. This information agrees with the findings of studies that characterized population of elderly patients with HIV/AIDS and elderly patients in general.\(^{(1,2,9)}\)

The Mini-Mental State Examination showed that 28.2% of older people with HIV in our study had cognitive deficit, with significant association with female sex and age 60 to 69 years; however, we found few data in the scientific literature with which to compare this result.\(^{(12,13)}\)

In the assessment of mental health/humor we found that 24.1% of elderly patients had dysthymia (mild depression); of these, most were men age 60 to 69 years. However, this result was not significant. One of the first studies about depressive symptoms and higher rate of depressive disorder among individuals infected with HIV consistently showed that men with HIV/AIDS within the same age range, compared with the HIV-negative general population, had a 2% to 7% greater likelihood of meeting criteria for a depression diagnosis.\(^{(9,11,14)}\)

Dysthymia is twice as frequent among women as men and, in terms of evolution, this condition can be considered as a subtype of adaptive humor that is developed to withstand stress and deprivation. However, an individual with clinical manifestation of dysthymic disorder can present a sensible compromising in the ability to carry out ADLs.\(^{(11,14,15)}\)

By evaluating the difficulty of aging individuals to perform ADLs, we observed a low prevalence of dependence, mainly among men age 60 to 69 years. Among the 15 evaluated ADLs, participants most often showed an inability to perform the following: climbing a flight of stairs, taking medicines on time, going to the toilet in time, trimming toenails, and cleaning the house.

When compared with the few studies of health and functionality in older people with HIV/AIDS, we found that age was a determinant of all independent measures of other factors. Women had a gradual decline in both health and functionality at age 50 years, while the decline for men became more noticeable at 60 years or older.\(^{(16-18)}\)

Our findings highlight the importance of using a hierarchical scale of functional ability that considers assessment of gradual loss of function with aging, mainly in aging with AIDS. Although functional ability was evaluated with instruments widely used and recognized in the gerontology literature, most studies of aging and functionality do not include older people with HIV/AIDS.
**Conclusion**

Data on functionality of these older people with HIV/AIDS were similar to findings for cognition, mental health and independence for ADLs among representative older people from the general aging population.

**Collaborations**

Cruz GECP and Ramos LR contributed with conception of the project, data analysis and interpretation, drafting the manuscript, critical review relevant for intellectual content and approval of final version to be published.

**References**


