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Editorial

Groundwater: out of sight, out of mind and out of actions for its protection

Why groundwater is so important for population health? In Brazil, opening a tap does not guarantee having drinking water. Although this is fundamental for population health, public attention in sanitation is still deficient. In the access to water and sewage, the country occupies the 112th place among 200 countries, and coverage of the national water network is 83%.(1) However, this number hides an even greater deficiency, since having one’s home connected to the public water network does not mean that it will receive water all the time, especially in the dry season and peripheral areas of cities.

When the public service is not available, the users appeal to alternative systems. In the last 20 years, the construction of 10 thousand water wells in the metropolitan region of Recife (Pernambuco State) was a crude response to the crisis that occurred in the 1990s. The strategy to overcome drought effects evolved to a cost-reduction strategy, because groundwater is 50-70% cheaper than that provided by the water company.(3) The Metropolitan Region of São Paulo, where 12 thousand private wells are estimated to extract more than 10 m³/s (contributing to 16-20% of the total supply), is another example.

Drilled wells are engineering works that allow access to groundwater reservoirs (aquifers). However, their costs are inaccessible to the poor population, who usually access groundwater by digging wells, which are vulnerable to contamination.

It is little known that groundwater supplies more than 82 million Brazilians (51% of the urban population) through the public network in more than 52% of Brazilian municipalities.(2) Groundwater is part of the hydrological cycle, ensures the presence of water flowing in the rivers (baseflow) in the dry season, performing the ecological function of diluting sewage transporting sediments, and maintaining ecosystems.

Alternative supply and health risks

Well contamination should be distinguished from aquifer contamination. The first is caused by poor well construction, when the Brazilian standards (ABNT NB588 and NB1290) are not followed. Wells must have sanitary cementation and protection slabs to prevent surface water and water from the aquifer shallow portions from entering the well. Aquifer contamination is caused by the infiltration of pollutants, derived from human activities, into the soil and, subsequently, into the aquifer. Thus, even in a well-constructed well, water quality is not guaranteed if the aquifer is contaminated.
When well contamination occurs, responsibility is exclusively of the user and of the drilling company. On the other hand, when degradation of the aquifer occurs, responsibility lies with the owner of contaminant activity, who must accomplish the monitoring, and afterwards send the data to state environmental agencies. The Health Surveillance has the role of accompanying the monitoring reported by the public and private water well and springs.

Groundwater exploitation should be formally required to the state authorities. However, more than 70% of the drilled wells are not authorized to operate. With such high illegality rate, quality control over well construction is smaller. Regular monitoring of private water wells is mandatory, but owners of illegal wells usually do not comply with the ordinance (MS 2914/2011). Both the ignorance of risks taken by many private users and the inadequate surveillance of the public power are the main causes of illegality.

Given these uncertainties, the use of groundwater has been prohibited in regions where the public network already exists (Federal Sanitation Law No. 11,445/2008, reinterpreted by Law No. 7217). Although this law is meritorious, one has to take into account the limitations that water companies face in supplying the total water demand. Its application in Brazilian cities is not realistic, as private wells play an important role for the urban water security. In addition, groundwater is economically relevant to the industrial and service activities; abandonment of these wells would cause the water table to rise, which is a risk to the civil urban works too.

For a peaceful coexistence with groundwater usage

Groundwater does not receive the necessary attention by the management organs, because society underestimates the importance of this resource. Given the great potential in water supply by aquifers which are still underused by the country, it is necessary that the State assume a user partner posture, guiding them and implementing protection actions, including:

a) clarification the groundwater importance for the public and private supply (as well as for the environment and social welfare);

b) establishment of a social communication program with view to stimulate the regularization of wells and to inform the public and private users on the correct use of groundwater wells;

c) enforcement on the usage of ABNT norms, regarding the drilled wells construction, and exigency that contamination and overexploitation risk studies are performed previously to the authorization concession for drilling new wells;

d) user orientation, through service channels, regarding groundwater monitoring and incentive to systematically report well operation, and also communicate any problems to the Sanitary Surveillance;

e) government institutions capacitation with regard to guiding, managing, and monitoring the groundwater resources usage;


f) making the territorial planning compatible with groundwater resources availability, in order to the government and watershed plans correctly treat the groundwater resources.

Ricardo Hirata¹
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It is a time of celebration! This is an odd moment in the social life, when we celebrate and honor an important achievement. To honor the 30 years of the Doctoral Course of the Nursing Graduation Program is the purpose of this Editorial.

The Course was created in 1986 and named Doctorate in Maternal and Child Nursing, being later expanded and renamed as Doctorate in Nursing (1994). This Program has already awarded 224 PhD degrees, and 105 graduate students are currently with their doctoral training in progress.

We highlight the entrepreneurship, knowledge, competence, leadership, and commitment of the creators of this strict sense course for nurse researchers. This primary mission was gradually expanded, awarding the PhD degree to other professionals who have identified, in the research lines and in the knowledge produced in this course, their ways to develop new knowledge. We should also emphasize the responsibility of those who currently propose to continue the mission of the program, which is to be a “center of excellence for the training of researchers, leaders, and professionals highly trained to promote the advancement of nursing and health sciences, with emphasis on the multidimensional approach to people and groups in their different expressions”.

In this context, we ask what was the Doctoral Course contribution to the graduation training in nursing and health in the country?

The first PhD award occurred in October 1991. The search for information about PhD graduates on the Lattes Platform allowed to present various information, including to identify the curricula of 217 PhDs awarded by the program until June 2016 and show some of its contributions to the graduation in Nursing and Health.

Of the 217 PhD trained in the EPE, 194 (89%) are nurses and 23 (11%) are professionals from other areas of knowledge. Most of them were awarded their degrees with about 40 years of age, and the increase in the number of awards for under 30 years of age in the last ten years is a highlight. On the average, the PhD awards occurred in 3.9 years. Of the total number of these PhD, 57% were from São Paulo State, indicating that the program has significantly contributed to the training of researchers from other States of Brazil.

We analyzed the research projects developed with the participation of PhD trained in EPE. A total of 1,189 projects were identified since the first record (1988) until 2016. Of these, 367 (31%) projects were founded by agencies for research support (such as the National Council for Scientific and Technological Development, CNPq; Coordination for the Improvement of High Level Personnel, CAPES; and Research Support Foundations
of several States of Brazil), as well as educational and health institutions. Given the total numbers of projects and PhD graduates, each researcher was estimated to participate in five different projects on the average.

Regarding intellectual production, a total of 4,297 articles was published in national and international journals with the participation of PhD trained in EPE, with a ratio of 20 articles per researcher. All PhDs trained in EPE were or are supervisors of undergraduate and graduate students, in broad and/or strict sense courses, with a total of 9,585 undergraduate and graduate students supervised, or 44 supervisions per PhD trained, highlighting that several of them were or are coordinators of graduation programs in Brazil.

These data allow us to see the relevance of the Doctoral Course in the training of researchers. We are proud of the PhD graduates for their contribution to the qualified training and scientific development of high level professionals in Brazil.

With view to celebrate this moment, we have idealized a scientific event that will allow us to celebrate the success achieved in these 30 years of the PhD course, identify gaps and opportunities for improvement, and move into the future. We will have the participation of national and international renown guests, and presentation of about 90 scientific posters. We hope to enjoy a unique sharing moment and stimulus for the continuous advancement of the health research and nursing art.

*The event Doctorate in Nursing at UNIFESP: contributions to the advancement of science and art, in commemoration the 30th anniversary of the Doctoral Course (Nursing Graduation Program, Escola Paulista de Enfermagem; to be held from Nov 30 to Dec 01, 2016), received financial support from the Coordination for the Improvement of High Level Personnel (CAPES, Process nº 8881.122606/2016-01), National Council for Scientific and Technological Development (CNPq, Process nº 436755/2016-5), and São Paulo State Research Foundation (FAPESP, Process nº 2016/16049-7).

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Family-centeredness and community orientation according to three child health care models

Orientação familiar e comunitária segundo três modelos de atenção à saúde da criança

Nathanielly Cristina Carvalho de Brito Santos¹
Beatriz Rosana Gonçalves de Oliveira Toso²
Neusa Collet³
Altamira Pereira da Silva Reichert³

Abstract

Objective: To assess the attributes family-centeredness and community orientation according to three Primary Health Care models for children.

Methods: Cross-sectional and quantitative assessment study, involving 1,484 family members and/or caregivers of children younger than ten years of age attended in different primary health care models. The attributes family-centeredness and community orientation were assessed using the Primary Care Assessment Tool - Brazil, child version. For comparative analysis, Kruskal-Wallis and Dunnett’s test were used.

Results: Separately, all Primary Health Care models scored unsatisfactorily for the attributes assessed. When compared, a statistically significant difference was found for the attributes derived, favoring the Family Health Strategy models over the traditional model.

Conclusion: The Family Health Strategy models scored higher for family-centeredness and community orientation. Their principles can contribute to reorient primary health care in the mixed model.

Keywords
Primary care nursing; Child; Health services evaluation; Public health nursing; Primary health care

Resumo

Objetivo: Avaliar os atributos orientação familiar e orientação comunitária segundo três modelos de Atenção Primária à Saúde da criança.

Métodos: Estudo transversal, avaliativo e quantitativo, realizado com 1,484 familiares e/ou cuidadores de crianças menores de dez anos atendidas em diferentes modelos de atenção primária à saúde. Os atributos orientação familiar e comunitária foram avaliados utilizando-se o instrumento Primary Care Assessment Tool - Brasil, versão criança. Para análise comparativa, utilizaram-se os testes de Kruskal-Wallis e Dunnett.

Resultados: Isoladamente, todos os modelos de Atenção Primária à Saúde apresentaram escore insatisfatório para os atributos avaliados. Quando comparados, houve diferença estatisticamente significativa para os atributos derivados em favor dos modelos que operam com a Estratégia Saúde da Família em relação ao modelo tradicional.

Conclusão: Os modelos com Estratégia Saúde da Família apresentaram maiores escores para orientação familiar e comunitária, cujos princípios podem contribuir para reorientação da atenção primária à saúde no modelo misto.
Introduction

Child health care has gained room in public policies, prioritizing care integrality to bring down child morbidity and mortality rates due to avoidable causes and achieve survival with quality of life, in view of the singularities and particularities involved in the growth and development process of these unique, dynamic and complex beings.\(^1\)

Therefore, in child care, the team’s interaction with the family and community is fundamental to permit shared activities in the systematic monitoring, involving prevention, cure, rehabilitation and health promotion actions,\(^2\) aiming for effective and high-quality child health care in Primary Health Care (PHC).

In Brazilian PHC, distinct models coexist, whose work processes present particularities that can influence the outcomes of effective and high-quality PHC in child health care. These are: traditional Primary Health Care Units (UBS), with care centered on specialty areas; Family Health units (USF) with integral care centered on the family and community;\(^3\) and mixed models,\(^4\) which consider the traditional models while cooperating with the USF, called mixed Primary Health Care Units here.

Despite the implementation of guidelines to guarantee high-quality care in the Unified Health System (SUS), in PHC, child health care is usually centered on spontaneous demand and acute causes, making integral care difficult and driving family members to health services like the emergency care. That was evidenced in a study\(^5\) intended to describe the problem-solving ability of child health care in PHC in two cities in the South of Brazil, in which the ability of PHC to solve children’s problems is considered low, which limited access to the health units when compared to the emergency services, which grant access to tests and the first medication dose.

To transform the organization and health practices from a comprehensive perspective, aiming to overcome the curative and disease-centered model,\(^6\) the care models need to be structured in accordance with the attributes of PHC: access upon first contact, longitudinality, integrality, coordination, family-centeredness, community orientation and cultural competency.\(^7\)

The family-centeredness considers the family as the subject of care, with potential for care. In the community orientation, the families’ needs are recognized in function of the geographical and socio-economic-cultural context they live in, besides its importance to assess the health services.\(^7\) In each attribute, dimensions are assessed that are important for the integrality of care delivered to individuals, families and communities. In the family-centeredness, the items are related to the professionals’ concern with what the child’s family thinks about the treatment and the care provided, the concern with existing problems in the family, meeting with other members if the relative thinks that is necessary. What the community orientation is concerned, the dimensions include a team member making a home visit, the service’s engagement in the community’s health problems through household surveys and the invitation of family members to participate in the health council.

In view of the above and considering the family’s importance for the integrality of child care, whose therapeutic project is put in practice by articulating the actions produced in health work, weaknesses at the encounter among professionals and between them, the child and his/her family represent challenges to produce new care forms,\(^8\) as the family is not being considered as the priority focus in its context, that is, in its community.\(^9\) That can reflect the continuation of care based on the individual and curative model.

Hence, the question is raised: What PHC model present higher levels of family-centeredness and community orientation in child health care? The objective was to assess the family-centeredness and community orientation according to three PHC models of child health care.

Methods

Quantitative and cross-sectional assessment research based on the Manual of the Primary Care Assessment Tool or PCATool - Brazil in the
child version.(10) The study was developed between October 2012 and February 2013 at 22 traditional UBS in the city of Cascavel and at 40 mixed Primary Health Care services in Londrina, all located in Paraná, in the South of Brazil; and at 53 USF from Health District III in the city of João Pessoa, Paraíba, in the Northeast. Despite the existing socioeconomic inequalities between the Brazilian South and Northeast, the three care models target low-income populations with higher social vulnerability, considering indicators like the Municipal Human Development Index (MHDI) (Cascavel: 0.782, and Londrina: 0.778, in the State of Paraná, and João Pessoa: 0.763, in the State of Paraíba) and the Gini Index (Cascavel: 0.41, and Londrina: 0.42, in Paraná, and João Pessoa: 0.50, in Paraíba).(11) These characteristics are considered to be an indicator of sample homogeneity and bias control in the choice of the research scenarios.

The population consisted of family members (father, mother) and/or caregivers (grandparents, uncles /aunts, legal caregivers) of children younger than 10 years of age, with a history of care at those health services within six months before the data collection. That resulted in a total of 94,014 care cases. This age limit was chosen as the child growth and development monitoring recommended by the Ministry of Health involves an appointment calendar for children between zero and ten years of age. In addition, the dimensions assessed in the PCATool-Brazil consider the family member’s opinion on the service or professional and their actions, independently of the child’s age.

In view of the heterogeneity in the number of care cases registered in the three different cities, to calculate the sample, a 2.51% error margin and a 95% confidence level were adopted, using the application ‘Diman 1.0’, which resulted in a total of 1,501 participants. This sample was stratified proportionately per city, with 548 cases in Cascavel; 609 in Londrina and 344 in João Pessoa. As the traditional UBS was predominant in Cascavel, however, 17 family members and/or caregivers covered by the USF were excluded, leading to a final sample of 1,484 participants. To select the participant, (non-probabilistic) convenience sampling was used in the waiting line for the medical or nursing consultation at the health services.

Relatives and/or caregivers living in the urban area of the cities were selected to answer the questionnaire, with capacity to understand and express themselves on the documents presented, who knew the service they were to assess, having taken the children for care at least twice before the occasion when they were waiting.

Undergraduate nursing and medical students, lato sensu post-graduation students in public health and stricto sensu post-graduation students (Master’s and Doctoral level) from the respective institutions that participated in the research collected the data by means of an interview at the waiting rooms of the health services. The professors who coordinated the research properly trained the students who collected the data. Therefore, they used the Primary Care Assessment Tool or PCATool - child version, (10) validated in Brazil.(12) In the tool, the answers are formulated using a Likert scale.(10)

To verify the attributes deriving from the child PHC models, the item scores for the attributes family-centeredness and community orientations of the PCATool-Brazil child version were used as variables. Based on the average item scores, the mean scores for the family-centeredness and community orientation attributes were calculated according to the Manual of the PCATool-Brazil. The scores for each component were transformed into an adjusted score on a scale from 0 to 10, defining scores ≥ 6.6 as high and scores < 6.6 as low or unsatisfactory, indicating the degree of these attributes or their supply but the investigated PHC models as adequate or not.(10)

To store, process and analyze the data, the software Microsoft® Excel, version 7.0 and SPSS (Statistical Package for Social Sciences), version 13.0 were used. To identify the existence of statistically significant differences in the attribute scores among the models, the Kruskal-Wallis test (non-parametric one-way ANOVA) was used. To define among what study groups the differences existed, Dunnett’s
(post hoc) multiple comparison test was applied, associated to the above with a 5% significance level (p<0.05).

The study was registered in the Ethics Committee (CEP) 044/2012-CEP/Brazil.

Results

The results evidenced that the supply of the attributes deriving from family-centeredness and community orientation in child health care was considered unsatisfactory in the three models, as the mean score was <6.6.

Table 1 presents the demographic and socioeconomic characteristics of the sample, which consisted of 1,484 family members and/or caregivers of children attended in the PHC models in three Brazilian cities. The mother was the most mentioned as the main caregiver in the three models (82.5%), whose prevalent age range varied between 24 and 34 years (41%). Independently of the care model, the majority has only one child (42.3%). Living with a fixed partner (48.5%) was predominant among the participants in the USF model when compared to married participants (31.4%), which scored higher in the other models. Family income was concentrated between two and three minimum wages (53.0%), except in the group attended in the USF, where it was up to one minimum wage (46.2%). The family providers were the fathers (45.5%) and, in total, four or more people depended on the income (59.4%).

As regards the application of the chi-square association test for the demographic and socioeconomic variables according to the Primary Health Care models (Family Health Unit, traditional Primary Health Care Unit and mixed Primary Health Care Unit), except for the variable number of dependents on the family income, all variables presented statistically significant results at p < 0.01.

Concerning the family-centeredness and community orientation attributes, in table 2, it is observed that, independently of the PHC model, the mean score was <6.6, considered unsatisfactory for child health care. In comparison, no statistically significant difference was found between the USF and mixed UBS, but a statistically significant difference was identified between these and the UBS model.

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<td>Father</td>
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<td>Grandparents</td>
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<td>Others</td>
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<td>Age range (years)</td>
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<td>&lt; 24 years</td>
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<td>54 years or +</td>
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<td>Others</td>
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<td>Not informed</td>
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<td>Total valid</td>
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<td>Mother</td>
</tr>
<tr>
<td>Father and Mother</td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td>Total valid</td>
</tr>
<tr>
<td>No. of people contributing to FI</td>
</tr>
<tr>
<td>1 person</td>
</tr>
<tr>
<td>2 persons</td>
</tr>
<tr>
<td>3 or + persons</td>
</tr>
<tr>
<td>Total valid</td>
</tr>
<tr>
<td>No. persons dependent on FI</td>
</tr>
<tr>
<td>Up to 3 dependents</td>
</tr>
<tr>
<td>4 or + dependents</td>
</tr>
<tr>
<td>Not informed</td>
</tr>
<tr>
<td>Total valid</td>
</tr>
</tbody>
</table>

(+) Chi-square association test: Significant results (*) p-value < 0.01. USF - Family Health Unit; UBS - traditional Primary Health Care Unit; UBS Mixed - mixed primary Health Care Unit; FI - Family Income; MW - Minimum Wage(s)
Family-centeredness and community orientation according to three child health care models

(p<0.001), which was higher for the USF in terms of family-centeredness (score 5.3) and for the mixed UBS in terms of community orientation (score 5.9).

Table 2. Scores of family-centeredness and community orientation attributes of primary health care models

<table>
<thead>
<tr>
<th>Attributes</th>
<th>USF</th>
<th>UBS</th>
<th>Mixed UBS</th>
<th>SE</th>
<th>Median score</th>
<th>Average score</th>
<th>p-value#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family-centeredness</td>
<td>341</td>
<td>536</td>
<td>603</td>
<td>0.16</td>
<td>5.6</td>
<td>5.3</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Community orientation</td>
<td>241</td>
<td>398</td>
<td>496</td>
<td>0.19</td>
<td>5.8</td>
<td>5.8</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

SE - Standard Error; USF - Family Health Unit; UBS - traditional Primary Health Care Unit; Mixed UBS - Mixed Primary Health Care Unit; #Kruskal-Wallis test (non-parametric one-way ANOVA), p < 0.05; *Dunnett’s multiple comparison (post hoc) test (*≠**≠***)

In table 3, it was observed that, in the family-centeredness items, a statistically significant difference was found in child health care among the PHC models. For the professional’s concern with the family’s opinions on the treatment and care provided to the child, the significant different was favorable to the Primary Health Care model, with an average score of 4.0, higher than the other models; for the professional’s concern with knowing about the existing illnesses in the child’s family and with meeting with other relatives if necessary, statistically significant differences were found in favor of the Family Health model, with 7.0 and 5.8 as the mean scores, respectively, despite the score superior to 6.6 in the mixed UBS model for knowing about existing problems in the family.

What the community orientation attribute is concerned, all items presented a statistically significant difference between the PHC models. The USF model revealed a higher mean score for the home visit by a service professional (8.0) and the mixed UBS model for the service knowing important health problems in its neighborhood (score 6.1) and surveying the community’s health problems (score 5.1), according to table 3.

Discussion

Based on the data, the perception of family members and/or caregivers of children younger than 10 years can be verified with regard to the quality of care offered in the distinct PHC models. The study contributes by raising awareness on the need for holistic care provision to children and families in PHC, in nursing actions as well, including qualified listening, bonding and health education, aiming for the subject’s autonomy. In that sense, in view of the nature of health care and the capacity to contribute to the families, this professional seeks to help them to find strategies and gain strength in view of the health needs identified in all phases of their lives. Therefore, it is urgent for the scientific knowledge on nursing activities in the family to be included in undergraduate and post-graduation education, with a view to its incorporation in clinical practice at the health services.\(^{(13)}\)

Table 3. Mean scores 0-10 for the items of the attributes deriving from the primary health care models

<table>
<thead>
<tr>
<th>Items of attributes deriving from primary health care</th>
<th>USF Mean score (SE)</th>
<th>UBS Mean score (SE)</th>
<th>Mixed UBS Mean score (SE)</th>
<th>p-value#</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Family-centeredness</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I1. Does your “physician/nurse” ask about your ideas and opinions about your child’s treatment and care?</td>
<td>3.1(0.24)*</td>
<td>4.0(0.20)</td>
<td>3.4(0.18)</td>
<td>0.006</td>
</tr>
<tr>
<td>I2. Has your “physician/nurse” already asked you about diseases or problems in your child’s family?</td>
<td>7.0(0.24)</td>
<td>4.8(0.21)</td>
<td>6.8(0.18)</td>
<td>0.000</td>
</tr>
<tr>
<td>I3. Would your “physician/nurse” meet with other family members if you thought that was necessary?</td>
<td>5.6'(0.19)</td>
<td>4.4'(0.16)</td>
<td>4.9'(0.15)</td>
<td>0.000</td>
</tr>
<tr>
<td><em>Community orientation</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J1. Does anyone from the health service visit you at home?</td>
<td>8.0'(0.20)</td>
<td>6.3'(0.19)</td>
<td>7.0'(0.18)</td>
<td>0.000</td>
</tr>
<tr>
<td>J2. Does the health service know the important health problems in your neighborhood?</td>
<td>5.4'(0.19)</td>
<td>4.9'(0.16)</td>
<td>6.1'(0.14)</td>
<td>0.000</td>
</tr>
<tr>
<td>J3. Does the health service survey community health problems in the homes?</td>
<td>4.7(0.19)</td>
<td>4.6(0.16)</td>
<td>5.1(0.15)</td>
<td>0.003</td>
</tr>
<tr>
<td>J4. Does the health service invite family members to participate in the health council?</td>
<td>3.9'(0.21)</td>
<td>2.8'(0.17)</td>
<td>3.0'(0.18)</td>
<td>0.000</td>
</tr>
</tbody>
</table>

USF - Family Health Unit; UBS - Traditional Primary Health Care Unit; Mixed UBS - Mixed Primary Health Care Unit; SE - Standard Error; *Kruskal-Wallis test (non-parametric one-way ANOVA), p<0.05; *Dunnett’s multiple comparison (post hoc) test (’=”)
In the analysis of the attribute scores deriving from the three PHC models, unsatisfactory results were found regarding effective and high-quality childcare. These findings are a source of concern, as the attributes under analysis represent fundamental characteristics for the services’ planning and execution of health actions, for the strengthening of the bond among professionals-family-community and advances in the health indicators, such as the reduction of the childhood morbidity and mortality due to causes sensitive to PHC.(14)

In a study involving traditional UBS users, it was appointed that the importance attributed to the family and community is still incipient in the health team's work process.(15) International studies developed in China(16) and in Santander(17) and Bogotá(18), Colombia, unsatisfactory scores were revealed for family-centeredness and community orientation in primary care.

The low qualification of these attributes has been demonstrated in an international study involving users, professionals, coordinators and managers of public health services, demanding an enhanced perspective with a view to the implementation of strategies that focus on the individual, together with the family and the community, in the care process.(19)

Therefore, there is an urgent need to transform the work process of the teams in the health care models, including the expanded clinic approach in their practices, based on a dialogical relation among professionals-child-family, establishing a legitimate encounter(8) to build a singular therapeutic project for the user.(20)

Therefore, reflections are needed on the work process the health teams implement, with a view to redirecting and strengthening the professional training, based on continuing health education that can awaken the professionals to thoughts and actions coherent with integral and interdisciplinary care for the subjects in PHC.(21)

In this study, the fact is highlighted that the USF and mixed UBS models present the highest scores for the family-centeredness and community orientation models when compared to the traditional model, in line with other studies(4,22,23) that demonstrate the superiority of USF concerning these attributes. These two models differ from the traditional UBS because their work process takes into account the principles of the Family Health Strategy.

The individual analysis of the attribute components among the investigated PHC models reveals that the USF model performed better in terms of the concern of the professionals who monitor the child with identifying the existing diseases or problems in the family. This attitude is coherent with the proposal to understand the health and disease processes based on the articulation of different knowledge,(20) from the perspective of activities based on welcoming and bonding, but also the professional's accountability and commitment to integrate the actions, with a view to defragmenting the care and supplying comprehensive care.(8)

When comparing the scores of the community orientation attribute’s component, a statistically significant difference was identified with regard to the better results of the models that work with the Family Health Strategy. This can reflect the steps taken, although discrete, towards the principles of the Family Health Strategy in health care practices for the population, in which individuals, families and communities serve as subjects in the care process.

A powerful tool for integral care in PHC is the home visit, which is fundamental for the effectiveness of the horizontal relation between the professionals and the families in the care process. At home, the professionals can acknowledge the mothers’ efforts in terms of autonomy and daily responsibility in childcare. In the same context, the professionals get to know the families’ reality, employment, housing and sanitation conditions, as well as the mothers’ dedication to the prevention and promotion of their children’s health.(8)

The contact with the family in the home environment allows the professionals to envisage possi-
Family-centeredness and community orientation according to three child health care models

Abilities for new care, guiding their practice by the population’s social determinants of health. Through qualified listening, they can plan interventions to respond to the family’s singular needs, going beyond strictly technical knowledge.(24)

Conclusion

It was evidenced that the models presented a statistically significant difference in favor of the USF and mixed UBS. This demonstrates that, despite the limitations, the models that operate with the Family Health Strategy (FHS) present higher scores for family-centeredness and community orientation in PHC. In that sense, the better score for the mixed UBS indicates that the presence of the FHS principles in the care practices may be contributing to improve the score of this model towards the reorientation of child PHC. It should be highlighted that the Ministry of Health adopts the concept of family-centered health care as a synonym of family-centeredness in the assessment of PHC. Nevertheless, to truly change the child and family health care process in the context of PHC, the professionals need to be sensitized to expand and found their actions in a theoretical framework with a family focus, going beyond the governmental guidelines. The fact that the study did not assess the PHC professionals’ opinion can also be considered a limitation in this study.

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Collaborations

Santos NCCB, Toso BRGO and Reichert APS participated in the conception of the project, analysis and interpretation of the results. Santos NCCB, Tosam BRGO, Collet N and Reichert APS contributed to the writing of the article, relevant critical review of the intellectual content and approval of the version for publication.

References


Authentic leadership and the personal and professional profile of nurses

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Isabel Cristina Kowal Olm Cunha¹
Alexandre Pazetto Balsanelli¹
Andrea Bernardes²

Abstract
Objective: To verify the association of authentic leadership with the personal and professional profile of nurses.
Methods: A correlational study, conducted in a tertiary hospital. Data collection occurred from October to December of 2014. Participants included 69 nurses who had worked more than two years in the institution. Instruments used: characteristic-containing variables of a personal and professional profile (sex, position, working hours, other occupations, specialization degree, leadership positions already held, and knowledge about leadership referential), and the Authentic Leadership Questionnaire. Data were analyzed using descriptive statistics and the -Student’s t- test (p <0.010).
Results: For authentic leadership, 36 (52.2%) participants achieved a very high score, and 32 (46.4%) obtained a high score. The self-awareness subscale was higher: nurses averaged 1.7.
Conclusion: Nurses presented characteristics of authentic leadership, but no association was found with many of the studied variables.

Keywords
Leadership; Professional competence; Nursing staff; Questionnaires

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

Several rapid changes have been found in the last five years in economic, social, political, ethical and philosophical sectors, which characterize the complexity of the current time. As a result of these transformations, the labor market has demanded greater flexibility and broadened its vision about new knowledge and skills, among these is the practice of leadership. In this context, nursing had to review their actions.(1,2)

Nursing leadership involves potentiation, coordination and articulation of nursing team activities for the delivery of care. The nurse is primarily responsible for empowering the team to achieve this goal.(3)

Among the predominant models of leadership in the health area, a historical perspective in the 1940s, suggested that leadership was derived from innate personality traits. The behavioral style of the leader was designed in the 1960s. The contingent or situational approach was prevalent from the 1960s to the early 1980s. And from the 1980s to the present day, a form of charismatic, visionary, and transformational leadership emerged. (4)

Today, although incipient, studies on authentic leadership have been steadily advancing within the health area. Its use was preceded in the industrial, financial and retail areas, and was defended by Walumbwa et al.(5) This model has a preponderant, indirect and notorious effect on the team management process, and on the desired outcomes in hospital institutions.

Authentic leadership reveals the extent to which the leader presents a pattern of openness and clarity in his behavior, by sharing information needed for decision-making, and accepting the opinion of others. This leader disseminates his personal values, motivations and feelings, thus allowing followers to more accurately assess the competence and morality of his actions.(6)

There are four components of an authentic leader: balanced processing, moral and ethical perspective, transparency, and self-awareness.(7) Balanced processing involves objectively analyzing all relevant information and seeking the opinion of others before making decisions. The moral and ethical perspective involves the behavior of leaders who are more guided by internal norms and moral values than external pressures from their peers, organization or society. Transparency consists of making personal disclosures, such as sharing information and openly expressing one’s truths, thoughts, feelings, and moral values with his follower. Self-awareness includes confidence in one’s own motivations, desires, as well as recognition of strengths and weaknesses.(6,7)

Authentic leadership can positively affect the attitudes and behaviors of a company’s employees, promoting expressions of work engagement, organizational citizenship behavior (OCB), and performance.(6) Organizational citizenship behavior is understood as any positive and constructive initiative in which the employee engages of his own will, for the benefit of co-workers and the company. Employees who express OCBs are recognized for exceeding minimum expectations, which is, doing what is their duty in their workplace. Thus, the organization benefits, because this behavior is related to increased productivity, efficiency and customer satisfaction, as well as reducing costs and rates of turnover and absenteeism.(8)

Authentic leadership studies are recent and related to positive outcomes that the authentic leader provides for the organization.(6-9) Affective commitment on the part of the nurse, job satisfaction and an increase in the quality of care can be found when nurses have a relationship of trust with their managers. Increased safety practices in hospital organizations were also identified, with fewer medication errors and patient falls.(6) Authentic leaders develop environments of greater empowerment, improving communication, enabling the team to perform its work in a collaborative manner with members of all health disciplines, favoring better patient care. In addition, they provide high quality inter-professional collaboration, greater respect in the physician-nurse relationship, and job satisfaction.(9,10)
The association between the personal and professional profile with authentic leadership was not the object of study, which justified the development of this research. It is necessary to advance this knowledge to identify the nurses’ characteristics that interfere with the practice of this leadership model, proposing coping strategies that can support their solidarity in the health and nursing management scenario.

In view of the above, the study question was: Is there an association between authentic leadership and the personal and professional profile of nurses within a hospital institution?

The objective of this study was to verify the association of authentic leadership with the personal and professional profile of these nurses.

**Methods**

This was a correlational study, conducted in a large tertiary, general public hospital, which serves as a reference center for surgery, urgent and emergency care in Vale do Paraíba, in São José dos Campos, SP, Brazil.

The data collection period occurred between October and December of 2014. The sample was not stratified for convenience. The inclusion criteria were: a bedside nurse or a clinical nurse, in direct contact with the patient, working for two years or more in the institution, and not being on leave for any reason. The institution, where the study was conducted, defines a bedside nurse as the professional who provides direct care to the patient, with the assistance of nursing technicians and assistants. The clinical nurse is responsible for planning and coordinating the care model. A total of 133 nurses (100%) who were staff members of the research institution and who met the inclusion criteria were approached, but only 69 (51.9%) responded positively to the invitation to the study.

The data were collected by the researchers using two instruments: the first presented personal and professional profile variables: sex, position, work schedule, other occupation, specialization degree, leadership position already held, and knowledge of the following references of leadership: behavioral, situational, charismatic, visionary, transformational and authentic. The second was the Authentic Leadership Questionnaire (Self). The purchase of the license and permission was necessary in order to administer this instrument. It is a self-administered questionnaire available in 38 languages, including in Portuguese. Developed by Avolio, Gardner and Walumbwa, the questionnaire consisted of 16 assertions that were answered using a Likert scale, varying from 1 to 5 points in graduation: never (1 point), rarely (2 points), sometimes (3 points), regularly (4 points), and always (5 points). All the responses were summed, and scores varied from 16 to 80 points, and were discriminated as: very low authentic leadership behavior (16-32 points), low (33-48 points), high (49-64 points) and very high (65-80 points).

There were five questions (1, 2, 3, 4 and 5) for the transparency domain, four questions (6, 7, 8 and 9) for moral perspective, three questions (10, 11 and 12) for balanced processing, and four questions (13, 14, 15 and 16) for self-awareness. The Authentic Leadership Questionnaire (Self), was not validated during the data collection period. However, as it was already translated into Brazilian Portuguese, it was possible to use it. The cross-cultural adaptation is under study, so the results have not yet been published. Thus, the purchase of the adapted version for Portuguese was appropriate, in view of its use in other research, and based on the recommendation of the primary authors of the instrument for its use until the transcultural adaptation was performed.

The subjects answered both instruments in writing, after reading and signing the Terms of Free and Informed Consent form. The questionnaires were sent to the unit where the participants were working; in order to assure the quality of the collected data, the instruments and the terms were read with the participant and any doubts were clarified. A date was scheduled with each participant for later data collection. The pre-test was performed with three nurses who were included in the sample, since no changes were made to the content of the instruments or to the collection strategy.
Data analysis was based on the use of descriptive statistics. Categorical variables were presented by means of absolute and relative frequencies and continuous variables by position (mean, minimum, maximum) and scale [standard deviation (SD) and interquartile range]. The Cronbach’s alpha was used to analyze the overall internal consistency of the Authentic Leadership Questionnaire, with an interpretation interval between 0 and 1. In order to evaluate the association of authentic leadership with variables of the personal and professional profiles, the Students t-test was adopted, with a significance level of 10% (p < 0.010).

This study was performed according to the recommendations established by Resolution 466/2012 of the National Health Council, and was submitted to the Brazil Platform and approved by the Ethics and Research Committee of UNIFESP, protocol n. 820.255, 10/08/2014.

Results

Table 1 presents the relative and absolute frequencies of the personal and professional profile variables investigated.

The sample consisted mostly of females (94.2%, n = 65). The majority of participants occupied the position of bedside nurse (82.6%, n = 57) and the remainders were clinical nurses (17.4%, n = 12), who, in turn, worked eight hour/day. The night shift nurses were those who participated most in the research (30.4%; n=21); few of them had other occupations (37.5%, n=6). The specializations were mainly in the clinical area, mostly in “ICU, Urgent care / emergency/critical care, and Cardiology “(36.3%, n=20), as this hospital is a reference in surgery, urgent and emergency care. Most of the nurses had held leadership positions; most of them viewed themselves as care leaders (76.8%, n=53). Respondents reported knowing the referential related to behavioral (66.7%, n=46), authentic (40.6%, n=28) and situational (34.8%, n=24) leadership.

<table>
<thead>
<tr>
<th>Table 1. Relative and absolute frequencies of the personal and professional profile variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Position</td>
</tr>
<tr>
<td>Bedside nurse</td>
</tr>
<tr>
<td>Clinical Nurse</td>
</tr>
<tr>
<td>Work schedule</td>
</tr>
<tr>
<td>12 hours - Night Shift 1</td>
</tr>
<tr>
<td>12 hours - Night Shift 2</td>
</tr>
<tr>
<td>6 hours - Morning shift</td>
</tr>
<tr>
<td>6 hours - Afternoon shift</td>
</tr>
<tr>
<td>8 hours - Day shift</td>
</tr>
<tr>
<td>Other occupation</td>
</tr>
<tr>
<td>Hospital</td>
</tr>
<tr>
<td>School</td>
</tr>
<tr>
<td>University</td>
</tr>
<tr>
<td>Other*</td>
</tr>
<tr>
<td>Specialization degree</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Specialization field*</td>
</tr>
<tr>
<td>ICU, urgent care/ emergency/ critical care, and cardiology</td>
</tr>
<tr>
<td>Nursing management and/or health management and/or hospital management</td>
</tr>
<tr>
<td>Master of Business Administration (MBA), executive in health and/or business management</td>
</tr>
<tr>
<td>Teaching of higher education and/or pedagogy</td>
</tr>
<tr>
<td>Pediatric intensive care and/or pediatrics</td>
</tr>
<tr>
<td>Nursing and/or Health Audit</td>
</tr>
<tr>
<td>Neurology</td>
</tr>
<tr>
<td>Oncology</td>
</tr>
<tr>
<td>Organ procurement</td>
</tr>
<tr>
<td>Occupational health</td>
</tr>
<tr>
<td>Environmental service</td>
</tr>
<tr>
<td>Neonatal ICU</td>
</tr>
<tr>
<td>Obstetrics</td>
</tr>
<tr>
<td>Family Health Strategy</td>
</tr>
<tr>
<td>Surgical center/ Sterile Processing Department</td>
</tr>
<tr>
<td>Dermatology</td>
</tr>
<tr>
<td>Trauma</td>
</tr>
<tr>
<td>Have you held a leadership position?</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Position of leadership already held</td>
</tr>
<tr>
<td>Direct care</td>
</tr>
<tr>
<td>Direct care and supervision</td>
</tr>
<tr>
<td>Supervision</td>
</tr>
<tr>
<td>Supervision and coordination</td>
</tr>
<tr>
<td>Director</td>
</tr>
<tr>
<td>Unit manager</td>
</tr>
<tr>
<td>Coordinator</td>
</tr>
<tr>
<td>Technical Responsible</td>
</tr>
<tr>
<td>Knowledge about leadership referential**</td>
</tr>
<tr>
<td>Behavioral</td>
</tr>
<tr>
<td>Situational</td>
</tr>
<tr>
<td>Charismatic</td>
</tr>
<tr>
<td>Visionary</td>
</tr>
<tr>
<td>Transformational</td>
</tr>
<tr>
<td>Authentic</td>
</tr>
</tbody>
</table>

*“Other” is related to Basic Health Unit (BHU), Family Health Program (FHP), Emergency Care Unit (ECU) ** The percentage does not add up to 100%, because the respondent could select more than one item
Table 2 shows the descriptive statistics of: age, years since completing nursing education, time in the institution, and time in the current unit.

The research sample was a young population, with a mean age of 33.3 years old. However, age variability with a standard deviation of 6.5 was found. This was also reflected in the time in the institution (SD = 2.3). The variation of the time since completing nursing education was between 2 and 21 years (SD = 3.7).

The Cronbach’s alpha of the Authentic Leadership Questionnaire domains achieved the following values: 0.357 for balanced processing; 0.637 for moral and ethical perspective; 0.635 for transparency; and 0.567 for self-awareness. The overall Cronbach’s alpha was 0.702.

Figure 1 represents the distribution of the overall score on authentic leadership using a boxplot.

Scores of 36 interviewees were very high (64-80 points); 32 were high (48-64 points); and only one was low (32-48 points). Most of the sample fell between the first and third quartiles, varying respectively between 61 and 69, representing that nurses self-evaluate as having authentic leadership behaviors.

The difference by domain was subtle, and the means varied in their extremes between 15.6 and 16.9. The balanced processing function scored slightly higher than the others, with a mean of 16.9, and the transparency domain scored lower than the others, with a mean of 15.6.

Authentic leadership domains were compared to the knowledge that the nurses reported on the leadership referential investigated. The indexes of nurses who reported knowing about transformational leadership showed greater significance in relation to the percentages related to the presence of transparency (p=0.047). When there was no knowledge of any of the leadership referential, greater self-awareness was present, as compared to those who knew at least one of the models (p=0.058).

When the means of the scores were compared according to the position held by the participants, previous achievement of some specialization degree, and their performance as a leader, the mean of the self-awareness domain was higher, on average 1.7, in these bedside nurses as compared to the clinical nurses (p = 0.006).

Nurses who reported having held a leadership position reached a higher value for self-awareness (p=0.104) and moral perspective (p = 0.091) domains, but without statistical significance.

The variables of sex, work schedule and other occupations did not present a significant relationship with the authentic leadership domains.

### Table 2. Descriptive statistics of age, time since completing nursing education, time in the institution, and time in the current unit, in years, of the professionals interviewed

<table>
<thead>
<tr>
<th>Measurement</th>
<th>n</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>69</td>
<td>24</td>
<td>57</td>
<td>33.3</td>
<td>6.5</td>
<td>32</td>
</tr>
<tr>
<td>Time after nursing education</td>
<td>69</td>
<td>2</td>
<td>21</td>
<td>8.4</td>
<td>3.7</td>
<td>8</td>
</tr>
<tr>
<td>Time in the institution</td>
<td>69</td>
<td>2</td>
<td>9</td>
<td>4.4</td>
<td>2.3</td>
<td>4</td>
</tr>
<tr>
<td>Time in the unit</td>
<td>69</td>
<td>0.1</td>
<td>9</td>
<td>2.6</td>
<td>2.2</td>
<td>2</td>
</tr>
</tbody>
</table>
Discussion

The limitation of this study is due to the fact that the cross-cultural adaptation of the *Authentic Leadership Questionnaire* to Brazilian culture was not available at the time of data collection. This research corroborates the adequacy of this methodological process and attests to its efficiency, by enabling the identification of the correlation of the investigated variables with the authentic leadership behaviors in this sample.

The sample of this study was young in age, time since completing education and time working, however, with high standard deviation values. This fact shows a generational conflict among nurses. Nursing management must consider this reality to promote the development of these professionals.

In the health scenario, it is urgent to adopt more participative leadership models that support the development of this competence by nurses. (16) In this context, the majority of those in this research sample identified themselves as a team leader and provider of patient care, and referred to knowing the referential of behavioral, authentic and situational leadership that favored the interface between leaders and followers for the development of people.

When measuring authentic leadership, a variation was obtained between domains using the Cronbach's alpha; however, the overall internal consistency was 0.702. Some evidence demonstrates that the minimum value (0.70) is accepted as good. However, nurses' achieved high and very high scores in their responses, which differs from other studies using the *Authentic Leadership Questionnaire*, whose findings demonstrate moderate levels of authentic leadership. (7,10,18) This fact leads us to believe there was an overvaluation of the nurse's status as a leader; that is, when he evaluates himself, he considers himself participatory, interacting with the others in order to perceive his needs, and valuing collective decision-making.

Nurses who claimed they knew about transformational leadership showed greater significance in relation to the authentic leadership domain. This is expected, because transformational leadership provides a stimulus to develop the assumptions of authentic leadership. (19,20) With theory development, the differences between them were outlined. Transparency is one of the central components of authentic leadership, as the leader self-regulates to align his values with intentions and actions. (18,19)

The self-awareness domain was higher in bedside nurses than in clinical nurses. Self-awareness includes self-confidence, motivation, values, goals, feelings, desires, strengths and weaknesses, as well as the multifaceted nature of oneself. (21) Clinical nurses, according to the institution field of study, have a vision focused on the coordination of care model, leaving the proximity of the nursing team and also the patient under the care bedside nurse's responsibility, although they work together. As the nurses have these assignments, more self-awareness would be demanded. Their responsibility to monitor the work activities of the technicians and assistants, and their own self-knowledge, are reflected in supervising the teamwork. It is interesting to note in this research that some nursing assistants see themselves as a care leader.

Independent of the occupied position, nurses that do not know any leadership referential scored more highly on the self-consciousness domain. The development of an authentic leader is based on his personal history, family influences, life challenges, educational and work experiences that facilitate personal growth and development, allowing the individual to develop skills that require innovative and unconventional solutions. It works as a catalyst for high levels of self-awareness. Even nurses, who do not know about authentic leadership, or other referential, can express behaviors of authentic leadership with an emphasis on self-awareness, due to the opportunities for personal development they have had throughout life.

Having once been in a leadership position provided a non-significant p-value, but highlighted the self-awareness and moral perspective domains. The specific competencies desired for a professional who assumed a certain function allowed him to self-evaluate more frequently and have his conduct guided
by the moral and ethical precepts that regulate the profession.

It is necessary for new studies with the use of authentic leadership to be conducted. This can provide managers with a model for the development of leaders in the organizational context, with better care results and a consequent increase in work environment satisfaction.\(^{(22,23)}\) The importance of caring as the central nucleus of the work process is perceived with the identification that nurses have greater self-awareness. Thus, it is important to emphasize that, in order for authentic leadership to be a reference for the development of leaders, nurses must be very close to their subordinates, so that their leadership matches the wishes of the team members, and occurs from their self-awareness.

**Conclusion**

The nurses studied showed characteristics of authentic leaders. Self-awareness was the domain that presented the highest value among nurses rather than among clinical nurses, being an essential element within the framework of authentic leadership. The other variables did not present significant relationships. The cross-cultural adaptation and validation of the Authentic Leadership Questionnaire for the Portuguese language is necessary and new studies in nursing should be developed for the advancement of knowledge.

**Acknowledgements**

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**Collaborations**

Carvalho AGF, Cunha ICKO, Balsanelli AP and Bernardes A contributed to the study design, data interpretation, article writing, relevant critical review of the intellectual content, and final approval of the version to be published.

**References**


Prevalence and factors associated with the occurrence of adverse events following immunization in children

Prevalência e fatores associados à ocorrência de eventos adversos pós-vacinação em crianças

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Valderlane Bezerra Pontes Netto²
Maria Sandra Andrade²

Abstract
Objective: To characterize adverse events following immunization in children under one year old.
Methods: Cross-sectional study conducted with data from the Brazilian Notification System on Adverse Events Following Immunization between 2009 and 2013.
Results: A total of 810 cases were analyzed, with a rate of 6.76 adverse events per 100,000 doses. Adverse events were related to the tetravalent (45.1%) and pentavalent (37.4%) vaccines, and associated with age, dosage, time elapsed from immunization, and adopted course. Hypotonic-hyporesponsive episode (27.0%) was the most prevalent event (p<0.001).
Conclusion: Adverse events were more frequent in children younger than three months that received the first dose of the tetravalent and pentavalent vaccines; they occurred within the first twenty-four hours following immunization, and the prevalent course consisted in changing the immunization schedule.

Keywords
Vaccination/adverse effects; Prevalence; Immunization schedule; Child

Descritores
Vacinação/efeitos adversos; Prevalência; Esquemas de imunização; Criança

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Introduction

Vaccines are considered safe products, effective in disease prevention, and cost-effective. In their historic context, it is possible to identify important advances in the reduction of morbidity and mortality rates and in the control of communicable diseases, such as the global eradication of smallpox and the eradication of urban yellow fever in Brazil.\(^1\)\(^-\)\(^6\)

Expanding and keeping high and homogeneous immunization coverage is necessary to achieve and maintain these achievements. It is important to mention that the expansion of vaccination coverage leads to the probability of occurrence of adverse events following immunization (AEFI), as vaccines are pharmacological products and are not exempt from causing adverse events in certain individuals.\(^1\)\(^-\)\(^3\),\(^7\)\(^-\)\(^8\)

Adverse events following immunization consist in any undesirable effect following immunization, not necessarily having a causal relation with the use of a vaccine or other immunobiological preparation. Most AEFIs are mild, local and systemic, thus, surveillance actions are focused on moderate and severe events. These events are related to several factors, such as the type of vaccine, conditions of administration, storage, and characteristics of the vaccinees. Their intensity, however, may vary from mild and expected effects such as local manifestation to moderate and severe events and rare cases, classified as unexpected.\(^1\)\(^-\)\(^3\),\(^7\)

Considering the characteristics of the vaccinees, children under one year old represent the most AEFI-affected group. The highest concentration of vaccines offered and doses applied take place in this age group. Studies conducted in São Paulo and Teresina showed that the distribution of AEFI in this age group represented approximately 80% in relation to the other population segments.\(^7\)\(^-\)\(^9\)

In this sense, it is important to perform screening and monitoring following immunization so that AEFI are identified and intervention measures are adopted in a timely manner, enabling the maintenance of quality, safety of the vaccinees, and preservation of the reliability of the immunization.\(^1\)\(^-\)\(^9\)

AEFI should be carefully investigated aiming at avoiding a mismatch of cause and effect with the immunization, especially in cases presenting the occurrence of transitory association of the complication with the immunization. On the other hand, confirmed cases of AEFI should be disclosed in order to enable health professionals to become aware of them and consequently adopt specific preventive measures, as well as prescribe immunizations with a higher level of safety.\(^1\)\(^-\)\(^3\),\(^6\)

Considering the relevance of information on AEFI for public health, safe immunization, and maintenance of the advances in the control of immunopreventable diseases, the objective of the present study was to characterize AEFI in children under one year old.

Methods

Cross-sectional, retrospective study with quantitative approach. The database consisted of secondary data from the Brazilian Notification System on Adverse Events Following Immunization (SI-EAPV, as per its acronym in Portuguese) of the State Immunization Program of Pernambuco, located in the Northeastern region of Brazil, with an estimated population of 9,208,50 inhabitants, being 137,885 (1.5%) under one year old.\(^1\)\(^0\)

The study sample consisted in the total of cases of AEFI occurred in children under one year old (11 months and 29 days) between 2009 and 2013. This period was chosen because in 2009 the AEFI notification flow was organized and the network professionals were trained, and 2013 was the last year of consolidation of the database within the data collection period. Three cases were excluded due to lack of information considered necessary for the study analysis; one related to the type of adverse event and two related to the type of vaccine. Data collection occurred between September 2014 and February 2015.

Adverse event following immunization was elected as the dependent variable, classified according to the options contained in the notification sheet. In this context, the ten most recurrent events were considered in the present study. The others were classified as others and represented 27 (3.3%) of the total of AEFI.
The independent variables consisted of those related to the vaccinee (sex, age - based on the interval and number of vaccines of the national immunization schedule); time (interval between the immunization and occurrence of the adverse event - time elapsed); immunobiological (vaccine associated with the adverse event, vaccine dose); and outcome of the case related to the intensity of the event, adopted course, and progress of the case. The variable intensity of the AEFI was classified as severe (consisting in cases that required hospitalization for at least 24 hours according to the Manual of Epidemiological Surveillance of Adverse Events Following Immunization) or non-severe.(1) The categorizations of the independent variables are described in chart 1.

Descriptive data analysis was conducted based on the relative and absolute frequency distributions for all the variables. The coefficient of incidence of AEFI was calculated taking into account the number of events notified by the quantitative doses of vaccines applied within the period of the study, multiplied by 100,000 doses. The association between the dependent and the independent variables was conducted through the use of Pearson’s chi-squared test. Differences between all the vaccines and a comparison between the vaccines presenting higher frequency of AEFI in the population of the study were considered for the associations. Statistical significance of 5% (p < 0.05) was adopted; the software STATA version 12.0 was used for the analysis.

The study complied with Resolution 466/12 of the National Health Council and was approved by the Research Ethics Committee of the University Hospital Oswaldo Cruz/Cardiologic Emergency of Pernambuco, under protocol nº 741,975/2014.

Results

A total of 1,167 cases of AEFI were notified to the State Program of Immunization of Pernambuco between 2009 and 2013; of these, 810 (69.4%) occurred in children under one year old. The highest frequencies of notification occurred in 2012 (33.9%) and 2013 (30.2%), whereas the lowest frequency was reported in 2009 (3.2%). The years of 2010 and 2011 accounted for 10.9% and 21.7% of the cases, respectively. The mean incidence of AEFI per dose within the period of the study was 6.76 per 100,000 doses.

It was observed that 711 (87.9%) of the cases of adverse events were related to the first two doses of vaccine. The occurrence of events prevailed in the first 24 hours (Table 1), with 515 (82.7%) having occurred in the first six hours following immunization.

Table 1. Distribution of the cases of adverse events following immunization in children under one year old (n=810)

<table>
<thead>
<tr>
<th>Variables</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Under 3 months</td>
<td>166(20.5)</td>
</tr>
<tr>
<td>Between 3 months and 6 months</td>
<td>399(49.2)</td>
</tr>
<tr>
<td>Between 6 months and 9 months</td>
<td>187(23.1)</td>
</tr>
<tr>
<td>Between 9 months and 12 months</td>
<td>58(7.2)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>392(48.4)</td>
</tr>
<tr>
<td>Male</td>
<td>418(51.6)</td>
</tr>
<tr>
<td>Dose</td>
<td></td>
</tr>
<tr>
<td>1st dose</td>
<td>476(58.9)</td>
</tr>
<tr>
<td>2nd dose</td>
<td>235(29.0)</td>
</tr>
<tr>
<td>3rd dose</td>
<td>80(9.8)</td>
</tr>
<tr>
<td>Others</td>
<td>19(2.3)</td>
</tr>
<tr>
<td>Time elapsed*</td>
<td></td>
</tr>
<tr>
<td>Less than 24 hours</td>
<td>623(80.2)</td>
</tr>
<tr>
<td>Between 1 and 7 days</td>
<td>124(16.0)</td>
</tr>
<tr>
<td>Above 7 days</td>
<td>30(3.8)</td>
</tr>
</tbody>
</table>

*33 cases had no information on the time of the event

Chart 1. Categorization of the independent variables related to the vaccinee, time, immunobiological agent, and outcome of the case

<table>
<thead>
<tr>
<th>Assessed items</th>
<th>Variable</th>
<th>Categorization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Related to the vaccinee</td>
<td>Sex</td>
<td>Male; Female</td>
</tr>
<tr>
<td>Related to age</td>
<td>Age in months</td>
<td>Under 3; between 3 and 6; between 6 and 9; between 9 and 12</td>
</tr>
<tr>
<td>Related to time</td>
<td>Time elapsed</td>
<td>Less than 24 hours; between 1 and 7 days; more than 7 days</td>
</tr>
<tr>
<td>Related to the immunobiological agent</td>
<td>Vaccine associated with the event</td>
<td>Tetraivalent; Pentaivalent; Human Rotavirus Oral Vaccine (OVRH); BCG; 10-valent pneumococcal (Pn10); Meningococcal C (MnC); Hepatitis B (HB); Influenza (INF); Others (DTP, Triple viral, VIP/VOP) *</td>
</tr>
<tr>
<td>Vaccine dose</td>
<td>Vaccine dose</td>
<td>1st; 2nd; 3rd; others (1st booster shot and campaign)</td>
</tr>
<tr>
<td>Intensity</td>
<td>Intensity</td>
<td>Severe; non-severe</td>
</tr>
<tr>
<td>Course</td>
<td>Course</td>
<td>Maintenance of immunization schedule; contraindication with and without change of immunization schedule; without course</td>
</tr>
<tr>
<td>Progress</td>
<td>Progress</td>
<td>With sequelae; without sequelae</td>
</tr>
</tbody>
</table>

*Vaccine nomenclature in accordance with the National Immunization Schedule of the Ministry of Health
Of the total of adverse events, 668 (82.5%) were related to the tetravalent and pentavalent vaccines, whereas 142 (17.5%) were related to the following vaccines: VORH 27 (3.3%), BCG 26 (3.1%), Pn10 17 (2.1%), MnC 17 (2.1%), HB 14 (1.8%), INF 14 (1.8%) and other vaccines (VIP/VOP, human rabies and yellow fever) 27 (3.3%). The cases of adverse effects related to the tetravalent vaccine (diphtheria, tetanus and pertussis combined with *Haemophilus influenzae* type b vaccine) corresponded to 365 (45.1%) and the events related to the pentavalent vaccine (diphtheria, tetanus, pertussis, hepatitis B (recombinant) and *Haemophilus influenzae* type b) 303 (37.4%). The associations of the cases of AEFI according to the applied vaccines are shown in table 2.

The association of the vaccines with the types of AEFI showed that hypotonic-hyporesponsive episodes (HHE) were the most frequent event among the cases of AEFI. A statistically significant difference in the HHE was observed in relation to the tetravalent in comparison with the pentavalent and the other vaccines (Table 3).

The progress of the cases of AEFI consisted of cure without sequelae in 807 (99.6%) cases. One case, classified as severe and/or unusual event, evolved to cure with sequelae; two cases, classified as fever higher than 39.5°C and local cold abscess, had not recorded the progress. Regarding the course adopted by the health staff, 457 (56.4%) considered the immunization as contraindicated and consequent change of schedule, 267 (32.9%) maintained the schedule, 54 (6.7%) did not adopt any course, and 32 (3.9%) considered as contraindicated, but without change of schedule. In relation to the intensity of the event, 776 (95.8%) of the notified events were classified as non-severe and 34 (4.2%) as severe.

### Table 2. Association of adverse events following immunization in children under one year old according to the immunobiological agent administered and the variables analyzed

<table>
<thead>
<tr>
<th>Variables</th>
<th>Immunobiological agent</th>
<th>p-value Tetra versus Penta</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tetravalent (n=365)</td>
<td>Pentavalent (n=303)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 3 months</td>
<td>51(14.0)</td>
<td>71(23.5)</td>
</tr>
<tr>
<td>Between 3 months and 6 months</td>
<td>188(51.5)</td>
<td>167(55.1)</td>
</tr>
<tr>
<td>Between 6 months and 9 months</td>
<td>105(28.8)</td>
<td>51(16.8)</td>
</tr>
<tr>
<td>Between 9 months and 12 months</td>
<td>21(5.7)</td>
<td>14(4.6)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>169(46.3)</td>
<td>148(48.8)</td>
</tr>
<tr>
<td>Male</td>
<td>196(53.7)</td>
<td>155(51.2)</td>
</tr>
<tr>
<td>Course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st dose</td>
<td>183(50.1)</td>
<td>207(68.3)</td>
</tr>
<tr>
<td>2nd dose</td>
<td>129(35.3)</td>
<td>73(24.1)</td>
</tr>
<tr>
<td>3rd dose</td>
<td>53(14.6)</td>
<td>23(7.6)</td>
</tr>
<tr>
<td>Others</td>
<td>0(-)</td>
<td>19(2.9)</td>
</tr>
<tr>
<td>Time elapsed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 24 hours</td>
<td>306(86.9)</td>
<td>246(84.8)</td>
</tr>
<tr>
<td>Between 1 and 7 days</td>
<td>46(13.1)</td>
<td>41(14.2)</td>
</tr>
<tr>
<td>Above 7 days</td>
<td>0(-)</td>
<td>3(1.0)</td>
</tr>
<tr>
<td>Course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contraindication with schedule change</td>
<td>191(63.1)</td>
<td>20(14.2)</td>
</tr>
<tr>
<td>Contraindication without schedule change</td>
<td>1(0.3)</td>
<td>29(19.8)</td>
</tr>
<tr>
<td>Schedule maintained</td>
<td>110(36.3)</td>
<td>54(38.3)</td>
</tr>
<tr>
<td>No course</td>
<td>1(0.3)</td>
<td>39(27.7)</td>
</tr>
</tbody>
</table>

†Statistically significant association (p < 0.05)
Prevalence and factors associated with the occurrence of adverse events following immunization in children

Discussion

The present study has common limitations related to the use of secondary data. Underreporting of occurrences of AEFI may exist, as well as inadequate filling of the investigation sheet, thus interfering in the quality of the collected information. Nevertheless, considering the size of the sample, the results of the study provide important information for AEFI monitoring actions and contribute to update health professionals and service managers that work in the area of immunization. It is also important to mention the scarcity of published articles that analyze the occurrence of AEFI in the first year of life.

Furthermore, this study emphasizes the fact that the increased percentage of AEFI during the studied period is probably due to the training conducted with professionals of the network and the organization of the notification flow in the state, in 2009, which may have contributed to improve the recording and detection of new cases. However, it is important to mention that since 2005 the notification of any suspected or confirmed cases of AEFI was already considered mandatory throughout the national territory.

Discussions on the risks of immunization should be balanced by the recognition of the already well established benefits in the prevention of diseases and in the disabilities and deaths caused by infectious diseases. In this sense, the identification of AEFI enables the improvement of healthcare routines for children and contributes to interventions aiming at the safety of vaccines as the passive surveillance of AEFI may be considered useful in the monitoring of vaccine-related safety.\(^{(2,6,7)}\)

The nursing team plays a prominent role as vaccinators and vaccine room supervisors, monitoring technical and operational aspects, and in the screening and monitoring of the vaccine status of users, especially in primary health care. Therefore, studies on AEFI may contribute to the identification of opportunities to improve the actions developed in immunization rooms. Also, they may contribute to reduce the losses of opportunities for immunization, as the decisions at the moment of the vaccination screening and post-vaccination follow-up will be made more safely.\(^{(3,11,12)}\)

Specific measures to prevent AEFI, including proper screening to verify possible contraindications or the need to postpone vaccines, continuous training for vaccinators, and education in health may contribute to the quality and safety of immunization, thus ensuring the advances verified in the eradication and control of diseases preventable by immunization. It is important to mention that the evidence on the safety and effectiveness of vaccines in the routine of immunization in children and adults are significantly favorable.\(^{(1,2,12,13)}\)

Immunization coverage rates in Brazil are considered high, especially in relation to children, granting the country global recognition regarding immunization actions, considered an important

<table>
<thead>
<tr>
<th>Adverse event</th>
<th>Tetra (n = 365)</th>
<th>Pentra (n = 303)</th>
<th>Other (n = 142)</th>
<th>p-value</th>
<th>p-value Tera versus Penta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotonic-Hyporesponsive Episode</td>
<td>142(38.9)</td>
<td>69(22.8)</td>
<td>8(5.6)</td>
<td>&lt; 0.001†</td>
<td>0.001†</td>
</tr>
<tr>
<td>Fever &gt; 39.5ºC</td>
<td>14(3.8)</td>
<td>20(6.6)</td>
<td>10(7.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain, flushing, and heat</td>
<td>6(1.7)</td>
<td>5(1.6)</td>
<td>12(8.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever &lt; 39.5ºC</td>
<td>6(1.7)</td>
<td>26(8.6)</td>
<td>5(3.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persistent crying</td>
<td>34(9.3)</td>
<td>30(9.9)</td>
<td>18(12.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other severe and/or unusual events</td>
<td>56(15.3)</td>
<td>41(13.5)</td>
<td>10(7.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Febrile seizure</td>
<td>7(1.9)</td>
<td>6(1.9)</td>
<td>7(4.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local warm abscess</td>
<td>9(2.5)</td>
<td>16(5.3)</td>
<td>19(13.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generalized rash</td>
<td>30(8.2)</td>
<td>39(12.9)</td>
<td>10(7.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generalized urticaria</td>
<td>6(1.7)</td>
<td>12(4.0)</td>
<td>6(4.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other events</td>
<td>30(8.2)</td>
<td>39(12.9)</td>
<td>46(32.4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

†Statistically significant association (p < 0.05)
The high frequency of AEFI in children under one year old found in this study was also evidenced in other studies. This study points out that in this age group there is a higher concentration of vaccines applied and the immune system is still immature, increasing the probability of infectious processes, allergies, and clinical alterations that may be associated with immunization.

The present study evidenced the predominance of AEFI in children aged between 3 and 6 months. Six of the fifteen vaccine doses are recommended for children under one year old. There were also notifications of AEFI in children between 9 and 12 months, a period in which there are no specifically recommended vaccine doses, suggesting the immunization of children with a delayed or late vaccine schedule.

Despite the slight predominance of males, no statistically significant difference of AEFI was observed between genders. A study of the CDC with children evidenced the same proportion of notifications between genders. A study conducted in Uruguay found a higher frequency for males between 2 months and 17 years old, and a study conducted in Brazil evidenced a predominance of female children.

Tetravalent and pentavalent vaccines presented the highest frequency of AEFI. Other studies associated AEFI with DTP and BCG. The tetravalent vaccine was implemented in the routine of immunization of the Unified Health System in 2002 and the pentavalent vaccine in 2012. The combination of vaccines enables a reduction of operational and logistic costs and provides a higher level of comfort to users (displacements to health units, number of injections applied, and reduction in the occurrence of local manifestations associated with less exposure). These aspects may contribute to increase adherence to immunization.

The vaccine component related to the pertussis toxin, used in the prevention of pertussis, is considered highly immunogenic. However, it may cause several changes in the immune response, such as hypersensitivity and development of autoimmune diseases. The association of AEFI with the DPT, tetravalent, and pentavalent vaccines containing this toxin may not be confirmed unless specific tests are performed to prove the causal relation considering all the components present in these immunological agents.

However, after the implementation of the tetravalent vaccine, some states registered increase in the number of cases of AEFI, especially HHE. In this study, HHE were the most prevalent event, and other severe and unusual events associated with the tetravalent and pentavalent vaccines were registered. Studies conducted in Teresina and Campo Grande verified HHE as the second and fourth most prevalent event, and fever > 39.5°C, pain, flushing, and heat as the most prevalent events.

There are few specific studies on the frequency of HHE associated with the pentavalent vaccine. HHE is characterized by the triad: decreased muscle tone, absence of response to stimuli, and altered skin color. The pathogenesis of HHE is still unknown, representing a rare condition that results in transitory signs. Most cases are reported in children under two years old.

Regarding the outcome of the AEFI, the course in most cases was the contraindication with change in the vaccine schedule, especially related to the tetravalent and pentavalent vaccines. In most cases the intensity of the AEFI was considered non-severe and the progress consisted in cure without sequelae. Other authors also reported similar outcomes.

Information on vaccine safety, contraindications, and the possible occurrences of AEFI are necessary for the control of immunopreventable diseases. Ignorance of the population may undermine reliability on the product and immunization coverage, as observed in relation to the influenza vaccine in 2012.

In view of the above, the present study suggests the improvement of surveillance actions in relation to AEFI, accuracy in completing the notification form, and continuous education in health services in order to update professionals working in immunization rooms and guide the population on the theme to increase the reliability, quality, and safety of immunization.
Conclusion

AEFI were more frequent for the tetravalent and pentavalent vaccines, and in these cases they were associated with the age (younger children) and dose (first dose). HHE was the most prevalent event. The identification of AEFI may contribute to the improvement of surveillance, children healthcare routines, and new interventions aimed at the safety of the vaccinees. The study suggests that further research be conducted to broaden knowledge on the causal relationships of AEFI with the vaccine components of the most reactogenic immunobiological agents.

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Collaborations

Santos MCS contributed with the design of the research project, analysis and interpretation of data, and writing of the article. Andrade MS collaborated in the conception and design of the article, data analysis, and critical review of its content. Pontes Netto VB collaborated in the data analysis and critical review of the study content. All the authors participated in the approval of the final version of the manuscript.

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Elaboration and validation of an information manual for cardiac catheterization

Elaboração e validação de um manual informativo sobre cateterismo cardíaco

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Abstract
Objective: To elaborate and validate an information manual for cardiac catheterization.

Methods: This was a methodological study. The manual was elaborated based on experience of researchers and data from the literature. The manual was validated by 8 nurses by using the Delphi technique; to be considered valid, agreement must reach 100%. Posteriorly, it was evaluated by 35 patients; at this stage the mean score must be 4 or greater.

Results: The manual covers the following topics: definition; location and time of conduction; how the procedure was done; and descriptions of care before, during, and after the procedure. A total of four rounds were needed to validate the manual with nurses. In the second step, all questions about the manual had a high mean score (4.83 to 4.91, p<0.001), making the manual valid for patients.

Conclusion: The manual was elaborated and considered valid by nurses and patients. The manual can be applied to different institutions.

Keywords
Cardiac catheterization; Education, nursing; Nursing care

Descritores
Cateterismo cardíaco; Educação em enfermagem; Cuidados de enfermagem

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Conflicts of interest: none to report.
Introduction

In the United States, an estimated 85.6 million adults have one or more cardiovascular diseases. Among these diseases, the acute coronary syndrome (ACS) is of note. This disease is defined by an imbalance between supply and demand of oxygen to the heart, leading the patient to present signs and symptoms of acute myocardial ischemia. The main cause of this disease is the instability of an atherosclerotic plaque, but it also can result from an increased demand for oxygen by the heart. Three forms of ACS exist: acute myocardial infarction (AMI) with ST-segment elevation, AMI without ST-segment elevation, and unstable angina.

In Brazil, an estimated 300,000 to 400,000 cases of AMI occur each year; for AMI, the coefficient of mortality per 100,000 inhabitants was 35.2 in 2002 and 39.36 in 2008, representing an increase of approximately 11%. These diseases are diagnosed by electrocardiogram clinical signs and cardiac enzymes and are confirmed by cardiac catheterization.

Because cardiac catheterization is an invasive diagnostic test, it often causes physiologic and psychological changes; anxiety and fear are the most common. According to an exploratory study on fear and anxiety in patients who underwent catheterization, the fear experienced before the procedure is related to concern about possible adverse events during exam, and anxiety results from the possibility of an unexpected diagnosis and prognosis. In addition, both the patient and his/her family member (or accompanying person) present anxiety before the procedure.

Both feelings can cause physiologic changes in the patient, such as increased heart rate and blood pressure, which increase the consumption of oxygen and thereby worsen the development of the disease. In addition, these symptoms occur during invasive procedure, such as cardiac catheterization, and they can increase the duration of and may cause difficulties during the procedure, as well as leading to possible changes in the results of the exam and physical harm to the patient.

A study showed that patients who underwent heart catheterization have gaps in knowledge about the procedure, mainly concerning the objective of the procedure, which can generate more anxiety. In this context, health professionals must find ways to reduce these feelings and increase the knowledge of these patients.

There are many ways to reduce anxiety and fear and increase knowledge, such as nursing orientation. Nursing orientation reduces the insecurity of these patients and improves their understanding of future events. If the orientation is effective, it shows positive results in the nurse-patient relationship after the procedure.

Orientation can be done verbally or by the use of alternative methods, such as information manuals. An information manual aims to help professionals perform verbal orientation for patients and their family through health education. It enables a multidisciplinary team approach in the treatment process, recovery, and self-care; it also provides uniformity in orientation and better understanding of the individual in the health-disease process and steps to be taken for recovery. In creating an information manual, social and cultural aspects of the target population must be considered.

The objective of our study was to elaborate and validate an information manual for cardiac catheterization.

Methods

This methodological study sought to elaborate and validate an information manual for cardiac catheterization. The elaboration and validation followed the steps described in other studies.

According to Echer, the first step is to seek existing scientific knowledge on the subject. Therefore, the manual was elaborated based on experience of researchers and data from the literature. We searched the literature indexed in PubMed, MEDLINE, LILACS and SciELO. Keywords used in LILACS and SciELO were “cardiac catheterization” and “care,” as well...
as “cardiac catheterization” and “nursing.” In MEDLINE and PubMed, the keywords used were “cardiac catheterization” and “nursing,” including the boolean expression “and.”

Inclusion criteria were reports written in English, Portuguese, and Spanish; published between 2003 and 2014; and related to nursing care for cardiac catheterization. We excluded studies that lacked full text.

We selected four reports to elaborate the information manual.\(^{[10-13]}\) In addition to the selected reports, we also included data from books on the subject.\(^{[14,15]}\) After review of the literature, we elaborated a manual question-and-answer type that included the following items: definition, purpose, time of duration, local, care delivery before, during and after the procedure.

After elaboration of the manual, its content and format were validated. Validation was done in two steps: the first step was validation by nurses and the second step was done by patients. In the first step, a previous version of the manual was submitted to evaluation of eight nurses who agreed to participate in the study and who had a minimum of 2 years of experience in cardiology. Participants signed the consent form. The number of experts included depends on the phenomenon to be studied;\(^{[16]}\) in our study we used the same number of experts used in another study.\(^{[9]}\) We requested that nurses read and suggest changes to the content in order to improve the clarity (coherence) and language (appropriate language for the patient) of each topic of the manual. We also inquired about age, sex, educational level and area of professional activity.

The instrument used was a 3-point scale: 1, totally inadequate; 2, partially adequate; and 3, totally adequate. If the professional chooses a score of 1 or 2, he/she would suggest the changes needed. We evaluated the following items: definition; purpose; duration; care delivered before, during, and after the procedure; location where the procedure was carried out; how the procedure was done; and as the manual as a whole. In addition to the information contained in the manual, nurses also evaluated the type of paper, the font size, illustrations, and accuracy. All these requirement had to be accepted by all nurses to be considered adequate.\(^{[9]}\)

For validation in this first phase, we used the Delphi technique. This technique aims to achieve a consensus of opinion in a professional group about a specific topic. The Delphi technique uses questionnaires in a group of experts in the studied area, who must remain anonymous. Feedback with answers from the group and enhancement of the instrument are carried out to obtain the consensus of all professionals;\(^{[17]}\) in the first study phase, this occurred when all items of the manual achieved a population of 3 (totally adequate).

Nurses were selected using the Lattes platform, which is an information system maintained by the Brazilian government to manage information on science, technology, and innovation related to individual researchers and institutions working in Brazil. In selecting the nurses, we considered the time they had worked in cardiology care (minimum of 2 years) and sought to include nurses from different hospitals. Afterward, patients were contacted and the objective of the study was explained to them. Once the nurses agreed to participate, the principal investigator applied the consent form, administered the assessment instrument, and gave the information manual to the professionals. The deadline to return the review was no later than 1 week.

After conclusion of the first stage, patients evaluated the final version of the manual; the convenience sample was composed of 35 patients. The sample size to verify the mean of each item of the information manual was greater than 4. The significance level was 5%; 95% confidence intervals were used; the standard deviation was 1.5; and the estimative error of 1 was of at least 26 interviewees.

Inclusion criteria were inpatients at a coronary unit who had already undergone cardiac catheterization and agreement to participate in the research. We excluded patients who had changes in
consciousness level, those who had vision problems, and those who were illiterate; all these patients were excluded because participants needed to read the content of the manual.

We used a 5-point scale Likert-type scale that evaluated the comprehensiveness of the manual. The minimum value was 1 (“I did not understand at all”) and the maximum value was 5 (“I fully understood and I do not have any doubt”). Patients had to evaluate the same topics that professionals did: the manual as a whole, definition, purpose, location, duration of the procedure, and care before and after the procedure. We also questioned about age, sex, level of education, and previous hospitalization.

Patients were approached personally by the principal investigator, and the objectives of the study were explained to them. Those who agreed to participate signed the consent form. After that, we gave participants the information manual and the assessment instrument. The principal investigator stayed close to the patient, but no further explanation was provided and no guidance about the content of the manual was given.

The manual was considered comprehensible when it achieved an average score of 4 or greater (“I understood almost everything”). We also evaluated the percentage of participants giving a score of 5 (“I fully understood and I do not have any doubt”), which must be 80% or greater. To verify that means were higher than 4, we used the Wilcoxon test; to calculate the 95% confidence interval to maximal grades proportion (equal to 5), we used the binomial distribution.

Characteristics of the patients during the second stage of validation were analyzed in a descriptive form; we used absolute frequency (n) and relative frequency (%) for qualitative variables (sex, level of education, previous hospitalization) and mean, standard deviation, and minimal and maximal for quantitative variables (age). Software used for data analysis was R3.12; a significance level of 0.05 was used for all analyses.

The research project was approved by the Ethical and Research Committee of Hospital São Paulo (UNIFESP/EPM), number 542.492/14.

Results

In the first validation, nurses ages ranged from 28 to 52 years, with mean age of 34.8 years. Seven nurses were women (87.9%). All nurses were specialized: 7 in cardiology (87.9%) and 1 in intensive care medicine (12.5%). Four had a master’s degree and 2 were attending a doctoral program. Most nurses had worked between 3 and 20 years in the area (mean, 10.5 years). Half of the professionals worked in an intensive care unit.

All nurses (100%) agreed that font size and type of paper of the manual were adequate in the first round. However, 37.5% (n=3) of professionals questioned the sharpness and purpose of the third figure, one nurse suggested more illustrations. To achieve 100% agreement, the third figure, which showed a nurse supporting the patient to be seated, was removed from the manual, once researchers reassessed and considered that this image was not in agreement with the content of the manual. Before removal of the figure, the manual was again forwarded to nurses, and all agreed removing the figure.

We used the Delphi technique to validate information content; four rounds were needed to obtain a consensus among experts.

In the first round, changes were suggested for 14 sentences: 1 about definition/purpose, 1 related to duration of the procedure, 3 about care before the procedure, 2 on care during the care, 4 on after the care, 1 on the location of the exam, and 2 on how the exam was carried out (Figure 1). We requested the inclusion of other care delivered before, during, and after the procedures, as well as inclusion of content on definition, location of the exam and how the procedure is carried out; a change was also suggested concerning the time needed to perform the procedure.

Sentences elaborated were redone according to the nurses’ suggestions. Only one change was not performed; this change was a request to replace “Sir/Madam” with “You,” but we decided not to make this change because most of the population performing the procedure is old and in Brazilian Portuguese the word “you” sounds informal. We chose to keep “Sir/Madam.”
After reformulation, sentences were resubmitted for assessment of the professionals in a second round. We highlight that some paragraphs were divided into phrases to facilitate the analysis.

Following the second round, we suggested changes in 11 sentences (1 about definition, 1 about duration, 3 about care before the procedure, 3 about care during the procedure, 2 about care after the procedure, and 1 about location in which the exam was performed). Suggestions were mainly about changing words to improve understanding (language) and improve content of topics about care before, during, and after the procedure. Some suggestions were not implemented because they were related to protocols of different institutions, and researchers preferred to keep as much information as possible, such as time of resting after catheterization, which was kept as 3 to 6 hours. The 11 sentences were reformulated and revaluated in the third round.

After the third round, 7 sentences (3 about care before the procedure, 1 about care after the procedure, 2 about care during the procedure, and 1 about location in which the exam was performed) were reformulated and resubmitted to another round. Suggestions concerned use of topic headings for better understanding instead of running text, and some suggestions referred to the content of sentences about care before and after the examination. For sentence 2, a professional suggested inserting a preceding sentence, which would be “Duration of the exam is approximately 30 to 50 minutes, but it can vary depending on each patient”; again the duration of hour of rest after the procedure was questioned. However, these changes were not made because these issues vary depending on the institution. Another suggestion not implemented regarded the removal of questioning the patient about allergy to seafood. This phrase was maintained because there was no consensus in the literature about relationship of seafood and allergy to contrast medium.

After the fourth round, there was a suggestion concerning the verbal agreement and not related with the content and, therefore, a new round was not needed. For this reason, the information manual was considered valid by experts.

After validation by professionals, the second stage entailed in assessment of the manual by 35 inpatients in coronary units who had already undergone cardiac catheterization. The sample was predominantly composed of men (60.0%), almost half (48.6%) had finished high school or had a college degree, and more than half (51.4%) already had another admission modality. The mean age was 55±11.19 years (minimal, 32 years; maximal, 72 years).

The validation of the information manual showed that all questions about the manual had higher means (Table 1). Lower means were observed for items about care before, during, and after the procedure (means equal to 4.83). The Wilcoxon test rejected the hypothesis that these means are 4 or less.

Figure 1. Mean of score assessment of nurses on the first round of assessment of information manual
Table 2 shows the proportion of responses equal to 5 for each item, along with their confidence intervals. We verified that even in worse cases, for care delivered before and after the procedure, the proportion of equal responses to 5 was still high (83%; confidence interval, 66.35% to 93.44%). Therefore, we observed that the manual had mean grades greater than 4 and that the proportion of maximal grades was higher, indicating that the manual was valid according to patients (Appendix 1).

Table 2. Percentage of responses of patients equal to 5 and confidence interval for the entire manual and the individual items

<table>
<thead>
<tr>
<th>Variables</th>
<th>Proportion of 5’s %</th>
<th>Confidence interval 95% *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Inferior %</td>
</tr>
<tr>
<td>Entire manual</td>
<td>89</td>
<td>73.26</td>
</tr>
<tr>
<td>Definition</td>
<td>89</td>
<td>73.26</td>
</tr>
<tr>
<td>Purpose</td>
<td>91</td>
<td>76.94</td>
</tr>
<tr>
<td>Time</td>
<td>86</td>
<td>69.74</td>
</tr>
<tr>
<td>Care delivered before the procedure</td>
<td>83</td>
<td>66.35</td>
</tr>
<tr>
<td>Care delivered during the procedure</td>
<td>86</td>
<td>69.74</td>
</tr>
<tr>
<td>Care delivered after the procedure</td>
<td>83</td>
<td>66.35</td>
</tr>
</tbody>
</table>

*Exact binomial confidence interval

Discussion

Creating and validating information manuals is important for education of patients about therapeutic methods or complex diagnoses. The use of manuals is rising to facilitate the guidance of multidisciplinary teams, as well as to standardize the information by using simple language that helps improve patients’ understanding, with proved efficacy.\(^{7,8}\) For this reason, the present manual was elaborated based on the literature and sought to provide relevant and necessary information on the procedure. Posteriorly, it was validated by nurses who worked with the phenomenon of the study and by patients who had undergone cardiac catheterization. A study that validated an educational guide on healthy diet during pregnancy also highlighted the importance of a literature search to guide the elaboration of the first version of the information manual, as well as to validate the content by experts in the area and by the target population.\(^{18}\) The guidance material, when adequately elaborated, can change the lives of the specific population; thus, the information to be included must consider.\(^{19}\)

The information manual was validated by nurses after four rounds. Similar results were identified in other studies showing validation of a manual after two to four rounds by using the Delphi technique.\(^{9,20}\) Nurses made important modifications to the content. The content with more suggestions was the duration of bed rest after cardiac catheterization. Although the literature still shows no consensus regarding this issue, studies have investigated shorter bed rest and have shown no harms to the patient.\(^{21-23}\) Regarding nurse characteristics, most nurses were female, corroborating the characteristics of the profession overall. All participants had, at the minimum, specialization that contributed to obtaining scientific knowledge added to clinical experience. A study emphasized the importance of validating specific content by specialists with clinical experience in the area.\(^{24}\) Another topic to highlight is the professional diversity of nurses, once they were from different institutions that gathered different background knowledge about the studied topic.
There is no consensus in the literature about techniques used for assessment of information manuals. The Delphi technique is one technique. The use of this technique allowed nursing professionals with specialization and different experiences to collaborate and achieve a consensus of opinion on a specific subject, thereby making a constructive decision and showing relevance for validation of instruments.

Concerning the validation by patients, we observed that patients understood the manual in its entirety, and they ended up validating the instrument. Because most patients had not completed primary education, this result shows that the manual is easy to understand. Our study emphasizes the importance of adequate content expressed at the level of the culture and education of the patient, avoiding limitation of learning due to low educational level. There is consensus that educational material must be written in a simple way that precisely communicates information. Regarding the characteristics of patients undergoing cardiac catheterization, studies reported a mean patient age of 57 to 63 years, primarily men with a low educational level; these findings agree with those reported in our study.

Items that reflected low patient understanding related to care delivered before, during, and after the procedure. We believe that this occurred because these items contained more information and this information had not been given to the patient before the procedure.

Participation of experts on the subject and individuals who received information increases the credibility and improves the content of information manuals, making the language more accessible. We received new recommendations and information on cardiac catheterization, and therefore we believe that the manual must be reviewed and updated periodically.

An identified limitation factor in the second step of validation was the education level of the studied population. Their high degree of illiteracy and functional illiteracy delayed data collection because they were considered exclusion criteria. Because our study was carried out in a cardiology unit and included a specific population, the same validations should be done while including other populations.

**Conclusion**

The manual was elaborated and considered valid by nurses and patients. The manual can be used by a variety of institutions that treat these patients in order to instruct them about procedures that they will undergo.

**Acknowledgement**

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**Collaborations**

Maciel BS, Barros ALBL and Lopes JL contributed to the conception of the study, interpretation of data, critical review relevant to intellectual content and approval of final version to be published.

**References**


Appendix 1. Information manual on cardiac catheterization

What is a cardiac catheterization?
The exam verifies the presence of possible obstruction in vessels (arteries) of the heart, as well as other cardiac problems, and proposes an adequate treatment.

Where the exam is done?
The exam is carried out at a special room that is cold because of the need to preserve the equipment. This room has a table for you (Sir/Madam) to lie down on and X-ray equipment so the physician can observe your heart.

How is the exam done?
You (Sir/Madam) will remain lying down and awake, and you must keep as still as possible during the entire exam to avoid contaminating the clothing that will cover you. Before beginning the catheterization, the physician or nursing team cleans up the site where the injection will take place (groin or arm) by using a product to reduce infection risk. Local anesthesia will be applied so that you (sir/madam) do not feel any pain. After local anesthesia, a catheter will be placed in a vessel of your arm or groin, and it will continue until it reaches the heart. Through the catheter, we will apply contrast material, which will enable the physician to visualize vessels and heart structures.

How long is the exam?
The exam takes approximately 30 to 50 minutes, but this duration may vary.

What preparation is required to perform the exam?
Care procedures before catheterization are:
- Fasting for at least 6 hours before the exam;
- Any blood pressure medicines should be taken with little water, even on the day of the exam;
- For diabetics, the medicine for diabetes should not be taken (Metformin, Glucophage, Glucoformin, Dimefor, Glucovance) for 24 hours before exam, and insulin should not be taken on the day of the exam, even if the patient has a high glycemic index;
- In case of use of anticoagulant (Marevan, Coumadin, and Marcoumar), patient should talk with his/her physician because the medication would be postponed 4 to 5 days before the exam.

You (Sir/Madam), if not hospitalized, must:
- Be accompanied by someone older than 18 years old;
- Bring your previous documents and exams;
- Communicate with the care team in case of allergy to iodine or seafood, medications and/or other food;
- Communicate the presence of bleeding and recent surgery or temporary heat throughout the body. This feeling is normal and will resolve in a few seconds.
- Removal of watches, bangles, earrings, necklaces, glasses, rings and dental prosthesis, if the patient has any of these items;
- Your arm/groin area hair will be shaved;
- Patient will use the hospital gown only, and it will be need to be removed in the exam room.

What steps should be followed during the exam?
You (Sir/Madam) must communicate anything you feel during the procedure, such as fast heart rate, chest pain, feeling as if you have to urinate, and
shortness of breath. If the team requests, you (sir/madam) should cough, breathe deeply and/or hold your breath.

**What steps should be followed after the exam?**

After finishing the exam, you (sir/madam) will be transferred to a recovery room and/or to hospital room. The physician will remove the introducer (catheter) from your groin or arm and will apply pressure to the site for approximately 20 minutes. Afterward, a bandage will be applied. It will be removed only according to the guidance of nursing team. If the exam was done using the groin area, you (sir/madam) will remain at rest without crossing your legs or raising the head of the bed, even to eat, for approximately 3 to 6 hours. If the exam used the arm, it is important to keep the arm at rest and not bend it for approximately 4 hours; however you (sir/madam) can move your hand. After removal of the bandage, the site must be washed with soap and water. The physician may request that you (sir/madam) drink plenty of liquid. If you are willing to urinate, the nursing team should be requested to assist with that. The patient must communicate to the team (if hospitalized) or to seek medical assistance (after discharge) if he/she feels pain, discomfort and/or bleeding in the location of the exam, chest pain, or changes in the temperature or color of the location where the exam was done. Nursing team support should be requested for when the patient will stand for the first time after resting.
Attitudes and associated factors related to suicide among nursing undergraduates

Atitudes relacionadas ao suicídio entre graduandos de enfermagem e fatores associados

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Daniel Fernando Magrini¹
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Manoel Antônio dos Santos²
Kelly Graziani Giacchero Vedana¹

Abstract

Objective: To investigate the suicide-related attitudes and associated factors among nursing undergraduates

Methods: A quantitative cross-sectional study, conducted with 244 nursing undergraduates from a rural higher education institution of São Paulo, Brazil. Data were collected in 2016, by self-administration of a sociodemographic questionnaire and the Suicide Behavior Attitude Questionnaire. The Spearman correlation coefficient and Mann-Whitney tests were used for data analysis.

Results: Women presented more negative attitudes related to suicide. Men and students who participated in a psychiatric nursing discipline, class or laboratory on suicide, were perceived to be more capable professionally. Baccalaureate students who read specific material about suicide, or had ever thought about committing suicide, showed a less moralistic or condemning attitude related to suicide.

Conclusion: The study highlights the need for educational interventions on suicide involving attitudinal knowledge.

Keywords
Suicide; Suicide, attempted; Students, nursing/psychology; Attitude

Descritores
Suicídio; Tentativa de suicídio; Estudantes de Enfermagem/psicologia; Atitude

Submitted
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Keywords
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Abstract

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Submitted
June 26, 2016
Accepted
December 12, 2016

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

The World Health Organization recommends that suicide be prioritized in the health agenda and in the formulation of public policies. Suicide is the second leading cause of death among people aged 15 to 29 years old, and more than 800,000 people die each year from suicide, even if that event is underreported. Suicide attempts can reach as many as 20 times the number of completed suicides.(1)

Considering the severity and the possibility of suicide prevention, the Ministry of Health introduced Ordinance 1,876 in 2006, which establishes National Guidelines for Suicide Prevention and emphasizes the importance of research on this subject.(2)

A study conducted in Australia showed that approximately 90% of people who died of suicide had at least one contact with a health professional during the three months prior to their death, and emphasized the importance of these contacts as opportunities to prevent suicidal behavior.(3)

The quality of care provided after an attempted suicide is particularly important, as such clients are at greater risk of a new, and successful, suicide attempt.(4) It is important to highlight that the nursing team that acts in emergencies maintains frequent contact with clients after suicide attempts, and plays a central role in the initial management of these cases.(4,5) However, in suicide-related interventions, health professionals present difficulties that involve, among others, lack of planning, inability to manage the risk of suicide, and lack of available resources.(6)

Caring for the suicidal client can be influenced by a variety of factors, including suicide beliefs and attitudes, professional education, the ability to assess suicide risk, and planning of care.(3-5,7-9)

The literature indicates the lack of preparation and educational exposure regarding suicide in the undergraduate courses of the health area, and emphasizes the importance of investing in educational interventions related to suicide for health professionals.(10)

Therefore, studies that incorporate the understanding of the attitudes of professionals in relation to suicide are necessary(4,11) considering variations among different countries, cultures and epochs. Attitude can be defined as a response to a stimulus that involves cognitive, affective and behavioral components, extending to all aspects of intelligence and behavior.(12) It is an inner disposition that affects the choice of action or conduct to be adopted in relation to persons, events or goals. Thus, attitude is not specifically behavior, but a propensity to action, or a way to approach, react or face a situation or problem in a variety of circumstances.

The relationship between attitudes and factors such as sex, age, time of clinical experience, and previous education is variable and poorly clarified in the literature.(13) The attitude toward suicide in future healthcare professionals, such as nurses, is also poorly investigated. Understanding attitudes attributed to suicide by nursing students may facilitate the understanding of suicide-related experiences and behaviors.

Hypotheses were established that attitudes related to suicide would be associated with gender, age, professional education (year and undergraduate course), exposure to different educational strategies (course, classroom, laboratory and events), previous reading about suicide, and personal experience (contact with person who attempted suicide, or suicidal thoughts). Thus, the results of the present study may provide support for the planning of academic training strategies and psychosocial support for students, contributing to the improvement of care qualification.

This study aimed to investigate attitudes and associated factors related to suicide among nursing undergraduates.

Methods

This was a quantitative, cross-sectional study, conducted at a higher education institution in the interior of the State of São Paulo, Brazil, from February to March of 2016.
Nursing undergraduates enrolled from the fifth semester of the Bachelor of Science in Nursing (BSN) degree and the Licentiate's Degree in Nursing (LDN) were eligible for the study. The option to approach the students of the last semesters is justified by the fact that it is at this stage of the course that students are more likely to come into contact with suicide in theoretical and practical activities of the undergraduate course. At the time of data collection, the eligible population for the study was composed of 282 graduates: 142 BSN and 140 LDN.

Three graduates who did not return the instruments during data collection, and 33 who were absent on the day of collection, were excluded. Two students refused to participate in the study. Thus, 244 nursing undergraduates were included in the sample.

The students who met the study selection criteria were invited to respond to a questionnaire containing sociodemographic and information related data, education and exposure to educational strategies on suicide and to the Suicide Behavior Attitude Questionnaire (SBAQ). Initially, the researchers obtained the list of students who met the inclusion criteria. An undergraduate student who was a member of the research team obtained authorization from professors who had classes with the students and, in a previously agreed class period, the researcher entered the classroom, presented by the professor, who then suspended class and left the room. After explanation, the students who agreed to participate in the study received the terms of free and informed consent form, and the data collection instrument. The average time for completing the instruments was 20 minutes.

The SBAQ is an instrument developed in the Brazilian context, which contains 21 statements about attitudes related to suicide. Each statement is followed by a 10cm (10cm) analogue visual scale, ranging from “totally disagree” to “totally agree”. Respondents were asked to indicate a point on each line that best reflected their opinions, feelings or reactions. Due to theoretical and practical limitations of instruments available for measurement of attitudes, an instrument was developed. For the development of the SBAQ, a review of the literature and focus groups with nursing professionals was initially performed to develop the statements that would compose the instrument. The pertinence and adequacy of the sentences were evaluated by experts and submitted to a pilot test. Thus, 21 affirmations were selected. The internal consistency of the scale was evaluated by factorial analysis, using maximum likelihood and Varimax orthogonal rotation. Three interpretable factors were extracted, accounting for 43% of the total variance.

Thus, in the original study, the items were grouped into three factors: 1 - Feelings towards the patient; 2 - Perception of professional capacity, and 3 - Right to suicide. The Cronbach’s alpha coefficient was calculated for each factor and the results obtained were, respectively, 0.7, 0.6 and 0.5. The score of each of the three factors can range from 0 to 30 points.

The instrument does not present cut-off scores, to categorize the results. Factor 1 - “Negative feelings towards the patient” includes items 5, 13 and 15 of the questionnaire. The higher the score on this factor, the greater the presence of such negative feelings. In Factor 2 - “Perception of professional capacity” - the scores obtained are summed for items 1, 10 and item 12, with negative value. A higher score on Factor 2 indicates more confident professionals in dealing with individuals with suicidal behavior. Factor 3 - “Right to Suicide” - is obtained by the sum of items 3, 6 and 16, these last two items having an inverted value. Higher scores on this factor represent a less “moralistic/condemnatory” attitude. The authors authorized the use of the questionnaire in the present study.

The score on each SBAQ item was considered from the point of intersection between the line available on the instrument and the line drawn by the study participant. The score was computed in centimeters and the values were transferred to the database, with one decimal place.
The data obtained by application of the questionnaires were double entered into the Microsoft Excel Program. Subsequently, the data were transported from the spreadsheet to the software program, Statistical Package for the Social Sciences (SPSS), version 19.0, and the program, R GUI 3.0.1.

The data did not present normal distribution, as assessed by the Shapiro-Wilk test. Thus, non-parametric tests were used to analyze the data. The Spearman’s correlation test was used to test the association between numerical quantitative variables and the SBAQ factor scores; the Mann-Whitney U-test was used to test hypotheses between categorical variables and scores on the SBAQ factors. The level of significance was set at p <0.05.

The recommendations for the development of research with human beings were met. The research was initiated after approval by the Committee of Ethics in Research with Human Beings of EERP/USP (Protocol CAAE: 48028215.1.0000.5393).

### Results

Data related to the population characteristics are presented in Table 1.

Table 2 presents the participants’ scores on each of the three SBAQ factors.

Table 3 shows the comparisons between the means obtained in the SBAQ according to the variables related to sociodemographic and educational characteristics.

Women presented higher scores on Factor 1 (p=0.01), therefore, more negative attitudes towards suicide. In Factor 2, which indicates a higher perception of professional ability, male students (p = 0.00), those who completed the psychiatric nursing course (p=0.01), and those who participated in a class/laboratory on suicide had higher scores (p=0.03). Regarding Factor 3, students with a bachelor’s and licentiate’s degree (p=0.03), and who read specific material on suicide (p = 0.01), had higher scores.

<table>
<thead>
<tr>
<th>Variable</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
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<td>211(86.5)</td>
</tr>
<tr>
<td>Male</td>
<td>33(13.5)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>19.0-20.9</td>
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<td>21.0-22.9</td>
<td>103(42.2)</td>
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<td>23.0-24.9</td>
<td>31(12.7)</td>
</tr>
<tr>
<td>≥25</td>
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<td>14(5.7)</td>
</tr>
<tr>
<td>Course of study</td>
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<tr>
<td>Bachelor and Licentiate Degree in Nursing (LDN)</td>
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<td>123(50.4)</td>
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<tr>
<td>Not provided</td>
<td>4(1.6)</td>
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<tr>
<td>Year in the undergraduate course</td>
<td></td>
</tr>
<tr>
<td>3rd year</td>
<td>97(39.8)</td>
</tr>
<tr>
<td>4th year</td>
<td>95(38.9)</td>
</tr>
<tr>
<td>5th year</td>
<td>50(20.5)</td>
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<td>Not provided</td>
<td>2(0.8)</td>
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<tr>
<td>Attended the course on psychiatric nursing</td>
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<tr>
<td>Yes</td>
<td>160(65.6)</td>
</tr>
<tr>
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<td>78(32.0)</td>
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<tr>
<td>Not provided</td>
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<tr>
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<tr>
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<td>72(29.5)</td>
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<td>172(70.5)</td>
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<tr>
<td>Had contact with someone who attempted suicide</td>
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<td>151(61.9)</td>
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<td>No</td>
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<td>Had read any specific material on suicide</td>
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<tr>
<td>No</td>
<td>195(79.9)</td>
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The Spearman’s correlation test was applied to test correlations between SBAQ factors and age variables and scores on question 21. There was no significant correlation between age and SBAQ factors. Item 21 presented a weak correlation (r=0.215) with Factor 3 (p=0.01) indicating that people who already had situations that made them think about committing suicide showed less condemnatory attitudes towards the suicidal patient.
Discussion

The study has as limitations the transversal design, the use of non-parametric tests (justified by the abnormality of the data distribution), and the fact that it included a delimited population from a specific context.

Despite these limitations, this study is the first to investigate the association between exposure to different educational strategies and suicide-related attitudes among nursing undergraduates. According to the results, nursing undergraduates had low specific educational exposure on the subject of suicide, and suicide-related attitudes were associated with sex, previous experience, and characteristics of nursing undergraduate education. Such results may support the planning of educational interventions necessary for the improvement of care, since care for suicidal patients is influenced by suicidal beliefs, attitudes, and professional training. Negative attitudes related to suicidal behavior can promote stigma and discrimination, increase the barriers for seeking treatment, and impair the quality of care offered.

The literature, predominantly, points out that health professionals show more negative attitudes towards people with self-mutilation and suicidal behavior than other patients. The present study shows that when the values obtained in the three factors are compared, lower scores in Factor 1 and higher scores in Factor 3 are identified, indicative of less negative and moralistic attitudes.

Women had more negative attitudes, and felt less prepared to provide care for the person with suicidal behavior. In the literature, a variety of results related to attitudes about suicide between men and women are found. One study identified a less moralistic attitude among women, while in other investigations, there was no difference in attitudes according to sex.

Education in mental health and suicide appears to promote consistent improvements in attitude and knowledge related to suicide. In the present study, participation in events, courses and lectures on suicide was not associated with better attitudes. On the other hand, attending a psychiatric nursing course or a suicide class and laboratory was associated with a greater perception of professional capacity, but it was not associated with more positive or less condemnatory atti-

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor 1</th>
<th>p-value</th>
<th>Factor 2</th>
<th>p-value</th>
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<td>Mean(SD)</td>
<td></td>
<td>Mean(SD)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>16.0(6.0)</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>0.45</td>
<td>12.8(5.8)</td>
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<td>11.3(5.9)</td>
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<td></td>
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<tr>
<td>Participation in events, courses or lectures</td>
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<tr>
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<td>17.2(6.9)</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
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<td>17.2(6.7)</td>
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<td></td>
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<tr>
<td>Read specific material</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Sim</td>
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<td>0.06</td>
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<td>0.11</td>
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<td>11.6(5.5)</td>
<td></td>
<td>16.9(6.9)</td>
<td></td>
</tr>
</tbody>
</table>

Test used: Mann-Whitney; SD - Standard deviation
Attitudes and associated factors related to suicide among nursing undergraduates

The characteristics of educational activities may have different potential in the transformation of attitudes. In addition, this finding indicates the importance of developing attitudinal knowledge, not just cognitive and procedural knowledge, to enhance the incorporation of more positive attitudes towards suicidal behavior.

Previous contact with a person who attempted suicide was not associated with attitudes related to suicidal behavior. The relationship between clinical experience and attitudes about suicide is unclear, suggesting that contact with a suicidal patient is not sufficient to provide greater empathy or understanding. Education and clinical supervision could enable professionals to achieve more productive and empathic interactions to understand patients’ experiences without giving value judgments.

A less moralistic and condemnatory attitude was found among bachelor’s and licentiate’s undergraduates, who read specific material on suicide, and between people who had already thought about committing suicide. It is possible that reading, an interest in materials on suicide, the experience of personal suffering, and the increased workload of the humanities disciplines have contributed to a more comprehensive and less condemnatory attitude.

Nurses play an important role in suicide prevention and care, and the education of these professionals needs to be reviewed and improved. Education of health professionals needs to includes skills related to self-knowledge, empathy, understanding, communication, attitudes and knowledge about suicidal behavior, the possibility of suicide prevention, and the clarification of the role of nursing in the care of the suicidal patient.

Negative, moralistic, or condemnatory attitudes toward suicidal behavior are among the many factors that interfere with the quality of care for a person at risk for suicide. However, the idea that suicide is reprehensible and censurable may favor more prescriptive approaches. Suicide is not desirable as an acceptable option; however, it is important to pay attention to extremist, condemnatory or non-empathic attitudes, asempathy and a therapeutic bond are necessary for implementation of several recommended care actions in the management of suicidal patients.

**Conclusion**

This study identified that nursing undergraduates had minimal educational exposure specific to the subject of suicide. Women had more negative attitudes related to suicide. Men, and students who participated in a psychiatric nursing course, suicide class or laboratory were more confident in caring for the individual with suicidal behavior. Graduates of the bachelor’s and licentiate’s degree, people who read specific material about suicide, or had ever thought about committing suicide, had a less moralistic and condemnatory attitude toward suicidal behavior.

**Acknowledgements**

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**Collaborations**

Moraes SM, Magrini DF, Zanetti ACG, Santos MA e Vedana KGG declare that they contributed to the study design, relevant critical review of the intellectual content, and final approval of the version to be published.

**References**


Clinical outcomes of ischemic stroke patients after thrombolytic therapy

Desfechos clínicos de pacientes com acidente vascular cerebral isquêmico após terapia trombolítica

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Suzel Regina Ribeiro Chavaglia¹
Patrícia da Silva Pires³
Sonia Beatriz Felix Ribeiro¹
Maria Helena Barbosa¹

Abstract

Objective: To analyze outcomes and associated factors in ischemic stroke patients submitted to thrombolytic therapy.

Methods: This was a retrospective cohort study of ischemic stroke patients submitted to thrombolytic therapy. Comorbidities, neurologic deficits and time of thrombolysis were described. The chi-squared test was used to assess association among comorbidities, time of thrombolysis, and occurrence of hemorrhagic transformation.

Results: There was a high frequency of comorbidities. Mean neurological deficit score was 15 points. Mean time window was 98 minutes and needle-to-door time, 89.9 minutes. Hemorrhagic transformation was observed in 20 patients. Bivariate analysis revealed that hemorrhagic transformation was associated with greater neurologic deficit score, atrial fibrillation and heart disease. Neurologic deficit fell from 51% to 12.5% between admission and discharge.

Conclusion: Thrombolytic therapy presented positive outcomes, regardless of long thrombolysis time and high neurologic deficit scores.

Resumo

Objetivo: Analisar desfechos e fatores associados em pacientes com acidente vascular cerebral isquêmico após terapia trombolítica.

Métodos: Estudo do tipo coorte retrospectivo de pacientes com acidente vascular cerebral isquêmico submetidos à terapia trombolítica. Foram descritas as comorbidades; os défices neurológicos e os tempos de atendimento. Utilizou-se o teste qui-quadrado para associação entre comorbidades, tempos de atendimento e ocorrência de transformação hemorrágica.

Resultados: Houve elevada frequência de comorbidades. Défices neurológicos pontuaram média de 15 pontos. A janela de tempo obteve média de 98 minutos e o tempo porta-agulha, 89,9 minutos. Observou-se transformação hemorrágica em 20 pacientes. Na análise bivariada, a ocorrência de transformação hemorrágica esteve associada com maior défice neurológico, fibrilação atrial e cardiopatia. Houve redução dos défices neurológicos de 51% para 12,5% entre a admissão e alta.

Conclusão: A terapia trombolítica apresentou resultados positivos, apesar de tempos de atendimento elevados e pacientes com défices neurológicos com elevada pontuação.
Introduction

Stroke and ischemic heart disease are the leading causes of premature death worldwide. Strokes are also one of the main events responsible for reducing functional capacity in activities of daily living.\(^1\)

The occurrence of strokes is related to risk factors, which are dependent on lifestyle habits that increase the probability of developing the disease.\(^2\)

There are two types of strokes, ischemic and hemorrhagic, depending on the determining ischemic mechanisms or predominant brain lesion topography. Approximately 80% of strokes are ischemic and, for the most part, involve the thromboembolic occlusion of the arterial territory corresponding to the neurologic manifestation, causing reduced cerebral perfusion pressure.\(^3\)

Stroke treatment promotes arterial rechanneling, dissolving occlusive thrombi or emboli through chemical (systemic or intra-arterial use of thrombolytic drugs) or mechanical thrombolysis (surgical removal of clots). These procedures restore cerebral blood flow to the region of ischemic penumbra, leading to functional recovery.\(^4\)

Since the early 2000s, the standard pharmacological treatment for acute ischemic stroke has been thrombolytic therapy with recombinant tissue plasminogen activator (rt-PA).\(^5\)

The effectiveness of this therapy has been demonstrated; however, there are still challenges in the implementation of thrombolytic treatment protocols and few ischemic stroke patients benefit from this therapy. One of the main limiting factors is time. The shorter the time window between onset of stroke symptoms and drug infusion, greater the chances of a good prognosis.\(^6\)

The main clinical outcomes associated with this treatment are: significantly improved National Institute of Health Stroke Scale NIHSS score, hospital discharge, low occurrence of symptomatic hemorrhagic transformation, and low treatment-related deaths.\(^7,8\)

In Brazil, intravenous thrombolysis for ischemic stroke is conducted in several hospitals. However, there are few national reports on the demographic and clinical characteristics of patients submitted to this treatment. There is also little information on the frequency of complications due to this therapy, such as hemorrhagic transformation. More information is needed on how epidemiological and health system characteristics influence the treatment’s safety, considering ischemic stroke as an extensively undertreated event.

In this context, the objective of this study was to analyze outcomes and associated factors in ischemic stroke patients at a hospital after receiving rt-PA thrombolytic therapy.

Methods

This was a quantitative retrospective cohort study. It was approved by the ethics committee of the Federal University of Triângulo Mineiro, under resolution 1.040.479.

The investigation took place at a public teaching hospital that covers 27 municipalities in the south of the Minas Gerais Triangle Region, Brazil. This facility provides high-complexity care, exclusively via the Brazilian Unified Health System (SUS). It has 301 active beds, of which 25 belong to the emergency department. The hospital is a certified teaching hospital and meets the professional training demands of health undergraduate programs, medical, nursing and multiprofessional residencies, and graduate-level programs.

Between January 2012 and January 2015, 828 stroke patients diagnosed were admitted. Of these, 78 received rt-PA treatment. The chart numbers of patients submitted to thrombolysis during this period were obtained from the institution’s electronic system, requested at the medical archive service. Data were gathered using an instrument specifically designed to gather information on the variables of interest of this study.
This study included the medical charts of patients 18 years or older diagnosed with ischemic stroke and International Disease Classification IDC 10 (I 64.0) duly registered with the pharmacy and the medical archive service for intravenous thrombolytic treatment.

Medical charts that were not found in the archive service’s registration system after five attempts and those that were incomplete in terms of research variables were excluded.

Seventy-nine patients were included in the initial sample; however, 14 charts were not found after five attempts with the hospital’s medical archive service. Thus, the sample comprised 64 medical charts that met the inclusion criteria.

The studied sociodemographic variables were: age, gender, ethnicity and origin, and comorbidities as recorded on the admission form or diagnosed during hospital stay. Tobacco use and alcohol consumption were considered as risk factors.

Etiology of ischemic stroke was classified as per Adams et al. (9) into large artery atherosclerosis, small artery atherosclerosis, heart embolism, undetermined, and other causes.

In this study, time window was defined as the time between stroke symptom onset and hospital admission, in minutes; door-to-needle time was understood as the time between hospital admission and intravenous thrombolysis, in minutes; time of thrombolysis was the time between onset of stroke symptoms and rt-PA infusion, in minutes; time of admission corresponded to time between admission and discharge, in days.

Hemorrhagic transformation due to hospital admission (pneumonia, urinary tract infection and pressure ulcers), discharge, and death comprised the clinical outcomes.

The NIHSS was used to assess stroke-related neurologic deficit. Minimum score is zero and maximum is 42, and, in general, the scale is used to estimate stroke severity, predict size of injury, patient evolution and prognosis. (10) Yaghi et al. (11) considers an NIHSS score lesser or equal to 7 as indicative of minor neurologic deficit, 8 to 14, as moderate deficit, and greater or equal to 15, severe deficit.

The data were inserted in an electronic spreadsheet using Excel® for Windows®, validated via dual data entry. Next, they were exported and processed using the Statistical Package for the Social Sciences (SPSS), version 22 for Windows 8®, for data processing and analysis.

Descriptive statistics were computed for quantitative variables using measures of central tendency (mean and median) and dispersion (standard deviation). The chi-square test was used to determine association between time of thrombolysis and NIHSS score after rt-PA infusion.

To assess statistical significance of NIHSS score improvement at the time of admission and discharge, scores were categorized into minor, moderate and severe. (11) After this procedure, the Wilcoxon test was applied.

Qualitative variables were analyzed according to descriptive statistics via simple univariate frequencies, and association measures via contingency tables.

Significance was set at 5% (p<0.05), with a 95% confidence interval.

Results

Between January 2012 and January 2015, 828 stroke patients were admitted; of these, 657 (79.4%) were ischemic and (11.8%) received rt-PA treatment. For this study, 64 patient charts were evaluated.

Of the analyzed charts (n=64), the age range of the study subjects was 39 to 85 years (mean 65.7 years, standard deviation 11.3)

The sociodemographic data revealed that most patients were men 34 (59.6%), white 31 (54.4%) and from the city of Uberaba 48 (84.2%).

The most prevalent comorbidities were systemic arterial hypertension (76.6%), atrial fibrillation (28.1%), heart disease (25%) and diabetes mellitus (17.2%).

The site of stroke for most patients (73.4%) was the middle cerebral artery. In terms of etiology, most of the events were caused by heart embolism (50%), followed by large artery occlusion (28%).
According to the NIHSS, neurologic deficit score at the time of admission varied between 6 and 30 points, with mean score 14.7 and median 15. At the time of admission, scores varied between zero and 25 points, with a mean and median of 7.7 and 15, respectively.

Level of severity of neurologic deficit as measured by the NIHSS at admission and discharge is demonstrated in table 1. There were improvements in scores by deficit category whose statistical significance was appraised via the Wilcoxon test, p< 0.01.

The results of the time intervals involved in thrombolytic therapy were: mean time window of 98.4 minutes and standard deviation of 61.2. Door-to-needle time obtained a mean of 89.9 minutes and standard deviation of 39.8. Time of thrombolysis had a mean of 191.4 minutes and standard deviation 52.9.

Complications due to thrombolytic therapy and hospital admission were: symptomatic hemorrhagic transformation 20 (31%), pneumonia 13 (20.4%), urinary tract infection 5 (7.9%) and pressure ulcer 4 (6.3%).

Regarding clinical outcomes (discharge and death), most of the investigated patients (90.6%) were discharged to home, 4.7% died from other causes, 3.1% were discharged to another hospital, and 1.6% died from thrombolysis.

Length of hospital stay ranged between 3 and 31 days, with a mean of 11.7 days.

Results of the association test between age and NIHSS score at time of admission did not find any association between age and NIHSS score (chi square with p>0.05).

There was no association between time window, divided into two categories (zero to 180 minutes and >180 minutes) and NIHSS score subdivided into categories zero to 14 points and 15 to 42 points (chi square with p>0.05).

Table 2 shows the correlation between the occurrence of hemorrhagic transformation according to the studied variables. Patients with NIHSS >15 were 2.8 times more likely to develop hemorrhaging after the procedure when compared to those with a score <15 points (p=0.01). There was no statistical significance between the occurrence of hemorrhages and age, door-to-needle time, and thrombolysis time.

Patients who presented atrial fibrillation had two times the risk to develop symptomatic hemorrhagic transformation; those with heart disease were two and half times more likely to suffer hemorrhagic transformation in comparison to individuals who did not present these diseases. These associations are shown in table 3.

### Table 1. National Institute Health Stroke Scale (NIHSS) scores on hospital admission and discharge of investigated patients (n=64)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Admission n(%)</th>
<th>Discharge n(%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor (0-7)</td>
<td>5(7.8)</td>
<td>34(53.1)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Moderate (8-14)</td>
<td>26(40.6)</td>
<td>18(28.3)</td>
<td></td>
</tr>
<tr>
<td>Severe (≥15)</td>
<td>33(51.6)</td>
<td>6(12.5)</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>-</td>
<td>4(6.3)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>64(100)</td>
<td>64(100)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2. Association between age, National Institute Health Stroke Scale (NIHSS) score, door-to-needle time and thrombolysis time; and occurrence of hemorrhagic transformation in selected patients (n=64)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Yes n(%)</th>
<th>No n(%)</th>
<th>RR (95%CI)</th>
<th>OR (95%CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-60</td>
<td>4(17.4)</td>
<td>19(82.6)</td>
<td>0.4(0.2-1.2)</td>
<td>0.3(0.1-1.1)</td>
<td>0.1</td>
</tr>
<tr>
<td>&gt;60</td>
<td>16(39.0)</td>
<td>25(61.0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIHSS, score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>5(16.1)</td>
<td>26(83.9)</td>
<td>0.4(0.1-0.7)</td>
<td>0.2(0.1-0.9)</td>
<td>0.01</td>
</tr>
<tr>
<td>15-42</td>
<td>15(45.9)</td>
<td>18(55.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door-to-needle, minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;60</td>
<td>5(26.3)</td>
<td>14(73.7)</td>
<td>0.8(0.3-1.9)</td>
<td>0.7(0.2-2.4)</td>
<td>0.6</td>
</tr>
<tr>
<td>≥60</td>
<td>15(33.3)</td>
<td>30(66.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thrombolysis, hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3</td>
<td>9(32.1)</td>
<td>19(67.9)</td>
<td>1.1(0.5-2.2)</td>
<td>1.1(0.4-3.2)</td>
<td>0.9</td>
</tr>
<tr>
<td>≥ 3</td>
<td>11(30.6)</td>
<td>25(69.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RR - relative risk; 95%CI - 95% confidence interval
In this study, only 78 (11.8%) of the patients admitted underwent thrombolytic therapy, being that a frequency above 20% is considered adequate.\(^{(12)}\)

The main events that explain such low rates of thrombolysis for stroke patients are: lack of public awareness about stroke symptoms to activate emergency medical services; lack of training for prehospital transportation professionals; patients’ referrals to hospitals that do not perform thrombolysis; inefficient screening at emergency services to identify stroke cases; and lack of protocols that integrate all health professionals to avoid delays in patient presentation.\(^{(12,13)}\)

In this investigation, most patients were male and white, similar to other studies.\(^{(14,15)}\) There was no association between skin color and gender and rt-Pa treatment outcomes.\(^{(14)}\)

Mean patient age was 65.7 years, close to that reported by the literature,\(^{(2,12)}\) and was not associated with patient severity on the NIHSS neither to the occurrence of hemorrhagic transformation. The benefits of thrombolysis do not depend on patient age or NIHSS score.\(^{(8)}\)

The selected cases presented high frequency of comorbidities. Arterial hypertension was the most prevalent risk factor, followed by heart disease, atrial fibrillation, and diabetes, data similar to those of other studies about rt-PA infusion.\(^{(2)}\) In this investigation, patients with atrial fibrillation and heart disease presented greater risk for hemorrhagic transformation. Saposnik et al.\(^{(16)}\) described the presence of atrial fibrillation as associated with greater risk for hemorrhagic transformation and higher death rates after intravenous thrombolysis.

The most common etiology for ischemic stroke was heart embolism, corroborating the findings of other studies.\(^{(17,18)}\) Ischemic strokes caused by heart embolism represent approximately one-fourth of ischemic stroke cases, with worse symptomology and greater risk of developing hemorrhagic transformation.\(^{(19)}\)

The researched patients presented severe neurologic deficit on hospital admission as scored by the NIHSS, with a mean of 15 points, i.e., higher than those found in other retrospective studies. A study in the United States developed with 7,193 patients found a mean NIHSS score of 11.\(^{(15)}\) Al-Khaled et al.\(^{(20)}\) obtained a mean score of 11.6 in a study with 1,007 patients. Patients with symptomatic hemorrhagic transformation obtained NIHSS scores higher than 15 points on admission, with statistical significance (p<0.01), corroborating the data presented in the literature.\(^{(15,21)}\)

When compared with the literature,\(^{(8,18)}\) this study found a higher percentage of patients with 15 points or more on the NIHSS. The percentage fell after thrombolytic treatment, dropping from 56% to 12.5%, a statistically significant difference

### Table 3. Association between comorbidities and occurrence of hemorrhagic transformation in investigated patients (n= 64)

<table>
<thead>
<tr>
<th>Comorbidities</th>
<th>Hemorrhagic transformation</th>
<th>RR (95%C.I)</th>
<th>OR (95%C.I)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAH 0.7(0.3-1.5)</td>
<td>0.6(0.2-2)</td>
<td>0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes 14(28.6)</td>
<td>35(71.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No 6(40)</td>
<td>9(60)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes 1.6(0.7-3.4)</td>
<td>2.1(0.6-8)</td>
<td>0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes 5(45.5)</td>
<td>6(54.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No 15(28.3)</td>
<td>38(71.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AF 2(1-4)</td>
<td>3.2 (1-10)</td>
<td>0.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes 9(50)</td>
<td>9(50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No 11(50.6)</td>
<td>35(69.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart disease 2.5(1.3-4.8)</td>
<td>4.3(1.3-14.2)</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes 9(53.8)</td>
<td>7(46.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No 11(22.9)</td>
<td>37(77.1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyslipidemia 0.5(0.102)</td>
<td>0.4(0.1-2)</td>
<td>0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes 2(18.2)</td>
<td>9(81.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No 18(34)</td>
<td>35(66)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RR - relative risk; 95%C.I - 95% confidence interval; SAH - systemic arterial hypertension; AF - atrial fibrillation
(p<0.01). This satisfactory result among the studied patients was primarily due to their greater stroke severity, presence of comorbidities, and delayed time of treatment.

The difference between time windows in Brazilian and international studies is noteworthy. In a Brazilian study by Tosta et al. (7) the mean time window was 118 minutes. In the most important Brazilian study conducted at 19 hospitals with 2,407 stroke patients, the mean time window was 12.9 hours. Of these, 19 (1.1%) were treated with rt-Pa. In Canada, Ganesh et al. (22) found a mean time of 190 minutes. A prolonged time window is associated with delays due to the general public’s failure to recognize stroke symptoms and the consequent delay in prehospital care and transportation. Thus, prolonged time window is one of the main barriers to conducting thrombolysis at hospitals. (15,22)

In this study, door-to-needle time was elevated and higher than that recommended by Brazilian guidelines on ischemic stroke treatment, (23) which establish a maximum of 60 minutes. Strbian et al. (24) and Fonarow et al. (25) obtained 77- and 40-minute door-to-needle times, respectively. A multicenter trial with 25,504 patients conducted by Fonarow et al. (26) in the United States indicated a direct relationship between adequate door-to-needle time and better patient outcomes. Thrombolysis is a complex process and in order to decrease door-to-needle time, health teams involved in stroke treatment must be organized and trained. This requires experience and changes that demand time. (24)

The mean time of thrombolysis in this study was 191 minutes, greater than those found in other studies, such as Tong et al. (15) with 125 minutes and Gumbinger et al. (27) 140 minutes. According to Mikulik et al., (28) factors such as delayed hospital presentation and unsatisfactory door-to-needle time interfere in thrombolysis time. Measures to reduce thrombolysis time are necessary, for the sooner treatment is administered, the better the outcomes for ischemic stroke patients. (26)

Frequency of symptomatic hemorrhagic transformation was greater in comparison to other studies. Al-Khaled et al. (20) found 6%; Tong et al. (15) 5%; Tosta et al. (7) and Cougo-Pinto et al. (21) found a frequency of 6%. The higher frequency of hemorrhagic transformation in this study can be explained by higher NIHSS scores and the presence of comorbidities such as atrial fibrillation and heart disease.

The occurrence of hospital pneumonia following rt-PA treatment diverges in the literature. Hoffmeister et al. (6) found 23.6% patients with pneumonia. Bruening and Al-Khaled (29) obtained 22.7%, while Gumbinger et al. (27) registered 8% of patients with hospital-acquired pneumonia. Hospital-acquired pneumonia following ischemic stroke treatment is considered a potentially avoidable complication, associated with high NIHSS scores and prolonged hospital stay. (29) This can explain the occurrence of the complication in the present study, as the patients presented higher NIHSS scores and longer hospital stays than in other studies.

Over 90% of the patients were discharged to home, and 6% died during the hospital stay. The death rate in this study was similar to that found by Schmidt et al. (30) Al-Khaled et al. (20) Ganesh et al. (22) and Tong et al. (15) with 6%, 8.2%, and 7.2%, respectively. In clinical practice, ischemic stroke patients treated with rt-PA present better outcomes when compared to those who do not receive rt-PA. This points to the need to increase treatment availability, with actions aimed at improving therapy, prevention measures and recognition of the disease. (27)

Limitations of this study include its retrospective nature and the inclusion of only one specialized center. Incomplete data on patient charts limited the sample size, but did not compromise reaching the goals established by the researchers.

The results of this study can contribute to increasing the effectiveness of thrombolysis protocols for ischemic stroke patients and help support public policies in favor of more effective treatment in the healthcare system, resulting in improved neurologic recovery and quality of life for patients and family members.

**Conclusion**

Treatment with intravenous rt-PA for ischemic stroke resulted in lower NIHSS scores at the time of hospital discharge. It is worth noting the occur-
ference of symptomatic hemorrhagic transformation and the data obtained from a sample with a high frequency of comorbidities, severe neurologic deficits, and prolonged therapeutic windows.

Collaborations
Nascimento KG, Chavaglia SRR, Pires PS, Ribeiro SBF and Barbosa MH contributed with the project’s conception, data analysis and interpretation, relevant critical review of its intellectual content and final approval of the version for publication.

References


Sleep quality and chronotype of nursing students

Qualidade do sono e cronotipo de estudantes de enfermagem

Teresa Celia de Mattos Moraes dos Santos
Milva Maria Figueiredo De Martino
Jaqueline Girnos Sonati
Ana Lucia De Faria
Eliana Fátima de Almeida Nascimento

Abstract

Objective: To verify the quality of sleep, chronotype, and health characteristics associated with the sleep quality of students.

Methods: Descriptive, observational, and cross-sectional study with 204 undergraduate nursing students (age group 18-29 years, 91.6% female). A questionnaire was used for sociodemographic and health characterization. The Pittsburgh Sleep Quality Index Questionnaire and the Morningness-Eveningness Questionnaire were applied to verify the sleep quality and identify the chronotype, respectively. The association between health variables and sleep quality was analyzed.

Results: The majority of students was identified with preference for the indifferent chronotype (56.37%) and poor sleep quality (84.31%). There was an association between being a student and working, with symptoms of poor digestion, headache, daytime sleepiness and insomnia.

Conclusion: Nursing students have poor sleep quality and preference for the indifferent chronotype. Those who accumulate the study/work functions, present more symptoms of poor digestion, headache, daytime sleepiness and insomnia.

Keywords
Students nursing; students, health occupations; Sleep; Circadian rhythm/physiology

Descritores
Estudantes de enfermagem; Estudantes de ciências da saúde; Sono; Ritmo circadiano/fisiologia

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

Important factors have played a role in regulating sleep-wake processes in humans, such as sex, age, chronotype, habitual sleep duration, and genetic variations.\(^{(1)}\) The light/dark cycle is considered to be the most important \textit{zeitgeber} of mammalian rhythms. However, with the discovery of electric light, the synchronization patterns have been altered in humans. Exposure to artificial light during the dark phase, in cases of night work and study, transmeridian trips and habits such as television and the internet are associated with the desynchronization of circadian rhythms.\(^{(2)}\)

This desynchronization is maintained throughout life given the profile of contemporary men’s rhythm that involves the accumulation of tasks such as work, study and night leisure. These aspects can lead to difficulty in falling asleep and inability to wake up in the morning, reflecting on the quality of studies and work. When it is possible to choose the natural preferential times, the sleep is generally of good quality and follows the natural course. In the attempt to meet school and professional obligations, arises the sleep debt, resulting in partial chronic sleep deprivation and excessive daytime sleepiness.\(^{(3)}\)

There are important individual differences observed according to chronobiological aspects. The consideration of preferences of sleep and wake hours, and phases of greater physical and cognitive disposition allows the classification according to chronotype preference. It respects the individual perception of phase relations that are different from the expression of circadian rhythms and external synchronizers in human beings.\(^{(4,5)}\)

The chronobiology allows to know the individual characteristics that form a phenotype based on behavior. It ensures the identification of individuals among five preferences of chronotype denominated extreme or moderate morning and evening, and indifferent or intermediate.\(^{(6)}\) Morning individuals are those who prefer to sleep early, at around 9:00 p.m. or 10:00 p.m. and wake up early, at around 6:00 p.m., without interference in their physical and mental performance. Evening individuals prefer to sleep after 10 p.m. and feel more relaxed in the afternoon and early evening. Indifferent individuals adapt more easily to the schedules.\(^{(7)}\)

Thus, in order to propose a planning regarding the use of time destined to studies, and raise awareness about health care, it is necessary to better understand the students’ daily biological cycles, because they develop sleep deprivation behaviors, especially when accumulating study and work tasks.

The aim of this study was to identify the chronotype, quality of sleep, and the presence of symptoms related to sleep quality of nursing students who study and work.

Methods

This is a descriptive, observational, cross-sectional study performed at a university in the region of Vale do Paraíba, countryside of the State of São Paulo, between August 2012 and June 2013. Participants were 204 volunteer students attending between the first and fifth year of the nursing graduation course, of both sexes, and aged over 18 years. The sample included all students enrolled in the morning (7:30 a.m. to 11:10 a.m.) and evening (7:00 p.m. to 10:40 p.m.) periods, considering the entire nursing student population of the university. The recruitment of participants and completion of questionnaires were performed during the class period. For data analysis, students were divided into two groups: the students who work and study, and the students who study only.

The sociodemographic and health characteristics were obtained through a questionnaire with open and closed questions, for information on sex, age, marital status, having children, additional activities, type and schedule of the activity, complaints regarding health status, working hours and health impairment, and study hours. These were all considered as independent variables.

The Pittsburgh Sleep Quality Index instrument was used to assess the quality of sleep. This
instrument quantifies the sleep quality on a scale ranging from 0 to 21 points. The range from 0 to 5 is considered as good sleep quality; between 5 and 10 is considered bad sleep quality; and greater than 10 is considered as presence of sleep disorder. The instrument version validated in Brazil was used, and its internal consistency was 0.82 (Cronbach’s alpha).

The chronotype preference was verified using the Morningness-Eveningness Questionnaire. It has questions about habitual situations of daily life, and people register their preferred times for these situations, assuming they would have total availability to choose. The result is a numeric value ranging from 16 to 86 points. The classification indicates the preference among five chronotypes: extreme evening/definitely evening (16 to 30 points), moderately evening (31 to 41 points), indifferent/neither evening nor morning (42 to 58 points), moderately morning (59 to 69 points), and extreme morning/definitely morning (70 to 86 points).

The data were analyzed in the Statistical Analysis System (SAS), version 9.2 with the aid of a statistical professional. Descriptive statistics (measures of central tendency and dispersion, frequencies and proportions) was used. The non-parametric chi-square test for independent samples was applied to study possible associations between the variables. The p value was set at 0.05 to consider the analysis results as significant.

The study was approved by the Research Ethics Committee of the Universidade de Taubaté under number CEP/UNITAU: nº014/12.

**Results**

The sociodemographic results showed a predominance of the female gender (91.67%), with mean age of 24.97 years (± 6.82), single (75.98%), without children (79.90%), attending the morning period of study (75%), with work activity (68.62%) in the nursing area (39.39%), and this activity was concentrated on daytime shifts (50.71%) and night shifts (34.29%) (Table 1).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Study n=64</th>
<th>Study and work n=140</th>
<th>Total n=204</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>n(%)</td>
<td>n(%)</td>
<td>n(%)</td>
</tr>
<tr>
<td>Female</td>
<td>61(95.31)</td>
<td>126(90.00)</td>
<td>187(91.67)</td>
</tr>
<tr>
<td>Male</td>
<td>3(4.69)</td>
<td>141(10.00)</td>
<td>17(8.33)</td>
</tr>
<tr>
<td>Age group, years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-29</td>
<td>56(27.45)</td>
<td>105(51.47)</td>
<td>161(78.92)</td>
</tr>
<tr>
<td>30-39</td>
<td>4(1.96)</td>
<td>28(13.73)</td>
<td>32(15.68)</td>
</tr>
<tr>
<td>40-49</td>
<td>3(1.47)</td>
<td>7(3.43)</td>
<td>10(4.90)</td>
</tr>
<tr>
<td>50 or over</td>
<td>1(0.49)</td>
<td>-</td>
<td>1(0.49)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>55(26.96)</td>
<td>100(49.02)</td>
<td>155(75.98)</td>
</tr>
<tr>
<td>Married</td>
<td>7(3.43)</td>
<td>34(16.67)</td>
<td>41(20.10)</td>
</tr>
<tr>
<td>Divorced</td>
<td>2(1.08)</td>
<td>6(2.94)</td>
<td>8(3.92)</td>
</tr>
<tr>
<td>Has children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9(4.41)</td>
<td>32(15.69)</td>
<td>41(20.10)</td>
</tr>
<tr>
<td>No</td>
<td>55(26.96)</td>
<td>108(52.94)</td>
<td>163(79.90)</td>
</tr>
<tr>
<td>Study shift</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning</td>
<td>53(25.98)</td>
<td>100(49.02)</td>
<td>153(75.00)</td>
</tr>
<tr>
<td>Evening</td>
<td>110(54.02)</td>
<td>40(19.61)</td>
<td>150(74.99)</td>
</tr>
<tr>
<td>Work shift</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning*</td>
<td>-</td>
<td>71(50.71)</td>
<td>71(50.71)</td>
</tr>
<tr>
<td>Night†</td>
<td>-</td>
<td>48(34.29)</td>
<td>48(34.29)</td>
</tr>
<tr>
<td>Afternoon/evening‡</td>
<td>-</td>
<td>21(15.00)</td>
<td>21(15.00)</td>
</tr>
<tr>
<td>Professional category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing</td>
<td>-</td>
<td>55(39.29)</td>
<td>55(39.29)</td>
</tr>
<tr>
<td>Paid internship</td>
<td>-</td>
<td>18(12.86)</td>
<td>18(12.86)</td>
</tr>
<tr>
<td>Teaching</td>
<td>-</td>
<td>2(1.43)</td>
<td>2(1.43)</td>
</tr>
<tr>
<td>Other activities</td>
<td>-</td>
<td>18(12.86)</td>
<td>18(12.86)</td>
</tr>
<tr>
<td>Not informed</td>
<td>-</td>
<td>47(33.57)</td>
<td>47(33.57)</td>
</tr>
</tbody>
</table>

*From 7 am to 7 pm, from 6 am to 6 pm, from noon to 6 pm, from 1 pm to 7 pm; †from 7 pm to 7 am, from 6 pm to 6 am; ‡from 5 pm to 10 pm

The analysis of sleep quality showed that most nursing students surveyed had poor sleep quality; both those who studied only (24.51%) and those who studied and worked (59.80%).

The individual perception in relation to chronotype showed that most students were indifferent (56.38%) regardless of having work activity or not. Regarding the study period and the work shift, there was a predominance of indifferent individuals in the morning period (42.16%) and the day shift (27.86%) (Table 2).

Being a student and working implied a higher frequency of symptoms of poor digestion (p = 0.0016), headache (p = 0.0357), classroom sleepiness (p = 0.0395) and insomnia (p = 0.0369) (Table 3).
Discussion

This study presents the characteristic limitations of cross-sectional studies, i.e., it did not assess cause and effect, but indicated concern about the health and sleep of the studied population.

The results of this study together with the data found in the literature, suggest that nursing undergraduate students are female, predominantly young, in the age group of 18 to 29 years, followed by individuals in the age group of 30 to 39 years, and a lower percentage of subjects aged over 40 years. These characteristics were also found in a study about the quality of life of freshmen students of the nursing course at the Universidade Federal Fluminense. (10) As for marital status, the results of this study were divergent, because some students were married and had children, which may be explained by the inclusion of students from all the course years and not only freshmen students.

Most students were enrolled in the morning course with their work shifts concentrated in the daytime and evening periods. This is a characteristic of nursing professionals, who prioritize the night work because of the higher salary gain, since respondents were also a majority in the nursing area work. The double journey (study-work), especially for night shifts, leads to sleeping difficulties during the day, compromising the health and social relations as family and friends. (11) It also affects the academic life, because remaining in graduation depends on the organization of work life, which is always prioritized. (12)

Most students had poor sleep quality, and these data are in agreement with the literature, such as in two studies corroborating the information. A study conducted with 701 students from the Universidade Federal do Ceará found that 95.3% of students had poor sleep quality. (13) Another study performed at the Universidade Federal de Pernambuco...

Table 2. Distribution of nursing students according to chronotype

<table>
<thead>
<tr>
<th>Chronotype</th>
<th>Morning Total (n=204)</th>
<th>Evening Total (n=204)</th>
<th>Study and work Total (n=140)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n(%)</td>
<td>n(%)</td>
<td>n(%)</td>
</tr>
<tr>
<td>Definitely morning</td>
<td>5(2.45)</td>
<td>5(2.45)</td>
<td>4(2.86)</td>
</tr>
<tr>
<td>Definitely evening</td>
<td>5(2.45)</td>
<td>3(1.47)</td>
<td>2(1.43)</td>
</tr>
<tr>
<td>Moderately morning</td>
<td>32(15.69)</td>
<td>7(3.43)</td>
<td>16(11.43)</td>
</tr>
<tr>
<td>Moderately evening</td>
<td>25(12.25)</td>
<td>12(5.88)</td>
<td>107(74.45)</td>
</tr>
<tr>
<td>Indifferent</td>
<td>86(42.16)</td>
<td>29(14.22)</td>
<td>4(2.86)</td>
</tr>
</tbody>
</table>

Table 3. Association between the variables of reported symptoms of poor digestion, headache, sleepiness and insomnia, and the school and work shifts of nursing students

<table>
<thead>
<tr>
<th>Signs and symptoms</th>
<th>Study shift (n=204)</th>
<th>Work shift (n=140)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Morning n(%)</td>
<td>Evening n(%)</td>
</tr>
<tr>
<td>Poor digestion</td>
<td>Yes 37(80.43)</td>
<td>9(19.57)</td>
</tr>
<tr>
<td></td>
<td>No 116(73.42)</td>
<td>42(26.58)</td>
</tr>
<tr>
<td>Headache</td>
<td>Yes 75(78.95)</td>
<td>20(21.05)</td>
</tr>
<tr>
<td></td>
<td>No 78(71.56)</td>
<td>31(28.44)</td>
</tr>
<tr>
<td>Sleepiness in class</td>
<td>Yes 80(76.92)</td>
<td>24(23.08)</td>
</tr>
<tr>
<td></td>
<td>No 73(73.00)</td>
<td>27(27.00)</td>
</tr>
<tr>
<td>Insomnia</td>
<td>Yes 25(71.43)</td>
<td>10(28.57)</td>
</tr>
<tr>
<td></td>
<td>No 128(75.74)</td>
<td>41(24.26)</td>
</tr>
</tbody>
</table>

*p-value obtained by the chi-square test
with 173 students (92 of courses in the area of exact sciences, mathematics, physics and computing, and 81 in the area of biological sciences and physical education) found poor sleep quality and excessive daytime sleepiness in students of health and exact sciences.\(^{(14)}\)

Regarding students who also work, the data on sleepiness are in agreement with the literature, corroborating the study performed in a private university in the countryside of the state of São Paulo with nursing students who worked on night shifts. This study demonstrated that the subjects’ sleepiness scores on the Epworth Sleepiness Scale ranged from 7.2 to 15.9, with a mean of 11.4, characterizing the prevalence of excessive daytime sleepiness. The author concluded the students increase their waking hours because of studies, resulting in a high incidence of daytime sleepiness.\(^{(15)}\)

The negative impact of the double journey (work-study) in the sleep of young Brazilian students in the city of São Paulo was confirmed by comparing their sleep rates before the start of the double journey and after engaging with study and work commitments, showing a significant difference between the mean values of sleep time.\(^{(16)}\)

These findings, together with the results found in the present study, are disturbing because sleeping is associated with different modes of memory processing, favoring its consolidation and the recovery of stimuli required at the moment of wakefulness.\(^{(17)}\) The lack of sleep may interfere in the process of consolidating students’ knowledge and in the quality of trained professionals.

The consequences of the double journey (work-study) to health were confirmed in the present study when finding associations between the variables of sleepiness in the classroom, insomnia, headache and poor digestion, with the presence of double journey. Shift work, especially the shifts that provide higher lack of sleep, have been associated with fatigue and sleepiness, conditions not expected from individuals who perform activities that require concentration and attention.\(^{(18)}\) These findings indicate the need for lifestyle changes to promote healthy habits involving better quality of sleep, food and physical activity.\(^{(19)}\)

The agreement between chronotype preference and period of work and study is also important in determining the work and study performance, and a better quality of life.\(^{(1)}\) The chronobiological profile can minimize or potentiate the negative effects of wake-sleep cycle changes.

The chronotype preference found in this study was of the indifferent type (neither evening nor morning individuals). This profile was similar to that found in a study performed with biological sciences undergraduate students of the Universidade Metodista de Piracicaba, in the interior of the State of São Paulo. Data indicated that indifferent and moderately evening types are seven times larger than the typical morning type, 1.4 times greater than the moderately morning type, and 3.5 times larger than the typical evening type.\(^{(6)}\) These characteristics show an adaptation of the indifferent chronotype to social rhythms. Therefore, understanding issues involving fatigue, excessive sleepiness, and duration and quality of sleep of students is of great interest because these factors are associated with worse school performance.

### Conclusion

The study found preference of the predominantly indifferent chronotype with poor sleep quality, and association between insomnia, headache, poor digestion and sleepiness in the classroom for students who work and study. These conclusions show the importance of investing in understanding the changes that may occur between biological rhythms and environmental cycles, especially in relation to adjustments in hours of study and shift work.

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Collaborations
Santos TCMM, De Martino MMF, Sonati JG, De Faria AL and Nascimento EFA declare to have contributed with the writing of the article, critical review of the intellectual content and final approval of the version to be published. Santos TCMM, De Martino MMF collaborated in the stages of study design, analysis, data interpretation, article writing, critical review of the intellectual content and final approval of the version to be published.

References

Postpartum depression and maternal self-efficacy for breastfeeding: prevalence and association

Depressão pós-parto e autoeficácia materna para amamentar: prevalência e associação

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Marina Moraes Di Lucca¹
Maite Varela²
Isília Aparecida Silva³

Abstract

Objective: To identify the prevalence of postpartum depression symptoms and the level of self-efficacy to breastfeed among puerperal women assisted at a Breastfeeding Incentive Center, and to analyze possible associations.

Methods: A cross-sectional study with 208 women up to 60 days postpartum submitted to the Edinburgh Postpartum Depression Scale and the Self-Efficacy Scale for Breastfeeding.

Results: Postpartum depression symptoms were present in 31.25% of women who presented medium (39.9%) and high (36.06%) levels of breastfeeding self-efficacy. The medium or high self-efficacy decreased the depression score by 27.4% or 38.8% respectively, while the high score on the postpartum depression scale reduced the self-efficacy score in breastfeeding by 11.84 points.

Conclusion: The high prevalence of postpartum depression symptoms and self-efficacy for breastfeeding were evident in the studied population. The levels of postpartum depression symptoms and self-efficacy revealed a cause and effect association between themselves.

Keywords
Depression, postpartum/psychology; Breast feeding/psychology; Postpartum period/psychology; Self efficacy; Mental health

Resumo

Objetivo: Identificar a prevalência de sintomas de depressão pós-parto e o nível de autoeficácia para amamentar, entre puérperas atendidas num Centro de Incentivo ao Aleitamento Materno, e analisar possíveis associações.

Métodos: Estudo transversal com 208 mulheres, até 60 dias pós-parto, submetidas à Escala de Depressão Pós-parto de Edinburgo e à Escala de Autoeficácia para Amamentar.

Resultados: Sintomas de depressão pós-parto estiveram presentes em 31,25% das mulheres, que apresentaram níveis de autoeficácia para amamentar médio (39,9%) e alto (36,06%). Ter média ou alta autoeficácia diminui em 27,4% ou 38,8%, respectivamente, o escore de depressão, enquanto a elevada pontuação na escala de depressão pós-parto reduz em 11,84 pontos o escore da autoeficácia na amamentação.

Conclusão: A prevalência elevada de sintomas de depressão pós-parto e autoeficácia para amamentar foram evidenciados na população estudada. Os níveis de sintomas de depressão pós-parto e autoeficácia revelaram associação de causa e efeito entre si.

Descritores
Depressão pós-parto/psicologia; Aleitamento materno/psicologia; Período pós-parto/psicologia; Autoeficácia; Saúde mental

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Abuchaim ESV is an Associate Editor of Acta Paulista de Enfermagem and did not participate in the evaluation process of this article.
Introduction

The puerperium is recognized as a delicate period in women’s lives because it includes physical and psychic modifications that can directly influence mental health and emotional well-being, raising the risk of developing psychiatric disorders.

Postpartum depression (PPD) stands out among the psychiatric disorders affecting women in the puerperal period, with prevalence between 13% and 19% in developed countries.\(^1\) Studies show higher rates in Brazil, with prevalence ranging between 7.2% and 39.4% in the cities of Recife and Vitória respectively.\(^2\,3\)

The main risk factors for developing PPD are the following: inadequate or non-existent family and social support, women’s psychiatric history, intense anxiety, previous depressive episodes, infertility, history of gestational loss, and negative feelings about gestation or the baby.

The Diagnostic and Statistical Manual for Mental Disorders - Fifth Edition - DSM-5 establishes the first four weeks of puerperium regarding the incidence of PPD symptoms, while the International Classification of Diseases - ICD expands the period for the first six weeks after childbirth.\(^4\,5\)

Anxiety, irritability, anhedonia or loss of ability to feel pleasure, changes in sleep pattern, persistent fatigue and tiredness, guilt feelings, suicidal ideation, decreased appetite, libido and cognition, and the presence of obsessive or overvalued ideas are some clinical symptoms. Together with the difficulty of satisfying the baby’s needs, especially regarding lactation, these symptoms are related to PPD.\(^2\,6\)

However, the risk association between postnatal depression and breastfeeding is not conclusive, since the known results are dissonant and poorly enlightening. Some studies show a negative relation, evidencing the greater chance of puerperal women with depressive symptoms weaning their babies early, while others show that weaning is prior to the onset of depressive symptoms, and relate hormonal changes and psychological aspects as risk factors for PPD.\(^7\,9\)

According to Bandura’s theory of self-efficacy, the way individuals interpret their feelings tends to modulate their behavior.\(^10\) In other words, the confidence of puerperal women in their ability to feed their child through breastfeeding (called maternal self-efficacy to breastfeed) tends to be compromised by the occurrence of depressive symptoms.\(^6\)

Although the findings of Flores-Quijano et al.\(^11\) reinforce the aforementioned hypothesis, revealing that PPD tends to impair women’s confidence about their ability to perform the maternal function, and interferes in their behavior and perception on factors associated with their lactational performance, there is a significant shortage of studies investigating the relationship between maternal self-efficacy for breastfeeding and postpartum depression symptoms.

The unquestionable benefits of breastfeeding for the baby, woman, family and society, and the harmful effects of PPD for them justify the present study.

In this perspective, the objectives of this study were to identify the prevalence of postpartum depression symptoms and the level of self-efficacy for breastfeeding among postpartum women treated at a Breastfeeding Incentive Center, and analyze the existence of a possible association between PPD and the self-efficacy to breastfeed.

Methods

Cross-sectional study performed at the Incentive and Support Center for Breastfeeding and Human Milk Bank, linked to the Universidade Federal de São Paulo, located in the city of São Paulo. The population was composed of women assisted by nursing in the first postpartum visit, and who were breastfeeding in the current gestation, regardless of the type of breastfeeding.

The sample was composed of 208 puerperal women, a size that met the stipulated criteria for sample calculation. Assuming an incidence of 20% of women with PPD and an error of 5.5% (plus or minus), the minimum sample required is 203 women.
The data collection period was between July 2013 and April 2016, and the puerperal women who agreed to participate in the study signed the Informed Consent form (IC).

The variables related to sociodemographic characteristics, life habits, obstetric and personal antecedents and characteristics related to the intra and interpersonal relations established by the puerperal women were collected from their medical records and recorded in a collection instrument specifically developed for this study. This instrument was adapted based on information from the institution’s service form.

The Edinburgh Postnatal Depression Scale (EPDS) and the Breastfeeding Self-Efficacy Scale (BSES) were used respectively to identify postpartum depression symptoms and assess the breastfeeding self-efficacy.

The EPDS is a Likert-type instrument developed in Great Britain and validated in Brazil by Santos et al. to detect depressive symptoms. It is composed of ten statements, with four possibilities of response each, according to the severity or duration of the symptomatology experienced and based on women’s perception in the week before the test application. The EPDS score ranges from 0 to 30 points, considering 10 as the cutoff for identification of PPD symptoms. Women in this study who scored ≥10 were referred to as having depression for descriptive effect.¹²

The BSES is also a Likert type scale with 33 items about two domain categories called: Technical and Intrapersonal thoughts. The Technical domain is related to the technical management of breastfeeding, while the Intrapersonal thoughts domain is related to the desire, motivation and satisfaction of women/ puerperal women in relation to this practice.¹³ For each investigated item, there is a score ranging from 1 (totally disagree) to 5 (totally agree) depending on the woman’s response. The total score ranges from 33 to 165 points. Maternal confidence in breastfeeding is classified as low (33 to 118 points), medium (119 to 137) or high (138 to 165).¹⁴

For the statistical analysis of qualitative variables was used the Fisher’s two-tailed test. To analyze the relationship of two-category variables with a quantitative scale was used the two-tailed t test or the Mann-Whitney test. For the analysis of variables with three or more categories was applied the Levene test. In the analysis of statistical significance was applied the Kruskall-Wallis test to verify if at least one of the categories has a different score. When the Levene test was rejected or in cases where at least a score was different (Kruskall-Wallis test), the Tukey’s test was used for multiple comparisons (pairwise).

For the non-linear regression, was used the model with negative binominal response variable for the EPDS, and the model with normal variable for the BSES. The variables with p-value <0.10 were included in the regression. The selection of the finalist variables of the models was done using the backward method, with an output alpha of 0.05. The software used for data analysis was the R 3.1.2. (R Team, 2012), and the level of significance adopted for all analyzes was 0.05.

This study was extracted from the study “The interface between the experience of postpartum depression symptoms and the breastfeeding process”, linked to the Postdoctoral Program of the University of São Paulo School of Nursing, 2016. The study was registered at the Plataforma Brasil system under number (CAEE) 14507113.9.0000.5392.

Results

The sample comprised 208 women assisted in the first nursing visit in the first 60 days after delivery, with an average age of 30 years. Of the total sample, 41.55% of women had high school education, 54.68% had family income between one and three minimum wages, 55.04% lived in their own dwelling and 86.96% lived with their partner (married/domestic partnership).

The majority of puerperal women (72.12%) did not have a history of abortion or gestational loss (93.27%) and had 2.26 pregnancies on average. Even though the current gestation was not planned,
it was desired by 50.96% of the women, 97.6% performed ≥ 6 prenatal visits and 61.35% underwent cesarean delivery.

Regarding breastfeeding, the results show that 96.14% of puerperal women were breastfeeding during the interview period; 58.82% were exclusively breastfeeding, 62.14% experienced some kind of event to breastfeed the baby, and 61.88% reported not having breastfed their other children.

Most of the sample (80.39%) denied a history of violence, 69.61% denied psychiatric disorders, and 72.68% denied a previous episode of depression. When asked about possible complaints, 66.83% denied complaints related to themselves, 88.29% denied child-related complaints and 86.22% denied partner-related complaints.

After the child was born, the marital relationship improved to 53.06% of women surveyed, while 87.75% perceived the relationship with their families satisfactorily.

The prevalence of postpartum depression symptoms among those surveyed was 31.25%. The highest scores in the EPDS were: n.03 - I have been blaming myself unnecessarily when things went wrong (mean = 1.59); n.04 - I have been anxious or worried for no good reason (mean = 1.42) and; n.06 - I have been overwhelmed by the tasks and events of my daily life (mean = 1.26).

Regarding the level of self-efficacy for breastfeeding, it was observed that 39.9% had medium self-efficacy, 36.06% high and 24.04% low. The puerperal women presented mean total score (SD) 128.58 (21.16) in the Self-efficacy Scale for Breastfeeding. Their scores in the Technical 76.53 (13.38) and Intrapersonal thoughts 52.74 (8.42) domains showed they felt discreetly more confident in intrapersonal aspects.

A crossing was performed between the EPDS and BSES scales and the quantitative variables - age in abortion, gestations, parity and postpartum days, using the Spearman’s correlation coefficient and considering p-value <0.05. The crossing did not show a very expressive result for any case because all correlations are lower than or equal to 0.40 for positive correlations, or greater than -0.40 for negative correlations (Table 1).

The association of the BSES scale versus variables with three or more categories showed a positive association (p-value <0.05) for the following variables: having a formal job (p - 0.44), absence of events in breastfeeding (p - 0.003), and improved marital relationship after the child (p -0.03).

The regression analysis of the EPDS showed that puerperal women with medium or high score for the self-efficacy scale decreased the EPDS scale score by 27.4% or 38.8%, respectively. The variables of improved marital relationship after the baby’s birth, no complaint of herself, and no previous episode of depression also decreased the depression score by 34.5%, 30% and 21%, respectively. Finally, for each new gestation, the woman has a depression score increased by 9.3% (Table 2).

The regression analysis of the BSES showed that a high EPDS score decreased the value of the BSES score by 11.84 points, and that not breastfeeding and not having breastfed the other children also decrease the self-efficacy score by 20.26 and 7.98 points, respectively. Finally, exclusive breastfeeding increases the self-efficacy score by 14.86 points (Table 3).
Discussion

In order to identify the symptomatology of postpartum depression in the studied population, the results showed a prevalence of 31.25%, with greater intensity in the symptoms of guilt, anxiety and distress, addressed in statements 03, 04 and 06 of the EPDS, respectively. International studies performed with the same screening scale (EPDS), cut-off point (≥10) and postpartum period, have found lower prevalence, ranging from 13% to 24.2%.\(^{(15,16)}\)

Although studies have shown the ≥10 cut-off point of the EPDS as the best to detect PPD in public health services, we found only two studies adopting this recommendation, both of which showed a prevalence (26.9%) lower than that found in this study.\(^{(17,18)}\)

The prevalence of depressive symptomatology found in national studies that adopted cutoff points of 11/12 in the EPDS reveals indices between 28% and 39.4%, which is a reality closer to that found among the puerperal women investigated in this study.\(^{(3,19)}\)

PPD data on the national scene are alarming. Considering the physical, emotional, psychological, economic and social costs generated for women, the child, family and society, it is necessary to develop public policies of attention to perinatal mental health. This will make it possible to create knowledge strategies about risk and protection factors to prevent, identify and treat perinatal mental disorders and their serious effects.\(^{(20)}\)

Evidence points to the short-term and long-term impact of postpartum depression on women’s lives, especially on mental health and negative effects on their environment. In this sense, the relationship with the baby is also impaired and may affect the breastfeeding process, a fundamental practice for the child’s health, because children of depressed women are susceptible to diarrheal diseases, nutritional disorders and changes in the physical, emotional, cognitive and social development.\(^{(21-23)}\)

The findings of the present study reveal that 58% of children of the interviewed women were exclusively breastfed at the time of the survey. This rate is above the national and state prevalence of 47.3% and 47.7%, respectively, for children aged up to 60 days of life.\(^{(24)}\) As women and their babies were assisted in a specialized breastfeeding center, the prevalence above the national average is justified by the received services of incentive, promotion and support.

### Table 2. Negative binomial regression model for the Edinburgh Postpartum Depression Scale

<table>
<thead>
<tr>
<th>Factor</th>
<th>Category</th>
<th>Estimate</th>
<th>Standard error</th>
<th>Relative risk</th>
<th>CI 95%</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td>-2.827</td>
<td>0.196</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mean BSES</td>
<td>119-137</td>
<td>-0.320</td>
<td>0.120</td>
<td>-27.4</td>
<td>-42.6</td>
<td>-8.1</td>
</tr>
<tr>
<td>High BSES</td>
<td>138 or more</td>
<td>-0.490</td>
<td>0.126</td>
<td>-38.8</td>
<td>-52.2</td>
<td>-21.6</td>
</tr>
<tr>
<td>Number of gestations</td>
<td></td>
<td>0.089</td>
<td>0.029</td>
<td>9.3</td>
<td>3.1</td>
<td>15.7</td>
</tr>
<tr>
<td>Complaint of herself</td>
<td>No</td>
<td>-0.356</td>
<td>0.103</td>
<td>-30.0</td>
<td>-42.7</td>
<td>-14.4</td>
</tr>
<tr>
<td>Marital relationship after the baby’s birth</td>
<td>Worse</td>
<td>-0.338</td>
<td>0.176</td>
<td>-28.7</td>
<td>-49.5</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>Better</td>
<td>-0.422</td>
<td>0.171</td>
<td>-34.4</td>
<td>-53.0</td>
<td>-8.4</td>
</tr>
<tr>
<td>Previous episode of depression</td>
<td>No</td>
<td>-0.236</td>
<td>0.111</td>
<td>-21.0</td>
<td>-36.5</td>
<td>-1.8</td>
</tr>
</tbody>
</table>

### Table 3. Negative binomial regression model for the Breastfeeding Self-Efficacy Scale

<table>
<thead>
<tr>
<th>Factor</th>
<th>Category</th>
<th>Estimate</th>
<th>Standard error</th>
<th>CI 95%</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td>129.38</td>
<td>0.18</td>
<td>129.04</td>
<td>129.73</td>
</tr>
<tr>
<td>EPDS</td>
<td>10 or more</td>
<td>-11.84</td>
<td>0.16</td>
<td>-12.14</td>
<td>-11.54</td>
</tr>
<tr>
<td>Breastfeeding</td>
<td>No</td>
<td>-20.26</td>
<td>0.43</td>
<td>-21.09</td>
<td>-19.42</td>
</tr>
<tr>
<td>Breastfed other children</td>
<td>No</td>
<td>-7.98</td>
<td>0.15</td>
<td>-8.28</td>
<td>-7.69</td>
</tr>
<tr>
<td>Type of breastfeeding</td>
<td>Exclusive</td>
<td>14.86</td>
<td>0.15</td>
<td>14.56</td>
<td>15.16</td>
</tr>
</tbody>
</table>
In this study, women’s level of self-efficacy for breastfeeding was investigated to analyze their probability of maintaining children’s exclusive breastfeeding for longer periods. The results showed a protective factor of breastfeeding, as they revealed high levels, predominantly medium (39.9%) and high (36%), that is, women were confident, motivated and persistent in the role of lactating, although 62% have experienced some type of breastfeeding event.

The above findings and their relevance are in line with studies performed at national and international level. They reinforce the advantages of adopting instruments in the clinic for the early identification of aspects of women’s low confidence in the breastfeeding practice by health professionals. Thus, they allow the elaboration of individualized and effective interventions to solve the difficulties experienced in this process and prevent early weaning, since women with low self-efficacy are three times more likely to interrupt breastfeeding.\(^{25-27}\)

Analyzing the existence of a possible association between PPD and self-efficacy, the results of the present study show a cause and effect relationship between the outcomes, showing that women with a high index of PPD symptoms in the EPDS present a reduction of 11.84 points in the BSES score value. In addition, puerperal women with moderate or high self-efficacy had a score reduced by 27.4% or 38.8% in the scale to detect postpartum depression symptomatology (EPDS).

The above findings are in line with national and international studies that reinforce the negative effect of PPD symptoms on the duration of breastfeeding, associating them with early weaning.\(^{7,11,20,28}\) and with the interference of low self-confidence to breastfeed in the symptoms of PPD.\(^{11,29}\)

The symptoms related to guilt, anxiety, concern and distress are present in the daily events, more prevalent among women in this study, and associated with the PPD.\(^{2,6,29}\) These symptoms reveal the way studied women experience and manage their emotions in the face of daily obstacles, including the infant’s demands, and which may interfere with their self-esteem and self-confidence in the performance of maternal functions. Puerperal women in this scenario are more vulnerable to emotional problems and feel less confident and secure to care for their child, including the establishment and/or maintenance of breastfeeding.\(^{11}\)

On the other hand, women with a satisfactory marital relationship, with less complaints of themselves and/or with no history of depression (statistically significant variables in this study), seem to have better conditions to deal with the maternal role demands imposed by the arrival of the baby in their lives. Thus, motivated to breastfeed and confident in their ability to care for the child successfully, the puerperal women of this study revealed more difficulty in technical issues than in the intrapersonal domain, besides presenting high self-efficacy levels for the breastfeeding practice and to tackle their difficulties.

Thus, the present study confirms the findings of the literature on the importance of developing specific national policies for perinatal mental health care aimed at reducing maternal morbidity resultant of mental disorders related to this period and with serious consequences for women, their child, family and society.

The instruments adopted in this study were suitable for use in the public health system and for the improvement of breastfeeding assistance because they allow the early identification of women and children at risk of early weaning.

**Conclusion**

The study identified a prevalence of 31.25% of postpartum depression symptoms in the investigated population; high levels of maternal self-efficacy for breastfeeding and an association between postpartum depression symptoms and the level of self-efficacy for breastfeeding: medium or high self-efficacy levels decreased by 27.4% or 38.8%, respectively, the EPDS score, while the high EPDS score has decreased the BSES score by 11.84 points.
Collaborations
Abuchaim ESV participated in the project design, collection, analysis and interpretation of data, writing of the article and approval of the final version of the manuscript. Silva IA collaborated with project design, analysis and interpretation of data, critical review of intellectual content and approval of the final version of the manuscript. Torquato NC contributed to the collection, analysis and interpretation of data, writing of the article and approval of the final version of the manuscript. Di Lucca MM cooperated with the analysis and interpretation of data, writing of the article and approval of the final version of the manuscript.

References
Validation of the Parenting Stress Index for Brazilian Portuguese

Validação da escala Índice de Estresse Parental para o português do Brasil

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Abstract

Objective: To present the cultural adaptation and validation of the Parenting Stress Index for Brazilian Portuguese.

Methods: Methodological research. For the validation, the scale was applied to 53 mothers of premature infants at the outpatient monitoring clinic of a public teaching hospital in Paraná between November 2013 and July 2014. For the data analysis, descriptive and inferential statistics were used.

Results: The reliability was satisfactory for the complete scale (α=0.91) and the domains: Child domain (α=0.87) and parents’ domain (α=0.88). The principal components explained 64.57% of total item variation, being 45.16% from the child’s domain and 17.80% from the parents’ domain.

Conclusion: The scale was appropriate to assess maternal stress after hospital discharge, endorsing its use in the Brazilian context in new studies to enhance its reliability and validity.

Keywords
Stress, psychological; Mother, Premature birth; Validation studies

Descritores
Estresse psicológico; Mãe; Nascimento prematuro; Estudos de validação

Resumo

Objetivo: Apresentar a adaptação cultural e validação do instrumento Parental Stress Index para o português do Brasil.

Métodos: Pesquisa metodológica com a aplicação da escala em validação à 53 mães de prematuros no ambulatório de seguimento de um hospital público de ensino no Paraná, no período de novembro de 2013 a julho de 2014. A análise de dados utilizou estatística descritiva e inferencial.

Resultados: A confiabilidade do instrumento foi satisfatória em seu conjunto (α=0,91) e em seus domínios: Domínio da criança (α=0,87) e domínio dos pais (α=0,88). Os componentes principais explicaram 64,57% da variação total dos itens, sendo 45,16% do domínio da criança e 17,80% do domínio dos pais.

Conclusão: A escala mostrou-se adequada para avaliar o estresse materno após a alta hospitalar, referendando-se seu uso no contexto brasileiro em novos estudos para ampliar sua confiabilidade e validade.

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Conflicts of interest: no conflict of interest to declare.
Validation of the Parenting Stress Index for Brazilian Portuguese

Introduction

The birth of a child at risk and the need for hospitalization at a Neonatal Intensive Care Unit (NICU) can develop insecurities and uncertainties in the parents with regard to this child’s life and prognosis. The imaginary considers the NICU as an inhospitable, cold environment, related to the pain of separation and the idea of finiteness. In addition to these aspects, the parents are confronted with a frightening and hardly welcoming environment with unfamiliar people and feel shocked and insecure at the sight of their hospitalized child.

Premature birth is a situation that requires the hospitalization of Premature Infants (PMI) and implies an increase in different vulnerability factors, for the parents as well as the child, which should be understood based on the biological, environmental and social influences. The parents are confronted with a strategic moment that causes stress during the hospitalization, at discharge and during the monitoring at home.

In the context of neonatal care, over the last decades, advances have been observed in the technologies and specialized care at the NICU. Thus, the survival rate of the PMI has increased as a result of these transformations. Nevertheless, this advance does not exclude the possibility of developing morbidities, directly interfering in the child’s quality of life and turning premature birth into the main cause of neonatal death. In Brazil, this rate reaches 28.7% of all deaths in children under one year of age.

In that context, the families who receive a PMI who survived the NICU go through an anguishing situation that can interfere in the parents’ competence concerning care for the premature child. This situation gets increasingly complicated when the infant is discharged with some special care demands due to the premature birth, which can be aggravated by the adversities of the family context, the low education and family income, as well as the maternal responsiveness to the child’s needs, the family stress and the parents’ changed competence.

The use of appropriate tools to measure the parents’ stress level supports the care planning, permitting intervention in the reduction of stress when the PMI enters the home. This assessment, however, needs to continue after the discharge from the NICU, at the outpatient monitoring clinic and at the Primary Health Care (PHC) services, as maternal depression and anxiety are directly related with negative growth and development outcomes for the PMI, increasing the search for the health services.

In Brazil, the use of stress assessment scales focused on the parents of children who are or have been hospitalized is not usual yet, as many of these scales are international and need to be translated and validated for our language and culture. Tools like the Parenting Stress Index (PSI) have been used in different countries with positive results when applied to parents of discharged children.

In a Brazilian study, one of the versions of the PSI (PSI short form) was used, validated for Portuguese from Portugal, involving parents of children with developmental problems. The full-form version of the PSI, however, expands the assessment of post-discharge stress, as several aspects on the child’s behavior and care requirements, adaptation skills, including the parents’ competence, the bond with the child, the parents’ role restriction, the marital relationship, aspects of the parents’ physical and mental health and the stress of family life are part of the full-form questions.

In a methodological study, including the translation, cultural adaptation and construct validation, the goal is to obtain a tool to assess the stress of PMI’s parents after the discharge, which can be incorporated into the work routine of the monitoring services for infants at risk. Therefore, the objective in this paper is to present the cultural adaptation and validation of the Parenting Stress Index (PSI) for Brazilian Portuguese.

Methods

To standardize the development of the tool’s cultural adaptation, the five-phase guidelines were followed: initial translation; back translation; assessment by expert committee; pre-test and; weighting of the scores.
The Parenting Stress Index (PSI) was elaborated to assess the stress of parents whose children were hospitalized. It was developed for application after discharge to the parents of children between one month and 12 years of age. The author, Dr. Richard R. Abidin, authorized the use of the tool by means of the document Psychological Assessment Resources, Inc - PAR, for the purpose of translation and cultural adaptation.

Two health professionals knowledgeable on the area of the instrument elaborated the translation. After reaching a consensus between the translations, version one was obtained. Next, this version was forwarded to two English language teachers for the back translation, who were not knowledgeable on the instrument. The back translation was analyzed and its consensus version was compared with the original English version. The goal was to preserve the equivalences of the instructions in the original version for the completion of the items and its respective answer card in the adapted version.

Version two of the translation was elaborated and then forwarded to the Expert Committee, which consisted of bilingual subjects with expertise in the concepts under analysis and representative of the group in question, included one physician, one nurse and one psychologist who were faculty members in child health, mental health and maternal-infant health. The experts analyzed the semantic, idiomatic, concept and cultural equivalences.

A minimum consensus of 80% is recommended among the committee members, agreeing with all instrument questions, to achieve content equivalence. The version resulting from the experts’ analysis led to version three of the instrument, which was forwarded to the author for approval. After obtaining this approval, the pretest started, applied to a sample of 20 mothers of PMI to recognize translation errors and divergences and elaborate the cultural equivalence of the instrument.

The PSI was considered culturally adapted as a consensus of 80% or higher was reached in each subdomain, in the weighting of the scores. This resulted in version four of the instrument, that is, the final version, used to develop its clinical validation. For the construct validity, psychometric analyses were developed through factor and reliability analyses, by means of Cronbach’s alpha (α).

The study was developed at a public teaching hospital in Paraná, at the outpatient monitoring clinic for PMI. The sample consisted of 53 mothers of PMI during a consult at the risk outpatient clinic, between November 2013 and July 2014.

The following inclusion criteria were adopted: literate mothers, due to the self-completion of the tool; over 18 years of age or, if the participants were under 18 years of age, the presence of a legal caregiver. Participants were excluded if: they reported using drugs for anxiety and/or had been diagnosed with a psychiatric disorder; mothers of PMI with severe comorbidities, malformations and syndromes of any kind, due to the possible influence of these conditions on the maternal stress level by itself.

The PSI contains 101 items, distributed in two domains (Child Domain and Parent Domain), in addition to 19 other items on the life stress scale, totaling 120 items. The Child and Parent Domain consist of 13 subdomains, six related to the child domain and seven to the Parent Domain. Each item is scored on a five-point Likert scale (5 - I totally agree; 4 - I agree; 3 - I am not Sure; 2 - I disagree; 1 - I totally disagree).

As regards the score that indicates the stress level, scoring each domain item permits three types of results: One per domain, one per subdomain and a total score, resulting from the sum of the Child Domain and the Parent Domain. In any case, the higher the result, the higher the stress level the respondent experiences.

The total score should be the most important guide for the professionals’ judgment in order to propose necessary and appropriate interventions. To obtain the stress level, the gross scores, which range from 0 to 505, should be converted in a standard sample table of percentiles from 0 to 99. The interpretation of these levels according to the following scale indicates: Normal stress, percentiles from 16 to 84; high stress, percentiles from 85 to 89; clinically significant stress, equal or superior to the 90th percentile.

Concerning the Child Domain, the maximum gross score is 235, equivalent to the 99th percentile, indicating that some characteristics of the child can be the main factors contributing to the general stress of the parent-child system. As for the Parent
Domain, the maximum gross score is 270 points (99th percentile), which can indicate sources of stress/dysfunction of the parent-child system.\(^{(13)}\)

Descriptive statistical analysis was used for the demographic data and the variables in the Child and Parent Domains. Inferential analyses were used for the Life Stress and Defensive Response scores, and the distribution pattern of the total scores in each domain were assessed by means of the Shapiro-Wilk test. As the data were normal, subsequent analyses were based on means and standard deviations.

The construct validity is one of the most important characteristics of a validation instrument. First, the Kaiser Meyer-Olkin (KMO) criterion was applied, in which coefficients superior to 0.5 represent good fit of the model, indicating the fitness of the sample for factor analysis.\(^{(16)}\) Next, factor analysis was applied, using the factor extraction method by means of Principal Components Analysis and Varimax rotation. As a factor selection criterion, an eigenvalue superior to one was adopted and loadings superior to 0.4 were considered significant.\(^{(16)}\)

To analyze the internal reliability of the scale and subscales, Cronbach’s alpha was used, ranging from 0 to 1, being considered acceptable when ranging between 0.70 and 0.90.\(^{(17)}\)

Approval for the study was obtained from the Ethics Committee for Research involving Human Beings under opinion 385.370 (CAAE16348813.7.1001.0107). All ethical premises were complied with.

### Results

After the factor analysis of the instrument, the presence of two components was verified, confirming the existing dimensions in the original version. To expand the reliability and validity data of the scale, it should be applied at different locations in Brazil, in different populations and larger samples.

In view of the equivalence between the original scale (PSI) and the translated instrument (IEP), the IEP can be applied to assess the parenting stress level after discharge from the NICU to support the planning of care actions for PMIs and their families.

The variation in the mean scores in the domains and subdomains and the assessment of the reliability scores of the IEP is displayed in table 1.

The mean maternal stress level in the Child Domain (CD) was $87.62\pm12.97$ and, in the Parent Domain (PD), $94.26\pm8.79$. As regards the subdomains, the lowest stress levels for the mothers of the PMIs identified in the CD was related to the child’s demandingness, with an average of $83.64\pm18.71$. On the opposite, the highest stress level in this domain referred to the child’s behavioral characteristics that reflect symptoms of Hyperactivity and Distractibility, corresponding to $97.53\pm3.79$.

In the Parent domain, the lowest stress level was for Competence, with an average $29.13\pm11.68$, referring to the parents’ perception of their capacity to be a parent of a PMI. The highest level in this domain was related to Attachment, with $95.42\pm9.07$, referring to the proximity between parents and child and their skills to identify and respond to the child’s needs. The average gross general stress score was $181.88\pm8.23$.

<table>
<thead>
<tr>
<th>Domains and Subdomains</th>
<th>Mean (Standard Deviation)</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Domain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distractibility/Hyperactivity</td>
<td>97.62(12.97)</td>
<td>0.87</td>
</tr>
<tr>
<td>Reinforces Parent</td>
<td>96.77(8.01)</td>
<td>0.88</td>
</tr>
<tr>
<td>Acceptability</td>
<td>96.47(7.16)</td>
<td>0.88</td>
</tr>
<tr>
<td>Adaptability</td>
<td>95.57(10.54)</td>
<td>0.89</td>
</tr>
<tr>
<td>Mood</td>
<td>92.19(9.91)</td>
<td>0.88</td>
</tr>
<tr>
<td>Demandingness</td>
<td>83.64(18.17)</td>
<td>0.88</td>
</tr>
<tr>
<td>Parent Domain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spouse/parenting partner relationship</td>
<td>95.75(8.37)</td>
<td>0.89</td>
</tr>
<tr>
<td>Attachment</td>
<td>95.41(9.07)</td>
<td>0.91</td>
</tr>
<tr>
<td>Role Restriction</td>
<td>92.15(15.72)</td>
<td>0.90</td>
</tr>
<tr>
<td>Depression</td>
<td>90.45(13.53)</td>
<td>0.88</td>
</tr>
<tr>
<td>Isolation</td>
<td>29.64(8.94)</td>
<td>0.89</td>
</tr>
<tr>
<td>Competence</td>
<td>29.13(11.68)</td>
<td>0.88</td>
</tr>
<tr>
<td>Health</td>
<td>26.70(6.44)</td>
<td>0.89</td>
</tr>
<tr>
<td>General Score</td>
<td>181.88</td>
<td>0.91</td>
</tr>
</tbody>
</table>
The reliability coefficient Cronbach’s alpha found for the instrument as a whole was 0.91. For the Child Domain (CD), the coefficient corresponded to 0.87, equaling 0.89 for the Adaptability subdomain and 0.88 for the others. In the Parent Domain (PD), this coefficient was equal to 0.88, ranging between 0.88 (Competence and Depression) and 0.91 (Attachment). In this assessment, the internal consistency among the six items was higher in the CD when compared to the seven items in the PD, as observed in table 1.

As the variables were in accordance for the construct validity analysis (KMO>0.05), two principal components with Varimax rotation were defined for the IEP items (Table 2).

These two components explained 64.57% of the total item variance. The first factor explained 45.16% of the data variance and mainly represented the CD variables (Eigenvalue=7.01). The second factor explained 17.80% of the data variance and represented the PD characteristics (Eigenvalue=2.67).

As regards the factor loadings in the subdomains, Distractibility/Hyperactivity, Adaptability, Reinforces Parent, Demandingness, Mood and Acceptability were correctly fit to the component that represented the CD. In the same domain, however, the subdomains Competence and Depression were also fit, which are part of the PD component in the original scale though. The other subdomains adjusted correctly to the PD component, as observed in table 3.

The distribution characteristics of the scale after the Varimax rotation show that the extracted components are independent and describe the understanding of the correlation structure of the variables and their combinations. In table 3, the factor loadings of each subdomain are displayed, which define the contribution to each of the components.

**Discussion**

The internal consistency coefficient of the IEP was 0.90, ranging between 0.87 and 0.91 for the subdomains, with similar scores for the CD as well as the PD (0.87 and 0.88, respectively. These data are in accordance with other studies(10) whose Cronbach’s alpha coefficients for the CD and PD ranged between 0.82 and 0.93.

The results indicate that the Cronbach’s alpha coefficients are acceptable according to the classification presented in the literature(10,18) and similar to the original PSI data.(13) In the internal consistency analysis of the scale, which corresponded to 0.90 for the total score and 0.87 and 0.88 for the CD and PD, respectively, the appropriate reliability of the scale items was evidenced. Therefore, the relation between each subdomain and the domain

### Table 2. Kaiser-Meyer-Olkin test, indication of sample fitness for factor analysis

<table>
<thead>
<tr>
<th>Domains and Subdomains</th>
<th>KMO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Domain (CD)</td>
<td>0.77</td>
</tr>
<tr>
<td>Distractibility/hyperactivity (DHA)</td>
<td>0.91</td>
</tr>
<tr>
<td>Reinforces parent (RRP)</td>
<td>0.90</td>
</tr>
<tr>
<td>Acceptability (AC)</td>
<td>0.86</td>
</tr>
<tr>
<td>Adaptability (AD)</td>
<td>0.80</td>
</tr>
<tr>
<td>Mood (MO)</td>
<td>0.76</td>
</tr>
<tr>
<td>Demandingness (DM)</td>
<td>0.75</td>
</tr>
<tr>
<td>Parent Domain (PD)</td>
<td>0.77</td>
</tr>
<tr>
<td>Competence (CO)</td>
<td>0.83</td>
</tr>
<tr>
<td>Isolation (IS)</td>
<td>0.82</td>
</tr>
<tr>
<td>Depression (DE)</td>
<td>0.80</td>
</tr>
<tr>
<td>Spouse/parenting partner relationship</td>
<td>0.74</td>
</tr>
<tr>
<td>Health (HE)</td>
<td>0.65</td>
</tr>
<tr>
<td>Attachment (AT)</td>
<td>0.60</td>
</tr>
<tr>
<td>Role restriction (RR)</td>
<td>0.58</td>
</tr>
</tbody>
</table>

KMO - Kaiser Meyer-Olkin

### Table 3. Factor coordinates after the Varimax rotation

<table>
<thead>
<tr>
<th>Domains and Subdomains</th>
<th>F1</th>
<th>F2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Domain</td>
<td>0.88</td>
<td>0.21</td>
</tr>
<tr>
<td>Distractibility/hyperactivity</td>
<td>0.70</td>
<td>0.13</td>
</tr>
<tr>
<td>Adaptability</td>
<td>0.60</td>
<td>-0.09</td>
</tr>
<tr>
<td>Reinforces parent</td>
<td>0.81</td>
<td>-0.07</td>
</tr>
<tr>
<td>Demandingness</td>
<td>0.71</td>
<td>0.20</td>
</tr>
<tr>
<td>Mood</td>
<td>0.89</td>
<td>0.01</td>
</tr>
<tr>
<td>Acceptability</td>
<td>0.80</td>
<td>0.28</td>
</tr>
<tr>
<td>Parent Domain</td>
<td>0.73</td>
<td>0.45</td>
</tr>
<tr>
<td>Competence</td>
<td>0.70</td>
<td>-0.04</td>
</tr>
<tr>
<td>Isolation</td>
<td>0.39</td>
<td>0.82</td>
</tr>
<tr>
<td>Attachment</td>
<td>0.39</td>
<td>-0.79</td>
</tr>
<tr>
<td>Health</td>
<td>0.46</td>
<td>0.50</td>
</tr>
<tr>
<td>Role restriction</td>
<td>0.47</td>
<td>-0.75</td>
</tr>
<tr>
<td>Depression</td>
<td>0.80</td>
<td>0.00</td>
</tr>
<tr>
<td>Spouse/parenting partner relationship</td>
<td>0.43</td>
<td>0.63</td>
</tr>
</tbody>
</table>
in question is appropriate, in which the translated questions reflect what the domain is intended to represent, indicating a perfect correlation.

As for the results of the construct validity analysis of the translated version, confirmation was sought using techniques suggested in other validation studies. (9,19) Thus, using exploratory factor analysis, it was verified that first principal component was more strongly related to the child domain and the second to the parent domain. Both explained 64.57% of the total item variance (the first explained 45.16% of the data variance and the second 17.80%), similar to the findings in the original scale. (13)

Concerning the factor loadings in the subdomains, Competence and Depression, which should fit into the Parent Domain, fit into the Child Domain, indicating that the specific questions in this subdomain can be improved to relate more strongly to the PD.

The IEP is indicated to identify parents who need orientation and support, to recognize a potentially dysfunctional parent-child relationship and children at risk of developing emotional and behavioral problems. (20) Its use permits the early recognition of difficulties in the parent-child relationship, with a view to programming prevention and/or therapeutic intervention activities in due time, particularly during the first days of life at home and in PMI monitoring.

Conclusion

As the study presents the cultural adaptation and validation of the Parenting Index (PSI) for Brazilian Portuguese, demonstrating equivalence with the original scale, as obtained by means of internal consistency and construct validity analyses, the IEP is considered a validated tool for use in the population of parents of PMIs in the Brazilian Portuguese version.

Collaborations

Pereira LM, Viera CS, Toso BRGO, Carvalho ARS and Bugs BM declare that they contributed to the conception of the study, interpretation of the data, relevant critical review of the intellectual content and approval of the final version for publication.

References


Effects of a simulation-based workshop on nursing students’ competence in arterial puncture

Efeitos de um workshop de simulação sobre a competência em punção arterial de estudantes de enfermagem

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Verónica V. Márquez-Hernández²
Alda Elena Cortés-Rodríguez²
Cayetano Fernández-Sola²,³

Abstract

Objective: To evaluate whether a short simulation-based workshop in radial artery puncture would improve nursing students’ competence to a level in which they could practise the procedure on a live patient without compromising his safety.

Methods: Quasi-experimental one-group pretest-posttest study with 111 third-year nursing students. A 1.5-hour simulation-based workshop was implemented. This included a video-lecture, live demonstrations, self-directed simulated practice in dyads and individual intermittent feedback. Participants’ skills, knowledge and self-efficacy in arterial puncture were measured before and after attending the workshop.

Results: After the intervention, a total of 61.1% of the participants showed the level of competence required to safely practice radial artery puncture on a live patient under supervision.

Conclusion: Effective simulation-based training in arterial puncture for nursing students does not necessarily need to be resource-intensive. Well-planned, evidence-based training sessions using low-tech simulators could help educators to achieve good educational outcomes and promote patient safety.

Keywords
Simulation training; Nursing students; Knowledge; Punctures; Social skills

Resumo

Objetivo: Avaliar se um workshop de simulação e curta duração sobre punção da artéria radial melhoraria a competência de alunos de enfermagem em um nível em que pudessem praticar o procedimento em um paciente vivo sem comprometer sua segurança.

Métodos: Estudo quase-experimental do tipo pré-teste e pós-teste com um grupo de 111 estudantes do terceiro ano de enfermagem. Foi implementado um workshop de simulação e 1,5 horas de duração. Isso incluiu uma vídeo-palestra, demonstrações ao vivo, prática simulada autodirigida em diades e feedback intermitente individual. As habilidades, conhecimentos e autoeficácia dos participantes em punção arterial foram medidos antes e depois da participação no workshop.

Resultados: Após a intervenção, 61,1% dos participantes demonstraram o nível de competência necessário para a prática segura da punção da artéria radial em um paciente vivo sob supervisão.

Conclusão: O treinamento efetivo em punção arterial baseado em simulação para estudantes de enfermagem não necessariamente precisa ser intenso em recursos. Sessões de treinamento bem planejadas e baseadas em evidências, com uso de simuladores de baixa tecnologia podem ajudar os educadores a alcançarem bons resultados educacionais e promover a segurança do paciente.

Keywords
Treinamento por simulação; Estudantes de enfermagem; Conhecimento; Punções; Habilidades sociais

Conflicts to interest: none to declare.
Introduction

As part of the respiratory assessment of acutely ill patients, arterial blood gases (ABG) analysis has become one of the most common laboratory investigations in modern medicine. Consequently, radial artery puncture has emerged as a regularly-performed invasive procedure in clinical settings. The puncture of the radial artery is often described as a very painful and challenging invasive procedure that is not exempt of risks. In fact, case report studies suggest that errors during the performance of arterial puncture for ABG analysis could lead to serious complications such as nerve injuries, acute compartment syndrome, thrombosis and pseudoaneurysm. Therefore, it is important that those healthcare professionals responsible for collecting arterial blood samples are adequately trained and their competence rigorously assessed before they attempt radial artery puncture on live patients. More studies specifically focusing on designing, implementing and evaluating the effects of different educational interventions in healthcare professionals’ competence in radial artery puncture for ABG analysis are needed.

In Spain and many other countries, nurses are responsible for collecting arterial blood samples for ABG analysis through the puncture of the radial artery. In many of these countries, the licensing examination does not exist and nurses are expected to be safe and fully competent practitioners upon completing their undergraduate nursing programme. However, literature suggests that opportunities to practise invasive procedures on live patients are usually scarce during undergraduate programmes. This reality could have a negative impact on the development of competence of future newly-qualified healthcare professionals, increasing the occurrence of mistakes and compromising patients’ safety. Consequently, with regard to arterial puncture and other invasive procedures, nursing educators are expected to: [1] find more effective educational strategies that facilitate the acquisition of competence amongst nursing students; and [2] rigorously assess learners’ competence before they are allowed to perform on live patients. Adopting a person-centred approach based on the holistic definition of competence may help nursing educators to effectively address these challenges.

Firstly, nursing educators should take into consideration that successful educational strategies must focus on the equal development of the cognitive, psychomotor and attitudinal domains of competence. Therefore, an effective training strategy should always include elements that not only facilitate the acquisition of knowledge and skills, but also promote individuals’ self-efficacy. Secondly, valid and reliable tools should be used to individually assess these three domains of competence. Rigorous and comprehensive assessment of knowledge, skills and self-efficacy can help to determine individuals’ competence in invasive procedures such as arterial puncture. The use of simulation-based training supports this person-centred approach and promotes safe practice.

To different extents, many studies have shown that the use of simulation is effective in both improving and assessing participants’ knowledge, performance and/or confidence in a wide range of skills and procedures. However, effective simulation-based training can be resource-intensive and this may pose a threat to its implementation in faculties with a limited budget. In these cases, video demonstration, modelling examples, dyad learning and intermittent feedback have demonstrated that, when used in conjunction with self-directed simulated practice, can be beneficial for the acquisition of competence in procedural skills whilst limiting the amount of resources needed. In spite of this, our literature review showed that there is a dearth of published studies aiming to develop, implement and evaluate the effects of educational interventions that facilitate the acquisition of competence in arterial puncture amongst healthcare professionals in general and nursing students in particular. Using low-tech equipment and an evidence-based educational intervention, this
study aimed to evaluate whether a short simulation-based workshop in radial artery puncture would improve nursing students’ competence to a level in which they could practise the procedure on a live patient without compromising his safety.

Methods

Study setting and context
The study took place in a southeastern Spanish university between October 2014 and January 2015. In the national context of this study, radial artery puncture for ABG analysis is taught as part of the undergraduate nursing degree programme. In many faculties around the country and around the world, budgets for innovation in teaching and learning are limited. This does not only apply to the acquisition of new equipment, but also to the amount of human resources dedicated to educate nursing students. For example, in the context of this study the ratio lecturer to student for procedural skills training is 1:16. Traditionally in this context, arterial puncture for ABG analysis is taught as part of a 2-hour lecture on “critical care procedures”. This is often done in a lecture theatre, with large groups of students (up to 60 at the time) and using either PowerPoint® presentations, video demonstrations, live demonstrations performed by the lecturer in a low-fidelity venepuncture arm, or a combination of them. It is expected that nursing students have the opportunity to practice the procedure once they are in clinical placements, under the direct supervision of their mentors and on live patients.

Study design
In this study, a quasi-experimental, one-group pretest-posttest design was used to test whether a single, short simulation-based workshop using low-tech equipment would allow nursing students to achieve a safe level of competence in arterial puncture for ABG analysis before practising the procedure on live patients. In order to rigorously assess the effectiveness of the educational intervention, we compared the proportion of students achieving the pre-defined competence pass-mark before and after attending the simulation-based workshop in arterial puncture for ABG analysis.

Ethical considerations
The Institutional Research and Ethics Committee granted ethical approval before a member of the research team contacted the potential participants. Written detailed information about the study’s aims and procedures was provided to all eligible subjects, who were both asked to voluntarily sign an informed consent document before participating and notified of their right to withdraw at any time. Assessment and demographic data were anonymous, and information was handled and stored confidentially.

Study participants and sample size
Participants’ eligibility criteria were: [1] to be enrolled in the critical care module of the undergraduate nursing programme, and [2] not to have received any training in arterial puncture. Sample size was calculated a priori using a conservative approach. Assuming a true proportion of 0.5, a type-I error of 5% and 95% power to detect significant statistical differences ($p<0.05$, two-sided), it was estimated that a total sample of 82 participants was needed. To compensate for possible attrition, an extra 30% was added to the sample size estimate. A total of 111 nursing students participated in the study. Information about whether participants had observed a qualified healthcare professional performing an arterial puncture on a live patient was collected in conjunction with demographic data (age, gender and education level).

Educational intervention
Participants were randomly divided in groups of 16 students and attended a 1.5-hour simulation-based workshop in arterial puncture for ABG analysis. Two members of the research team and two independent experts designed the workshop. The educational intervention started with a 5-minute introduction...
on the session’s aims, learning outcomes and structure. Then, all attendees were shown a 10-minute video lecture on arterial puncture for ABG analysis,(25) which was followed by two flawless modelling examples performed by the facilitator. Whilst the first one of these modelling examples was carried out silently, the second one included a simultaneous description of the procedure. Furthermore, a flawed modelling example was performed and participants were asked to identify the mistakes, describe them and explain the correct way of doing it. All these modelling examples were run in 25 minutes using a hybrid-simulated approach that comprised an arterial puncture simulator (Arterial Puncture Wrist from Kyoto Kagaku Co., Japan®) and a role-player who acted as the patient. This allowed the facilitator to demonstrate not only the technical skills involved in the procedure, but also the communication skills needed to guarantee an effective nurse-patient interaction. Finally, students were paired up in dyads and the last 50 minutes of the workshop were dedicated to self-directed simulated practice. A member of the dyad acted as a simulated patient, which allowed the other one to practise the nurse-patient interaction while performing arterial puncture on the simulator. The ratio student to simulator was 4:1, meaning that while one dyad practised using the simulator, the other dyad observed them doing so. The facilitator provided individual intermittent feedback to all participants. Although students were encouraged to provide feedback to each other, the use of concurrent feedback was forbidden. In order to minimise bias, the same facilitator delivered all the training workshops and the ratio lecturer to student was 1:16.

Data collection, instruments and outcome measures

Procedural skills, knowledge and self-efficacy in arterial puncture for ABG analysis were individually assessed for all participants before (pre-test) and immediately after (post-test) receiving the intervention.

In order to assess participants’ skills in arterial puncture, they were given a hybrid-simulated scenario with a role-player acting as the patient and the arterial puncture simulator to perform the invasive procedure.

Participants’ performances were observed and assessed using the ‘Arterial Puncture Skills Assessment Tool’ (APSAT). Participants’ knowledge was assessed using a 20-item multiple-choice-questionnaire (AP-MCQ). Both assessment tools were developed based on international guidelines on best practices in arterial blood sampling and other authors’ tool. Psychometric evaluation of the AP-MCQ and APSAT included a critical review from a panel of 10 experts and an experimental study with 58 students. The psychometric properties of both tools are presented in table 1. Lastly, participants’ self-efficacy was measured using the ‘Arterial Puncture Self-Efficacy Scale’ (APSES). (5)

Table 1. Psychometric properties of the AP-MCQ* and APSAT**

<table>
<thead>
<tr>
<th>Psychometric properties</th>
<th>Instrument</th>
<th>AP-MCQ</th>
<th>APSAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability properties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal consistency</td>
<td></td>
<td>0.90</td>
<td>0.96</td>
</tr>
<tr>
<td>Cronbach alpha coefficient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporal stability - tested at 4 weeks</td>
<td></td>
<td>0.85</td>
<td>0.78</td>
</tr>
<tr>
<td>Spearman correlation coefficient between test and re-test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Validity properties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content validity</td>
<td></td>
<td>0.92</td>
<td>0.97</td>
</tr>
<tr>
<td>Average Content Validity Index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criterion validity</td>
<td></td>
<td>0.63</td>
<td>0.70</td>
</tr>
<tr>
<td>Correlation with other tools measuring similar concepts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construct validity</td>
<td></td>
<td>1 (62.1)</td>
<td>5 (79.8)</td>
</tr>
<tr>
<td>Number of structural factors + percentage of variance explained by factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to differentiate between known-groups = p-value &lt;0.05</td>
<td></td>
<td>&lt;0.05</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

1 AP-MCQ is the multiple-choice-questionnaire used to assess knowledge in arterial puncture;  
2 APSAT is the checklist used to assess skills in arterial puncture.

Participants’ results on the assessments of knowledge, skills and self-confidence could range from 0-100. Following similar studies’ benchmarks, participants were considered to have demonstrated a safe level of competence in arterial puncture for ABG analysis when they achieved the following average results: APSAT≥70%, AP-MCQ≥80% and APSES≥70%.(11,22) Due to the multidimensional structure of the APSAT and APSES, it was stipulated that, in order to compute an average final score, participants must have achieved more than 70% in all the dimensions of these instruments.

Data analysis

Statistical analysis of data was performed using IBM® SPSS® version 21 for Mac®. Firstly, the counts and proportion of students achieving the benchmarks for skills, knowledge and self-efficacy...
cy in arterial puncture at pre-test and post-test were compared using McNemar’s test. Then, participants’ competence was dichotomised and the proportion of students demonstrating competence at pre-test and post-test was also compared using McNemar’s test.

Results

Participants’ demographic characteristics and data about previous direct observation of an arterial puncture for ABG analysis are presented in Table 2. Students who had observed qualified nurses performing the procedure (n=16) completed the workshop but their data were not included in the analysis, as this could be considered a form of training. Furthermore, a total of 9 participants did not complete all the self-administered assessment tools correctly and they were also excluded from the analysis. A total of 86 datasets were finally analysed.

The final sample (N=86) had not received any form of training in arterial puncture before the educational intervention and was comprised of approximately 77% (n=66) female participants. The average age of the participants included in the analysis was 22 years (SD=5.48; range=19-50). In terms of education level, 77% (n=66) of these participants had entered the undergraduate nursing degree programme after completing upper secondary education.

Table 3 presents the counts and proportion of students who achieved the safety benchmarks for the following variables: skills, knowledge, self-efficacy and competence in arterial puncture. In summary, the proportion of students who achieved the safety benchmarks at post-test was significantly higher than at pre-test for all the study variables (p<0.05).

Table 2. Demographic characteristics of the total workshop participants (n=111) and the final study sample (n=86)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Workshop participants (n=111)</th>
<th>Final study sample (n=86)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M ± S.D.</td>
<td>M ± S.D.</td>
</tr>
<tr>
<td>Age (years)</td>
<td>22.36 ± 5.49</td>
<td>22.01 ± 5.48</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>82 (73.9)</td>
<td>66 (76.7)</td>
</tr>
<tr>
<td>Male</td>
<td>29 (26.1)</td>
<td>20 (23.3)</td>
</tr>
<tr>
<td>Education Level (completed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper secondary education</td>
<td>79 (71.2)</td>
<td>66 (76.7)</td>
</tr>
<tr>
<td>Others</td>
<td>32 (28.8)</td>
<td>20 (23.3)</td>
</tr>
<tr>
<td>Observed arterial puncture on a live patient</td>
<td>16 (14.4)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

Table 3. Counts (proportions) of participants who achieved the benchmark for all variables measuring competence in arterial puncture. Comparisons are based on McNemar’s test

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pre-test n=86</th>
<th>Simulation-based workshop n=86</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge in arterial puncture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥80% of AP-MCQ answered correctly</td>
<td>1 (1.2)</td>
<td>64 (75.3)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Self-efficacy in arterial puncture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥70% achieved in Total APSES</td>
<td>18 (20.9)</td>
<td>81 (94.2)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>&gt;70% achieved in APSES’s subscale ‘Preparation of patient and material’</td>
<td>33 (38.4)</td>
<td>86 (100)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>&gt;70% achieved in APSES’s subscale ‘Arterial puncture and sample management’</td>
<td>22 (25.6)</td>
<td>81 (94.2)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Skills in arterial puncture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥70% achieved in Total APSAT</td>
<td>4 (4.7)</td>
<td>74 (86)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>≥70% achieved in APSAT’s subscale ‘Patient communication’</td>
<td>15 (17.4)</td>
<td>84 (97.7)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>≥70% achieved in APSAT’s subscale ‘Preparation of material’</td>
<td>7 (8.1)</td>
<td>80 (93)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>≥70% achieved in APSAT’s subscale ‘Infection control and anaesthesia’</td>
<td>8 (9.3)</td>
<td>82 (95.4)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>≥70% achieved in APSAT’s subscale ‘Arterial puncture procedure’</td>
<td>17 (19.8)</td>
<td>85 (98.8)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>≥70% achieved in APSAT’s subscale ‘Sample management’</td>
<td>14 (16.3)</td>
<td>84 (97.7)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Competence in arterial puncture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall competence achieved</td>
<td>0 (0)</td>
<td>56 (65.1)</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

*AP-MCQ is the multiple-choice-questionnaire used to assess knowledge in arterial puncture; **APSES is the scale used to assess self-efficacy in arterial puncture; **APSAT is the checklist used to assess skills in arterial puncture; ***Overall competence = ≥80% of the AP-MCQ answered correctly and ≥70% in all subscales of the APSES achieved and ≥70% in all subscales of the APSAT achieved
This study aimed to design and implement a simulation-based workshop in radial artery puncture for ABG analysis and explore its effects on nursing students’ competence. In summary, participation in a 1.5-hour simulation-based workshop resulted in a significantly higher proportion of students achieving and demonstrating adequate levels of knowledge, skills, self-efficacy and overall competence that would allow them to safely practise radial artery puncture for ABG analysis on live patients. However, almost 40% of the participants did not achieve the pre-established level of competence required to be allowed to practise radial artery puncture on a live patient. Far from interpreting this finding as a failure of the educational intervention implemented in this study, we see this result as a success in so far as it demonstrates that the simulation-based workshop not only allowed more than 60% of the students to achieve a safe level of competence in arterial puncture for ABG analysis, but also allowed the educators to identify those who may have not been safe performing the procedure on live patients. Nonetheless, more research on how to support these students and how to improve the educational intervention used in this study is needed.

In the study setting, as in many other faculties with limited resources, creating realistic and effective simulation training can be challenging. Consequently, the researchers focused on designing and implementing an innovative educational intervention that, being potentially effective in improving nursing students’ competence in arterial puncture, would only require the extra expense of acquiring low-tech simulators. In this context, evidence suggested that the use of video and live demonstrations, self-directed hybrid-simulated practice, dyads learning and intermittent feedback could improve learners’ competence in invasive procedures. Corroborating these studies’ findings, our results have shown that the integration of self-directed hybrid-simulated practice with video and facilitator demonstration, peer-observation and intermittent feedback can also significantly improve nursing students’ knowledge, skills and self-efficacy in invasive procedures such as radial artery puncture.

Previously published results suggest that the use of low-tech simulators may not be effective in improving nursing students’ acquisition of venepuncture skills if they are not combined with high-tech simulators. However, concurring with Reinhardt et al., our study has demonstrated that using low-tech simulators does not necessarily prevent students from acquiring confidence and competence in arterial puncture. In fact, when combined with simulated patients, the low-fidelity simulators served to create an accurate representation of real-life scenarios, which may have contributed to the observed improvement in the proportion of participants who achieved the benchmarks for psychomotor and communication skills. This improvement in participants’ skills may have also been positively influenced by other factors. For example, the video and facilitator demonstrations of the procedure on a simulator could have reduced the cognitive demands that learning such skills impose on students; the self-directed practice may have increased participants’ motivation to learn and given them the opportunity to repeat the procedure until the skills were mastered; the dyad learning might have fostered peer-teaching and peer-observation, reduced the time needed for hands-on practice and increased participants’ motivation to learn; and lastly, intermittent feedback from peers and facilitator may have contributed to correct mistakes and consolidate learning gains while minimising distractions.

Although skills are a paramount element of the competence, students should also be expected to gain certain level of knowledge and self-efficacy before being allowed to practise invasive procedures on live patients. In this regard, the present study has shown that attending a simulation-based workshop can improve nursing students’ knowledge and self-efficacy in arterial puncture.
The improvement in the proportion of participants achieving the knowledge benchmark could have been influenced by all the different educational methodologies used. On the one hand, the initial video-lecture and the two flawless modelling examples could have contributed to disseminate the knowledge involved in the procedure. On the other hand, the flawed modelling example, self-directed practice in dyads and individual feedback may have facilitated its consolidation through fostering individual reflection, group discussion, practical implementation and self-evaluation of such knowledge. Likewise and concurring with previous studies’ results, the implementation of modelling examples, self-directed simulated practice and dyad learning seems to have fostered an increase in the proportion of students reporting a high level of self-efficacy in arterial puncture. This increase in participants’ self-efficacy could have contributed to the final acquisition of competence in so far as it could have boosted their motivation to learn and positively influenced their perseverance and willingness to work.

To the best of our knowledge, this is not only the first study that focuses on the design, implementation and evaluation of the effects of a simulation-based workshop in arterial puncture for nursing students, but also the first one that measures the competence in terms of knowledge, skills and self-efficacy. However, there are some limitations that may restrict the generalizability and interpretation of our results. Firstly, the study sample was conveniently recruited, which means that our results cannot be generalized to populations with different characteristics. Secondly, due to organisational constraints we could only design a one-group pretest-posttest study. Lacking results from a comparison group means that it is very difficult to ascertain whether the improvements on the participants’ competence are directly caused by our educational intervention. Thirdly, although we could say that the simulation-based workshop has contributed to an increase in the proportion of participants achieving competence in arterial puncture, we are unable to identify what is the actual effect of each educational methodology on the learners’ competence. Lastly, in this study, we could not measure students’ retention of competence and their ability to transfer it into clinical practice. Therefore, we are unable to guarantee whether participants’ educational gains after the simulation-based workshop will be maintained in time and whether they would be able to show similar levels of competence when performing the procedure on live patients.

**Conclusion**

Radial artery puncture for ABG analysis is a risky and challenging procedure. Consequently, nurses and nursing students should be trained and assessed before they are allowed to practise arterial puncture on live patients. The design and implementation of a 1.5-hour workshop using video demonstration, modelling examples, dyad learning, intermittent feedback and self-directed hybrid simulated practice using low-tech equipment can improve nursing students’ competence in radial artery puncture for ABG analysis. Future studies should use experimental designs and aim to compare the effects of different educational strategies on nurses’ and nursing students’ acquisition, retention and transferability of competence in arterial puncture. Equally, more research needs to be conducted on how to support those who do not achieve the level of competence required to practise on live patients after simulation-based training in arterial puncture.

**Collaborations**

Hernández-Padilla JM, Granero-Molina J, Márquez-Hernández Verónica V, Cortés-Rodríguez AE and Fernández-Sola C state that they collaborated in the conception of the study, analysis, data interpretation, writing of the article, relevant critical review of its intellectual content and final approval of the version to be published.
References


Hydrotherapy and the Swiss ball in labor: randomized clinical trial

Hidroterapia e bola suíça no trabalho de parto: ensaio clínico randomizado

Angelita José Henrique¹
Maria Cristina Gabrielloni¹
Ana Carolina Varandas Cavalcanti¹
Patrícia de Souza Melo¹
Márcia Barbieri¹

Abstract
Objective: To understand the influence of a warm bath and perineal exercise with the Swiss ball, in an isolated and combined manner, on the progression of labor.

Methods: Randomized and controlled clinical trial, conducted from 2013 to 2014 in two public hospitals, with 128 women hospitalized for labor and delivery. The randomization allocated 44 parturients into the warm bath group, 45 into the Swiss ball group, and 39 into the warm bath with Swiss ball group.

Results: The study showed a statistically significant increase in the frequency of uterine contractions with the isolated technique (p = 0.025) and associated Swiss ball use (p <0.001), and a significant increase in fetal heart rate with isolated and associated warm bath use (p <0.001).

Conclusion: The association of the warm bath and Swiss ball was more effective for the progression of labor and vaginal delivery outcome when compared to the isolated use.

Resumo
Objetivo: Conhecer a influência do banho quente e exercício perineal com bola suíça, de forma isolada e combinada, sobre a progressão do trabalho de parto.


Resultados: A pesquisa mostrou aumento estatisticamente significante na frequência da contração uterina com uso isolado (p=0,025) e associado da bola suíça (p<0,001), um aumento também significante na frequência cardíaca fetal com uso isolado e associado do banho quente (p< 0,001).

Conclusão: Associação do banho quente e bola suíça foi mais efetiva para a progressão do trabalho de parto e desfecho para o parto normal quando comparado com o seu uso isolado.

Keywords
Labor; Midwifery; Complementary therapies; Hydrotherapy

Descritores
Trabalho de parto; Assistência ao parto; Terapias complementares; Hidroterapia

DOI
http://dx.doi.org/10.1590/1982-01942016600096

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

Measures to increase comfort and reduce apprehension during all stages of labor should begin during gestation, by means of education and counseling during prenatal care, so that women are able to make choices.1

Non-pharmacological interventions are considered auxiliary tools in care during labor, support for pain reduction, stress and cesarean rate, and reflect on the quality of obstetrical care provided.2-4

The warm bath, or hydrotherapy, is a non-pharmacological method that uses water heated to 37°C as a therapeutic object, offering different benefits during labor, such as greater pain tolerance, stress reduction, regulation of uterine contraction pattern, and satisfaction with the labor process, by offering greater autonomy to the woman with regard to her choices, and the possibility for active participation by her companion.2,3,5,7

The effect of local heat during the bath stimulates redistribution of muscular blood flow, increasing relaxation and comfort.2,5,8 The cost-effectiveness is good, since it is an easy to access, low cost technique.6

Perineal exercise with the Swiss ball facilitates the adoption of a vertical posture of the parturient in a comfortable sitting position, promoting well-being and pelvic mobility.9 It provides relief from pelvic discomfort, and reduces the time to delivery. This is effective in reducing the need for analgesic medication, epidural anesthesia, and cesarean section.9,10

The combined use of warm bath therapies associated with perineal exercises using the Swiss ball, during the dilation phase, is related to the relevant reduction of the laboring woman's pain, and the promotion of comfort in relation to the isolated use of these therapies.2

Evidence-based clinical practices that favor and stimulate vaginal delivery are recommended and should be encouraged.11

The importance of this research is justified as cooperation in the evidence that supports the practice of obstetrical nurses and other professionals involved in the care of laboring women, contributing to a change in posture, in a contemporary context, in delivery care and modification of obstetrical care in Brazil.

The objective of the present study was to understand the influence of the use of the non-pharmacological interventions of a warm bath and/or perineal exercises with the Swiss ball, on the labor process.

Methods

This was a randomized controlled trial with three study groups using repeated pre and posttest measures: warm bath group (AG), perineal exercises with the Swiss ball group (BG), and combined interventions group (CG). The data collection period was from June of 2013 to February of 2014, in two public hospitals in the city of São Paulo, Brazil, which routinely use pain relief methods in obstetric care, in addition to allowing the presence of the companion.

Participants

The inclusion criteria were: minimum age of 18 years, single and living fetus, cephalic presentation, no clinical or obstetrical pathology, cervical dilation between 3 and 8 cm, term gestational age. The exclusion criteria were indication for cesarean delivery, analgesia, patients with mental disorders, drug users, and those who completed less than six prenatal visits.

The sample was calculated from a pilot study, using the G* power program, ANOVA test, significance level of 0.05 and test power of 0.80. The sample consisted of 43 parturients in each group.

Ethical and legal aspects

This research met the principles of the Declaration of Helsinki, and was approved by the hospitals involved, the Research Ethics Committee of the Federal Universidade Federal of São Paulo No 1200/11, and was registered in the Brazilian Clinical Trials Registry (ReBEC) RBR-84 XPRT.
Data collection
A team of obstetrical nurses was trained for data collection, guiding the eligible parturients about the purpose and procedures of this study, obtaining consent and sample randomization.

The parturients were evaluated before the intervention on the frequency of uterine contractions, fetal heart rate, cervical dilatation, fetal descent stations according De Lee planes. The socio-demographic and obstetrical data were obtained from the medical record and in the interview with the parturients.

The warm bath as a therapeutic intervention was performed using a warm water jet spray directed to the lumbo-sacral region, at the temperature of 37 degrees Celsius (°C) measured with the Akso® digital thermometer. The parturients were instructed to adopt the standing or sitting position for the 30 minute duration of the bath.\(^{(2,5,6)}\)

The perineal exercise as a therapeutic intervention was performed using the Swiss ball. The parturients were instructed to sit on the ball with their legs flexed, at a 90° angle, knees apart, with the plantar region of the feet resting on the floor, performing movements of propulsion and pelvic rotation for 30 minutes.\(^{(2,9)}\)

The ball used was the Gynboll®, 60cm diameter. For safety, the ball was inflated and positioned on a firm, non-slip surface, without any perforating object on the floor. After each use, the cleaning and protection of the ball were performed by washing with soap and water, disinfecting with 70% alcohol, and wrapping with plastic film.

The combined intervention of a warm bath while sitting on the Swiss ball, for 30 minutes, was performed according to techniques and precautions related to the interventions described above.

The parameters previously described were re-evaluated 30 minutes after the interventions. The time elapsed between the intervention and the birth and the type of delivery were also recorded.

Statistical analysis
Mean and standard deviation were used for continuous variables, and for those of a categorical nature, proportions were used. Univariate analysis was used to evaluate effectiveness between interventions and Bonferroni correction for multiple comparisons. In order to treat, imputations were performed by means of sequential regression. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS), version 21, with a significance level of 0.05.

Results
During the recruitment procedures, 137 parturients were eligible, but nine were excluded before randomization. Thus, 128 parturients were randomly allocated into the three intervention groups, divided into GA: warm bath (n=44), GB: Swiss ball (n=45) and GC: combination of warm bath and Swiss ball (n=39) (Figure 1).

Table 1 presents the sociodemographic and obstetric characteristics of the 128 study participants. Homogeneity was found between groups.

![Figure 1. Flowchart of the study participants](image-url)
No analgesia was used during any of the interventions, 24 received anesthesia after participating in the study (AG=15.9%, BG=24.4%, CG=15.4%), 108 had a vaginal delivery (AG=86.4 %, BG=80.0%, CG=87.2%), 20 had a cesarean delivery (AG=13.6%, BG=20.0%, CG=12.8%). Fetal wellbeing was monitored by cardiotocography (AG=9.1%, BG=4.7%, CG=10.3%); all newborns received an Apgar >7 at five minutes of life, and the companions of 115 parturients were present during labor (AG=88.6%, BG=88.9%, CG=92.3%). The mothers had an average of eight prenatal visits; approximately 90% did not attend childbirth classes.

Post-intervention results were compared with the pre-intervention results, and the behavior of the outcomes was different between the study groups.

The effectiveness among interventions for the occurrence of the outcomes is shown in table 2.

Cervical dilatation was similar between the groups when introduced in the study, with 5 cm of dilation, increasing in all groups after receiving the interventions. However, the group that received the combination of a warm bath and Swiss ball (CG) was more effective in increasing cervical dilatation, without a statistically significant difference, in relation to the groups that received isolated interventions (6.69 cm/p=0.194).

Progression of the fetal head presentation was verified to be in the birth canal for all groups after interventions. The combined warm bath and Swiss ball group (p=0.688) showed a higher progression of the presentation, and was more effective for this outcome than when performed alone, warm bath (AG) (p=0.428) and swiss ball (BG) (p=0.679).

The frequency of uterine contractions increased in all three intervention groups. The groups that used the combination of a warm bath and Swiss ball (CG) (p<0.001), and the Swiss ball alone (BG) (p=0.025) showed a statistically significant difference in relation to the warm bath (AG) group.

The basal fetal heart rate (baseline FHR) remained within normal limits before and after interventions. The warm bath (AG) (p <0.001) and the combination of a warm bath and Swiss ball (CG) (p <0.001) interventions were effective in increasing the fetal heart rate. These groups presented a statistically significant difference in relation to the group swiss ball (GB).

The time between interventions and childbirth was shorter in the group warm bath and swiss ball

Table 1. Distribution of parturients according to sociodemographic and obstetric characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>(AG)</th>
<th>(BG)</th>
<th>(CG)</th>
<th>n</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean/sd)</td>
<td>26.04(5.4)</td>
<td>27.24(6.47)</td>
<td>24.56(4.9)</td>
<td>128</td>
<td>0.101*</td>
</tr>
<tr>
<td>White</td>
<td>56.80</td>
<td>44.40</td>
<td>44.70</td>
<td>127</td>
<td>0.181†</td>
</tr>
<tr>
<td>Education 8-11 years</td>
<td>61.40</td>
<td>75.60</td>
<td>73.70</td>
<td>127</td>
<td>0.639†</td>
</tr>
<tr>
<td>Marital status: single</td>
<td>50.00</td>
<td>64.40</td>
<td>47.40</td>
<td>127</td>
<td>0.367†</td>
</tr>
<tr>
<td>No occupation</td>
<td>56.80</td>
<td>53.30</td>
<td>42.10</td>
<td>127</td>
<td>0.385†</td>
</tr>
<tr>
<td>Gestational age (mean/sd)</td>
<td>39.6(1.1)</td>
<td>39.6(1.16)</td>
<td>39.6(1)</td>
<td>128</td>
<td>0.731*</td>
</tr>
<tr>
<td>Number of pregnancies (mean/sd)</td>
<td>1.95(1.36)</td>
<td>2.24(1.33)</td>
<td>1.79(0.97)</td>
<td>128</td>
<td>0.246*</td>
</tr>
<tr>
<td>Parity (mean/sd)</td>
<td>0.75(1.16)</td>
<td>0.71(0.91)</td>
<td>0.56(0.73)</td>
<td>128</td>
<td>0.511*</td>
</tr>
<tr>
<td>Number of miscarriages (mean/sd)</td>
<td>0.20(0.46)</td>
<td>0.40(0.88)</td>
<td>0.23(0.48)</td>
<td>128</td>
<td>0.313†</td>
</tr>
</tbody>
</table>

*ANOVA test, †Fisher’s exact test, ‡Chi-square test

Table 2. Distribution of interventions according to effectiveness for outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>AG - CG mean/sd</th>
<th>p-value</th>
<th>BG - CG mean/sd</th>
<th>p-value</th>
<th>AG - BG mean/sd</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical dilatation (cm)</td>
<td>-0.0158(0.27)</td>
<td>0.954</td>
<td>-0.3623(0.273)</td>
<td>0.188</td>
<td>0.3464(0.26)</td>
<td>0.194</td>
</tr>
<tr>
<td>Level of fetal head presentation (DeLee)</td>
<td>-0.079(0.1968)</td>
<td>0.688</td>
<td>-0.1577(0.19)</td>
<td>0.428</td>
<td>0.0780(0.18)</td>
<td>0.679</td>
</tr>
<tr>
<td>Frequency of contractions/number/min</td>
<td>-0.301(0.074)</td>
<td>&lt;0.001</td>
<td>-0.115(0.07)</td>
<td>0.315</td>
<td>-0.1860(0.07)</td>
<td>0.025</td>
</tr>
<tr>
<td>Basal fetal heart rates (bpm/min)</td>
<td>0.967(0.72)</td>
<td>0.546</td>
<td>-2.75(0.71)</td>
<td>&lt;0.001</td>
<td>3.72(0.69)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Time between intervention and childbirth (min)</td>
<td>41.18(34.57)</td>
<td>0.236</td>
<td>74.16(34.39)</td>
<td>0.09</td>
<td>-32.97(33.32)</td>
<td>0.324</td>
</tr>
</tbody>
</table>
associated (CG), lasting 216.85 minutes. The use of the combined interventions was more effective in reducing labor time by 41.18 minutes in relation to the warm bath group (CG), which lasted 255.05 minutes (p = 0.236), and by 74.16 minutes in relation to the Swiss ball group (BG) that lasted 288.41 minutes (p = 0.09), but did not show significant difference.

**Discussion**

This research, when evaluating the influence of the non-pharmacological interventions of a warm bath and perineal exercises with Swiss Ball on the progression of labor, showed that the group of combined interventions (CG - warm bath and Swiss ball combined) was clinically favorable to labor progress and vaginal delivery, in relation to the isolated interventions.

Women who received the combination of a warm bath and Swiss ball (CG) needed less analgesia, had a greater occurrence of vaginal delivery (87.2%), a more rapid progression of cervical dilatation, a better evolution of fetal head presentation, increased frequency of contractions (p <0.001) and fetal heart rate (p <0.001), a greater reduction in labor time of 41.18 minutes, compared to the warm bath group (AG), and 74.16 minutes compared to the Swiss ball group (BG).

These non-pharmacological interventions are used as an auxiliary therapy during labor, and are well known throughout the world. Most studies describe their use alone, and compare effectiveness with other interventions, mainly addressing pain management in labor.(2,5,6,9)

They are part of the international policy strategies for caring the women during pregnancy, labor and childbirth.(10,12,13) Their use must be respected and encouraged by professionals who provide care for childbirth, if chosen by the parturient.(11) These interventions can be used alone or in combination, promoting continuous support, maternal well-being, and favoring the evolution of labor. (2,6,9,14)

Studies show that using a warm bath during labor is a growing maternal choice intervention. It is related, in a significant way, to a reduction in the need for epidural analgesia, when compared with parturients who did not use it. The early use of the warm bath (when dilatation is less than five cm) is related to increased use of analgesia when compared to women who use the intervention when dilatation greater than five cm.(7)

The warm bath provides relief from pain and anxiety, increases the comfort, and provides positive feelings during the labor, (5,6) especially when combined with perineal exercise with the Swiss ball. (2) Its use facilitates a professional approach when patient-centered care is provided, which results in benefits for labor progress. (7)

The use of the Swiss ball to perform perineal exercises during labor is an auxiliary therapy in the obstetrical practice that promotes comfort and pain relief, labor progression, and favors the vertical position. (15) This intervention provides less need for medication and cesarean section. (2,9,10) However, to date, few clinical trials have been conducted on this topic to support the effects on the labor progress and childbirth, and most of the studies are focused on pain relief.

The understanding of the benefits related to the use of the Swiss ball lies in the fact that the vertical position favors the gravitational force and the alignment of the fetal axis with the maternal pelvis, the descent and fetal progression in the birth canal, aided by relaxation caused by perineal muscle exercise. The effects of pelvic position and movement during labor may be related to the reduction of maternal discomfort, (2) facilitate uterine circulation, increase the intensity of the contractions, which can decrease the length of labor, facilitate fetal progression in the birth canal, as well as reduce the possibility of perineal trauma and the need for episiotomy. (9,10,16)

Women who used this therapy presented a reduction in pain, an increase in the active participation in the labor process, decreased use of epidural anesthesia, shorter duration of the first stage of labor, and a lower cesarean section rate than the control group. (9)

A detailed description on the records about the use of the Swiss ball during pregnancy and labor can provide an auxiliary tool for the standardization of its use by professionals in relation to the promotion of women’s comfort and care during the labor progress. (9,16)
The Safe Motherhood Program, adopted by the Ministry of Health, makes reference to the practices used in the management of labor that promote maternal well-being, with reference to methods of pain relief and promotion of comfort as “practices that prove to be useful and should be encouraged”. Therefore, having an outcome of a vaginal delivery helps this process and provides support for the patient. (17)

Surveys on the rate of surgical delivery in Latin America show that about 850,000 caesareans are unnecessarily performed every year. Brazil is among the countries with high cesarean rates: close to 50%. The increasing proportion of cesarean rates in Brazil has risen from 52.3% in 2010 to 55.6% in 2012, and according to the Ministry of Health, this rate reaches 82% in the private network and 37.5% in the Public Health system. (18)

Therefore, encouragement of normal birth is related to support in the reduction of unnecessary cesarean rates. Formulation of public policies, women’s autonomy, and changes in the care practices during the prenatal and labor periods may contribute to the reduction of unnecessary caesarean sections. (19)

The applicability of the findings of this study give support, by means of evidence, to the use of non-pharmacological interventions empirically used by obstetricians and other professionals who provide care to the parturients, offering comfort, freedom and autonomy to these women, and stimulating vaginal delivery in Brazil.

Conclusion

Our study showed that the use of a warm bath, and perineal exercises with the Swiss ball modify the labor progress. The combination of these interventions demonstrated greater clinical relevance to the labor process. We recommend combining the warm bath with the perineal exercise using the Swiss ball during the labor process, as it showed to be more effective for changes in the labor progress, shorter length of labor, and higher occurrence of vaginal delivery than with the isolated use of these interventions.

Acknowledgements
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Collaborations
Henrique AJ, Gabrielloni MC, Cavalcanti ACV, Melo PS and Barbieri M declare that they contributed to the study design, analysis and data interpretation, article writing, relevant critical review of the intellectual content, and final approval of the version to be published.

References
Hydrotherapy and the Swiss ball in labor: randomized clinical trial


Abstract

Objective: Bioethical questions have been raised among community health workers in terms of the perceptions and threats that they face during their daily labor practices. Thus, questionnaires are required for assessing the issues experienced by these workers and the psychological effects experienced by primary care workers. Therefore, this study demonstrates the reliability of a double scale based on a pilot study involving community health workers.

Methods: A scale-based and validated methodological investigation was developed by including 97 community health workers in the Brazilian cities of Riacho Fundo I and Riacho Fundo II, located within the administrative region of Brasilia.

Results: The perception scale’s internal consistency exhibited good Cronbach’s alpha values (0.76 overall, and >0.75 for the different dimensions). Furthermore, the factor analysis presented a 3-factor solution with ratio significance.

Conclusion: The scale exhibits good reliability and psychometric properties and has potential for use in future research.

Keywords
Community health workers; Primary health care; Bioethics; Reproducibility of results; Questionnaires

Resumo

Objetivo: Questões bioéticas foram levantadas entre agentes comunitários de saúde sobre as percepções e ameaças enfrentadas por eles durante suas atividades diárias de trabalho. Deste modo, questionários são necessários para avaliar os problemas enfrentados por esses profissionais e os efeitos psicológicos enfrentados por trabalhadores na área de cuidados primários. Para isso, este estudo demonstra a confiabilidade de uma dupla escala baseada em um estudo piloto envolvendo agentes comunitários de saúde.

Métodos: Uma investigação metodologicamente validada e baseada em escala foi desenvolvida incluindo 97 agentes comunitários de saúde nas cidades brasileiras de Riacho Fundo I e Riacho Fundo II, localizadas na região administrativa de Brasília.

Resultados: A consistência interna da escala de percepção mostrou bons valores de coeficiente alfa de Cronbach (0.76 no geral, e >0.75 para as diferentes dimensões). Além disso, o fator de análise apresentou uma solução de 3 fatores com significância proporcional.

Conclusão: A escala mostra boa confiabilidade e boas propriedades psicométricas, e tem potencial para uso em pesquisas futuras.

Keywords
Agentes comunitários de saúde; Atenção primária ao saúde; Bioética; Reprodutibilidade dos testes; Questionários

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Conflict of Interest: there is no conflict of interest to declare
Introduction

Mental health is a broad field of research that combines various sciences and types of professions in an attempt to observe, investigate, and understand human beings in a multifaceted manner involving familial, social, psychological, and psychopathological aspects. Brazil’s Unified Health System (SUS) was created and based on this multidisciplinary principle that considers an integrated and regional perspective, with primary care as the first step for all patients’ health issues.

The concept of basic care is different from that of primary healthcare. According to the Brazilian Ministry of Health and the principles of SUS, there is no distinction between the areas of basic and primary healthcare. Primary care is defined as “a set of individual or collective measures performed at the primary care level of health systems that focused on fostering health, preventing illness, treatment, and rehabilitation.”

Considering the magnitude of mental issues experienced by the Brazilian population, it is easy to see how primary care teams confront mental health issues in their daily routines. According to the World Health Report’s (2001) recommendation, the inclusion of mental health measures in primary care was a subject discussed at the Third National Mental Health Conference in Brazil (CNSM). The proposal that was approved recommends healthcare training for Family Health Program (PSF) teams, the inclusion of multi-professional mental health teams to work with Family Health Teams (ESFs), and the inclusion of a specific printed form for collecting data on individuals with psychological disorders who are treated by Family Health Teams.

In this organizational context, psychiatric care reform in Brazil is in the initial stages of its inclusion in primary care. Psychiatric care reform is a complex political, social, and historical process including measures, institutions, and forces of different origins. It has only been successful in places where intensive and continued follow-up programs have been created within the community. Thus, the important interface between mental health networks is represented by substitute services such as Psycho-Social Care Centers (CAPS), Family Health Support Centers (NASF), residencies, social centers, and (ambulatory) healthcare centers, all of which represent primary healthcare.

With the positive result obtained in the northeastern region of Brazil, the Family Health Program (PSF) was expanded to the remaining country. This expansion caused an improvement in primary care and the establishment of Community Health Workers (CHWs). The Ministry of Health has stated on its website that in December 2012, the number of registered CHWs in Brasilia was 849.

CHWs’ daily activities involve issues that require to be understood well because these professionals depend on the support of other professionals for good performance and sustainability. Examples include CHWs’ entry into home environments, which requires involvement in families’ internal conflicts; the often unsuccessful attempt to mediate the interaction between the health team and individuals; measures to promote healthcare despite people’s resistance to changing modern unhealthy habits; CHWs’ personal beliefs regarding healthcare, which may be in conflict with scientific concepts; strategies to manage feelings of powerlessness despite the socioeconomic and cultural conditions that hinder patients’ healthy behaviors; and difficulties that arise at work because of difficulties in teams’ interpersonal relationships. CHWs must experience these and other issues in their daily tasks. They raise the bioethical questions experienced by these workers and require us to reflect upon the professionals’ (who work in Family Health Programs) practices. They reinforce the requirement for heightened sensitivity and ethical commitment on behalf of primary care professionals.

To determine CHWs’ daily work experiences, it is important to consider workers’ opinions. Concerning public healthcare management, the major challenge is to maximize the quality of health services to society while respecting budgetary limitations. The population that large-
ly utilizes public health services belongs to the marginalized strata of society and cannot seek paid treatment from physicians or private hospitals. Moreover, the resources available to public health are never sufficient to meet the growing demand. In addition to these financial issues, team training, appropriate work infrastructure, and employee skill and motivation represent important factors in the delivery of primary health-care services.\(^\text{10}\)

Thus, using questionnaires is a measure that aids in the understanding of individuals’ experiences regarding healthcare to develop strategic objectives and suggest measures to guide the interdisciplinary work of those engaged in public health.

However, a questionnaire should be duly developed such that it reliably reflects reality. Regardless of the type of study adopted, the philosophical basis is normally founded on the view that reality is constructed by individuals who interact with their social world; therefore, using empirical studies is key to the construction of reality.

To determine whether a questionnaire is reliable, statistical programs can be used, in which the variables studies can determine the research tool’s reliability. Cronbach’s alpha coefficient is an example of a test that relies on a factor to express the degree of responses’ reliability to a particular questionnaire.

Therefore, this study is aimed at demonstrating the reliability of a double scale constructed through a pilot study with CHWs.

**Methods**

This is a scale-based and validated methodological study. This study was preceded by another study that was qualitative in nature and was developed through interviews with community workers who were requested to respond to the following open question: “Objectively identify four issues involved in your mental health practice.” This study provided a set of proposals that we organized into two subscales with 16 items:

- Subscale 1: The response began with: “this occurs in my mental health practice.” The possible responses were expressed in the Likert format, varying from 1 (never occurs) to 6 (always occurs).
- Subscale 2: The response began with: “I see this as a threat to my mental health practice.” The possible responses were expressed in the Likert format, varying from 1 (never occurs) to 5 (always occurs).

In addition to these two subscales, the questionnaire contained sociodemographic data on gender, age, marital status, time working, and work location from the Family Health Program and CHW teams.

The sample included 97 CHWs undergoing training in mental healthcare in the Federal District’s (Brasilia, Brazil) regional health office. The inclusion criterion was participation in mental health training.

The survey was conducted in December 2012 in a private room at the health centers involved. On February 15, 2012, the Ethics Committee of the Science and Health Care Research Foundation (FEPECS/SES/DF) approved the project as No. 643/11. The 97 CHWs who agreed to participate in the study signed a free and informed consent form, which guaranteed their anonymity and their information’s confidentiality. To guarantee the study’s confidentiality, the names of the family health units that participated in the present study are not reported.

The data was analyzed using SPSS (version 19 for Windows). A \(p\) value of 0.05 was considered to be the critical significance level. Cronbach's alpha was used to determine the questionnaire’s reliability.

**Results and Discussion**

The 97 CHWs’ sociodemographic data revealed that the majority were women (78.4%). Those between 30 and 39 years of age were found to constitute 40.2% of the group, and more than half of the workers interviewed were married. The main results are presented below and are organized by the previously defined objectives.
Bioethical issues regarding mental health workers’ practices - Validity and Reliability

The survey was analyzed using Cronbach’s alpha test (Table 1). On analyzing the effect of items’ correlation with the entire scale of the survey on the alpha coefficient, high correlations were obtained between almost all items and the entire scale. This finding demonstrates the entire survey’s correct functioning and contributes to the high alpha value (0.76 overall). According to the test, values of this magnitude support the conclusion that the questionnaire is within the expected reliability factor.

Table 1. Questions grouped into five factors by percentage of variance as confirmed by the scree plot

<table>
<thead>
<tr>
<th>Factor</th>
<th>% Variance</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24,425</td>
<td>4, 8, 11</td>
</tr>
<tr>
<td>2</td>
<td>14,866</td>
<td>6, 10, 12, 13</td>
</tr>
<tr>
<td>3</td>
<td>9,222</td>
<td>1, 5</td>
</tr>
<tr>
<td>4</td>
<td>8,162</td>
<td>14, 15</td>
</tr>
<tr>
<td>5</td>
<td>7,661</td>
<td>7, 9</td>
</tr>
</tbody>
</table>

Similar results were found in a study that sought to validate the self-confidence of the Portuguese version of the scale. High Cronbach’s alpha coefficients were found overall (0.92), and they were >0.83 for the different dimensions, reflecting the questionnaire’s reliability.

In a study by Aguiar et al. (11) seeking to determine the test-retest reliability of the Swedish “Demand-Control-Support Questionnaire” scale’s Portuguese version among a population of workers with low education levels, Cronbach’s alpha values were found to be >0.70 for most dimensions. These results reflect the questionnaire’s stability and enable its use in studies analyzing the association between work stress and health. (11)

Factor analysis - Determining the frequency of the occurrence of bioethical issues

A principal components analysis was performed with the 16 items of the questionnaire by employing a varimax rotation with the sample of 97 CHWs. The factor analysis method’s suitability was confirmed using Bartlett’s test of sphericity (chi-square approximation = 457,358; df = 120; p < 0.0001). The test results were significant and indicated the data’s appropriateness for the method. The suitability of Kaiser-Meyer-Olkin (KMO) (with a value of 0.687) confirmed the factor analysis method’s adequacy. A commonality analysis revealed that the percentage of common variance in the data structure ranged from 46% to 75%.

A Cronbach’s alpha of 0.761 indicated that the questions attained a satisfactory degree of internal coherence and that the responses to the questions were reliable.

The initial analysis indicated that five components met the eigenvalue criterion of >1 and explained 64.336% of the variance. This indication was confirmed by the scree plot, which suggested five factors before the change in the curve’s steepness (Figure 1).

The questions shown in table 1 are significant at the value of 0.05 with regard to each factor.

Figure 1. Scree plot showing the curve’s steepness before factor 5
The questions were associated with each factor involved in the perception of frequency of occurrence. They were then grouped and labeled on the basis of the topic discussed in each question.

**Factor 1, titled “Training in Mental Health,” included the following questions:**
- Q4-Is it difficult to work with patients who are dependent on medication?
- Q8-Is it difficult to approach patients with mental illness?
- Q11-Is diagnosis difficult?

These questions refer to issues involving the requirement for CHWs’ technical training to improve their approach toward patients receiving basic healthcare.

**Factor 2, titled “Comprehensiveness of Treatment,” included the following four questions:**
- Q6-Do patients experience difficulty in getting urgent care or mental health clinics?
- Q10-Is it difficult to provide patients with instructions?
- Q12-Is it easy to manage a patient suffering from a mental illness?
- Q13-Are you able to identify patients’ disorders?

**Factor 3, titled “Resource Allocation,” included the following questions:**
- Q1-Are enough medications available to meet patients’ requirements?
- Q5-Are you able to follow up with patient treatment?

**Factor 4, titled “Lack of a Psychosocial Network,” included the following questions:**
- Q14-Is the institution’s lack of support responsible?
- Q15-Is there a lack of support for transferring patients?

**Finally, factor 5, titled “Lack of a Psychosocial Network” included the following questions:**
- Q7-Are you able to find mental health professionals when necessary?
- Q9-Is it easy to guarantee the continuity of care?

These questions are correlated because of the psychosocial network’s inadequacies.

**Perception of threats involving bioethical questions**
A principal components analysis was performed using the questionnaire’s 16 questions by employing a varimax rotation with the sample of 97 CHWs. The factor analysis’s suitability was confirmed by Bartlett’s test of sphericity (chi-square approximation = 576,079, df = 120, p < 0.0001). The suitability of KMO was confirmed; the value was 0.822. A high KMO value and the significance of Bartlett’s test of sphericity indicated the data’s suitability for factor analysis. The communality analysis revealed that the percentage of common variance in the data structure ranged from 40% to 72%.

The value of Cronbach’s alpha was 0.883, a finding that indicates that the questions attained a high degree of internal consistency and reflected the responses’ reliability.

The initial analysis indicated that the four components met the criterion of an eigenvalue >1 and explained 60.651% of the variance, thus reflecting a multifactor structure (four values). However, this finding appears to be inconsistent with the scree plot, which suggests factor 1 before the change in the curve’s steepness (Figure 2).

Table 2 shows that there was a large difference in the percentages of variance for the four factors. The first factor had a variance of 36.75%, which was very different from the others. This difference may explain the divergence between the criterion of an eigenvalue of >1, the four factors, and the scree plot, which suggests a single-factor solution. The estimated Cronbach’s alpha coefficients strengthen the single-factor solution because the coefficient for all the items is 0.883.

The factors’ nature was considered.
Q6-Do patients experience difficulty in getting urgent care or mental health clinics?
Q8-Is it difficult to approach a patient with a mental illness?
Q10-Is it difficult to provide patients with instructions?
Q11-Is it difficult to diagnose patients?

Factor 3, titled “Treatment Integrity,” included the following questions:
Q12-Is it easy to deal with a patient who suffers from a mental illness?
Q14-Is there a lack of support from the institution responsible?
Q15-Is there a lack of support for transferring patients?
Q16-Does the patient receive care in the private network and return to the public system to renew a prescription?

Factor 4, titled “Lack of a Psychosocial Network,” included the following questions:
Q3-Do patient families offer good support?
Q9-Is it easy to guarantee the continuity of care?

Cronbach’s alpha was 0.76. This value meets the standards established by Streiner (2003) (12) who suggests that the coefficient’s values must be >0.7 to be reliable.

These measures foster ethics and the protection of citizens. Such principles may be observed in the conditions proposed by Schramm and Kottow (13):

“...To consider protection each time, certain health objectives are publically accepted to be inevitable because they are indispensable; accepting public health programs involves the certainty, or the high probability, that the measures proposed are necessary and reasonably sufficient for prevention. Once accepted as pertinent, the principle of protection must be completely implemented without being disregarded for ulterior motives because a social need exists to exercise protection through predetermined measures; in other words, possible negative effects do not invalidate the program and health issues in question.”

Table 2. Questions grouped into four factors by percentage of variance, as confirmed by the scree plot

<table>
<thead>
<tr>
<th>Factor</th>
<th>% Variance</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36.754</td>
<td>1, 5, 7, 9, 13</td>
</tr>
<tr>
<td>2</td>
<td>8.998</td>
<td>2, 6, 8, 10, 11</td>
</tr>
<tr>
<td>3</td>
<td>7.715</td>
<td>12, 14, 15, 16</td>
</tr>
<tr>
<td>4</td>
<td>7.185</td>
<td>3, 9</td>
</tr>
</tbody>
</table>

Figure 2. Scree plot showing the curve’s decreased steepness after factor 1
Conclusion

The responses’ internal consistency obtained using a questionnaire among CHWs in the cities of Riacho Fundo I and II in Brasília revealed that the questionnaire presented reliability within the context in which it was applied. Thus, determining the obtained results’ reliability provides more relevance and robustness to this study regarding CHWs’ mental health labor practices. The study considered their perceptions and threats to their work and detected bioethical issues, particularly in terms of the principle of justice.

Therefore, the questionnaire was confirmed to be a relevant tool for future research to improve the association between basic healthcare and mental health. Identifying issues associated with CHWs, particularly those trained in mental healthcare, facilitates improvements in governmental measures. These improvements may particularly include the development of public policies for this group of patients. There is a requirement for providing better service. These changes may aid both service providers and patients treated using health programs in Brazil.

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Collaborations

Castro UR, Palha AJP, Martins JCA and Oliveira NR contributed with study design, analysis, data interpretation, article writing, and relevant critical review of the intellectual content and final approval of the version to be published.

References

Nominata

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Adriana Barbieri Feliciano, Universidade Federal de São Carlos, SP, Brazil
Adriana Amorim Francisco, Universidade de São Paulo, SP, Brazil
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