ABSTRACT

Objective: to evaluate the positioning of orthopedic patients using the Nursing Outcomes Classification. Method: a quantitative, descriptive, longitudinal study was performed in a Brazilian hospital, with 20 orthopedic patients who underwent total hip arthroplasty, followed up for up to four postoperative days. Four indicators of the nursing outcome Body Positioning: self-initiated (0203) from the Nursing Outcome Classification were assessed using the five-point Likert scale. For the analysis, Student's t-tests, Generalized Estimation Equations and Bonferroni's Post Hoc tests were used. Results: 76 evaluations were performed and the mean score of Body Positioning: self-initiated (0203), in the first evaluation, was 2.01 ± 0.25 points (substantially compromised). In the last evaluation, the mean score was 4.73 ± 0.08 (mildly compromised), p <0.001. Conclusion: a progressive improvement in the positioning of orthopedic patients was found. It is concluded that NOC is a clinically useful tool for evaluating the patients' outcomes during the implementation of the nursing process in clinical practice.

Descriptors: Outcome Assessment; Health Care; Orthopedics Nursing; Standardized Nursing Terminology; Nursing care; Nursing Diagnosis; Nursing process.

RESUMO

Objetivo: avaliar o posicionamento de pacientes ortopédicos, segundo a Nursing Outcomes Classification. Método: estudo quantitativo, descritivo, longitudinal, realizado em hospital
brasileiro, com 20 pacientes ortopédicos, submetidos à artroplastia total de quadril, que foram acompanhados por até quatro dias de pós-operatório. Realizou-se a avaliação de quatro indicadores do Resultado da Nursing Outcomes Classification - Posicionamento do Corpo: autoiniciado (0203), por meio da escala Likert de cinco pontos e, para a análise, empregaram-se os testes t de Student, Equações Estimativas Generalizadas e Post Hoc de Bonferroni. **Resultados:** realizaram-se 76 avaliações e a média do resultado Posicionamento do Corpo: autoiniciado (0203), na primeira avaliação, foi de 2.01±0.25 pontos (muito comprometido). Alcançou-se, na última, por este resultado, média de 4.73±0.08 (levemente comprometido), p<0.001. **Conclusão:** demonstrou-se melhora progressiva no posicionamento de pacientes ortopédicos. Evidenciou-se a NOC como ferramenta clinicamente útil para avaliação dos resultados de pacientes, durante a implementação do Processo de Enfermagem, na prática clínica.

**Descritores:** Avaliação de Resultados em Cuidados de Saúde; Enfermagem Ortopédica; Terminologia Padronizada em Enfermagem; Cuidados de Enfermagem; Diagnóstico de Enfermagem; Processos de Enfermagem.

**RESUMEN**

**Objetivo:** evaluar el posicionamiento de los pacientes ortopédicos, según la Clasificación de Resultados de Enfermería. **Método:** estudio cuantitativo, descriptivo, longitudinal, realizado en un hospital brasileño, con 20 pacientes ortopédicos sometidos a artroplastia total de cadera, que fueron seguidos hasta cuatro días después de la cirugía. Se evaluaron cuatro indicadores del Resultado Posicionamiento Corporal: autoiniciado (0203) de la Clasificación de Resultados de Enfermería, mediante la escala Likert de cinco puntos y, para el análisis, la prueba t de Student, Ecuaciones de Estimación Generalizadas y Post Hoc de Bonferroni. **Resultados:** Se realizaron 76 evaluaciones y la media del resultado Posicionamiento corporal: autoiniciado (0203), en la primera evaluación, fue de 2,01 ± 0,25 puntos (muy comprometido). En el último, para este resultado se alcanzó un promedio de 4.73 ± 0.08 (levemente comprometido), p <0.001. **Conclusión:** hubo una mejora progresiva en el posicionamiento de los pacientes ortopédicos. La NOC se evidenció como una herramienta clinicamente útil para evaluar los resultados de los pacientes durante la implementación del Proceso de Enfermería en la práctica clínica.

**Descritores:** Avaliação de Resultados em Cuidados de Saúde; Terminologia Normalizada de Enfermiera;

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INTRODUCTION

Hip arthroplasty is performed as a treatment for osteoarthritis, injuries caused by rheumatoid arthritis, avascular necrosis, and fractures. Despite being a beneficial and relatively common procedure, and despite advances in biomedical technology and improved surgical techniques, prosthesis displacement is still a high-risk complication that increases health costs, the use of resources, the risk of new surgery, and that affects the quality of life. Approximately 400 thousand arthroplasties are performed annually worldwide.1

In orthopedic inpatient units, the immediate postoperative evaluation of patients undergoing arthroplasty is performed by nurses using the Nursing Process as the basis for clinical reasoning to the correct positioning, mobilization, and education of the patient.2 The application of the Nursing Process associated with the use of standardized nursing terminologies, such as NANDA International3 (the classification of nursing diagnoses most used in the world), the Nursing Outcomes Classification (NOC)4 and the Nursing Intervention Classification (NIC),5 can maximize the accuracy of assessments, outcomes, and interventions, minimizing the risks and complications arising from surgeries.

It is known that orthopedic patients are often diagnosed with (00085) Impaired Physical Mobility related to pain or musculoskeletal impairment.6 In the postoperative period, these patients have mobility limitations, bed restriction, and difficulty in walking, positioning, or performing adduction exercises with the operated leg due to pain and the risk of prosthesis dislocation.4 It is noteworthy that the evaluation of outcomes related to the positioning of the patient after arthroplasty is relevant since these limitations imply some degree of dependence. Besides, it is believed that maintaining correct positioning and mobility after surgery is essential for a successful surgical outcome.

This reality reinforces the need to evaluate, over a continuous period, the orthopedic patients' outcomes using the Nursing Outcomes Classification (NOC) - a standardized nursing terminology used...
for this type of monitoring. This terminology covers the patients' health status, behaviors, reactions, and feelings before and after nursing interventions. It consists of Nursing outcomes with a title, numeric code, definition, and indicators measured by five-point Likert scales, which make it possible to monitor the improvement, worsening, or stagnation of the patient's status during healthcare.

A literature review identified 21 articles addressing the NOC under different approaches, including translation and cultural adaptation (4.77%), applicability in clinical practice (33.33%), and validation of its elements (63.90%). Two studies were identified that addressed NOC in the orthopedic setting and evaluated self-care results. As orthopedic problems are related to functional limitations and impaired physical mobility, the assessment of orthopedic patients' positioning, using the NOC, is necessary during the implementation of the Nursing Process in clinical practice.

Given the above, the guiding question emerged: "Do the Nursing Outcomes Classification indicators make it possible to assess the positioning of orthopedic patients undergoing total hip arthroplasty?".

**OBJECTIVE**

To evaluate the positioning of orthopedic patients using the Nursing Outcomes Classification.

**METHOD**

This is a quantitative, descriptive, and longitudinal study, carried out from April to August 2016, in an orthopedic inpatient unit of a Brazilian university hospital accredited by the Joint Commission International. This hospital allocates beds for patients undergoing total hip arthroplasty whose focus is on multidisciplinary treatment for pain relief, restoration of joint function, and symptom control after surgery. Patients are submitted to a physiotherapy session per day, and a trained nursing team performs procedures related to positioning. This program aims to improve the patient's quality of life and education to facilitate hospital discharge.

In addition, the nursing process carried out in this institution is registered in the Electronic Health Record using NANDA International to establish the nursing diagnoses. NIC is used to support the care actions prescribed by nurses.

Orthopedic patients who underwent total hip arthroplasty were chosen as the study population. The convenience sample was recruited as patients were admitted to the orthopedic inpatient unit. The sample size was calculated aiming at improved NOC scores. We considered a difference of one score on the NOC scale, a power of 90%, an alpha-type error of 1%, a standard deviation of 0.7, and an estimated correlation of 0.5 between the first and last assessment scores, totaling 17 patients.
The following inclusion criteria were defined: patients over 18 years of age, who underwent total hip arthroplasty, and who were admitted to the hospital at least four days before data collection (as established in a previous study).\(^9\) Patients with postoperative complications such as nausea, vomiting, or intense pain were excluded as well as patients transferred to other institutions or units and/or with limitations that could hinder communication/interaction with the researchers.

An instrument was built for the data collection and included the NOC Body positioning: self-initiated (0203) outcome and four indicators previously revised by nurses specialized in orthopedic care. This nursing outcome and the chosen indicators are listed in a chapter of the NOC that covers specialties in Orthopedics and Rehabilitation, for which conceptual and operational definitions developed in a previous study were used.\(^4\)\(^6\)

The nursing outcome with its numerical code, definition, and the respective selected indicators is presented below:

- **Body Positioning: self-initiated** (0203) - personal actions to change own body position independently with or without assistive device. Four indicators were investigated, as follows: Moves from lying to sitting (020302), Moves from sitting to lying (020303), Moves from sitting to standing (020304), and Moves from standing to sitting (020305). These indicators were scored using the five-point Likert scale as recommended by the NOC (1 = Severely compromised, 2 = Substantially compromised, 3 = Moderately compromised, 4 = Mildly compromised, 5 = Not compromised). This outcome belongs to the Functional Health (I) Domain and to the Mobility (C) Class of the NOC, characterized by outcomes that describe the physical mobility and sequelae of restricted movement of an individual.\(^4\)

The data collection form was created and divided in two parts: the first has sociodemographic and clinical data, and the second aims at assessing the clinical evolution of the Body positioning indicators. For each indicator, a conceptual and operational definition describing the evaluation procedure was constructed. The instrument consisted of the day of the assessment, the magnitude of the operational definition (measured on a five-point Likert scale where 1 represented the least adequate and 5 the most adequate response), a column intended for "not applicable" responses, and a space for observations.

The data collection procedure was initiated by accessing the patients' electronic records to consult the list of surgeries to locate patients eligible for the study. Exclusion and inclusion criteria were applied to the study when patients were already in the Orthopedics unit. Those individuals who met the inclusion criteria received an explanation of the data collection procedure, and those who agreed signed an Informed Consent Form.
The data collection was performed through clinical evaluations in the postoperative period. In the first evaluation, sociodemographic and clinical characteristics were identified, and the NOC indicators were measured after 12 hours postoperatively in the orthopedic inpatient unit. Scores were established at the end of each assessment. These measures were reapplied in subsequent assessments (2nd, 3rd, and 4th days), within a 24-hour interval, including the record of the presence or absence of an orthopedic bed. It was verified how the patients sat on the bed or armchair and how they would position themselves to lie down or stand up. A total score was calculated by adding the scores of each item assessed.

A 16-hour workshop was held with the researchers before data collection with the following themes: Nursing care in the postoperative period of total hip arthroplasty, Applicability of the NOC, and Approach to the application of the data collection instrument. A pilot study with patients not included in the sample was conducted to observe the scores' variation and standardize the data collection process. The findings of the pilot study were not included in the final analysis. It should be noted that the researchers were not part of the institution's service team.

The Statistical Package for Social Sciences (SPSS) version 20.0 was used for the data analysis. Continuous variables were expressed as means and error or standard deviations, median, and interquartile ranges depending on the normality of the data. Categorical variables were expressed as absolute frequencies and percentages. The Student's t-test was applied to paired samples comparing the mean NOC scores between the first and the last evaluation. The Generalized Estimating Equation (GEE) model was used to compare the mean NOC scores between daily assessments. The Bonferroni Post Hoc test was applied to identify the statistical differences between the daily means. A value of p < 0.05 was adopted, which was considered statistically significant.

This investigation was approved by the Ethics and Research Committee of the Hospital de Clínicas de Porto Alegre under Opinion n° 16-0118 and CAAE n° 50981015.9.0000.5327. All participants signed two copies of the informed consent before participation.

**RESULTS**

Twenty patients undergoing total hip arthroplasty participated and received a total of 76 assessments during the study period. From the total sample, 16 (80%) patients were followed for four days and four (20%) for three days. It was found that patients were predominantly male (n = 13, 65%), with a mean age of 60 years (± 11), and 15 patients (75%) underwent this type of surgery for the first time, all of them in orthopedic beds and with a diagnosis of Impaired Physical Mobility in their medical records.
It was found that the mean score of the Body Positioning: self-initiated (0203) outcome in the first evaluation was $2.01 \pm 0.25$ (substantially committed). In the last evaluation, a mean of $4.73 \pm 0.08$ (mildly compromised) was found, with a statistically significant difference of 2.72 points in the NOC score, $p < 0.001$ (Student’s t-test). Among the indicators evaluated, Moves from sitting to standing (vice versa) (mean score = 1.55) was the most compromised indicator in the first evaluation (Table 1), and Moves from lying to sitting was the second most compromised (mean score = 2.35) (GEE). For almost all indicators, the mean values in the first evaluation were significantly lower than in the second evaluation and in the third and fourth days of follow-up, which did not differ from each other (Bonferroni’s Post Hoc test) (Table 1 - 95% CI 2.24 to 3.18, $p <0.001$ for all comparisons).

Table 1. Mean scores obtained for the NOC outcomes of patients undergoing total hip arthroplasty.

<table>
<thead>
<tr>
<th>Outcome/Indicators</th>
<th>1st Evaluation</th>
<th>2nd Evaluation</th>
<th>3rd Evaluation</th>
<th>4th Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0203) Body positioning: self-initiated</td>
<td>$2.01 \pm 0.25^a$</td>
<td>$3.58 \pm 0.25^b$</td>
<td>$4.44 \pm 0.19^c$</td>
<td>$4.73 \pm 0.08^c$</td>
</tr>
<tr>
<td>(020302) Moves from lying to sitting</td>
<td>$2.35 \pm 0.29^a$</td>
<td>$3.95 \pm 0.25^b$</td>
<td>$4.35 \pm 0.23^{bc}$</td>
<td>$4.56 \pm 0.15^{c}$</td>
</tr>
<tr>
<td>(020303) Moves from sitting to lying</td>
<td>$2.60 \pm 0.36^a$</td>
<td>$4.25 \pm 0.26^b$</td>
<td>$4.45 \pm 0.21^b$</td>
<td>$4.63 \pm 0.12^b$</td>
</tr>
<tr>
<td>(020304) Moves from sitting to standing</td>
<td>$1.55 \pm 0.25^a$</td>
<td>$3.00 \pm 0.34^b$</td>
<td>$4.40 \pm 0.20^c$</td>
<td>$4.75 \pm 0.11^c$</td>
</tr>
<tr>
<td>(020305) Moves from standing to sitting</td>
<td>$1.55 \pm 0.27^a$</td>
<td>$3.10 \pm 0.36^b$</td>
<td>$4.55 \pm 0.21^c$</td>
<td>$4.88 \pm 0.08^c$</td>
</tr>
</tbody>
</table>

* Analysis of variance (ANOVA) a, b, c - means with the same letter did not differ according to the Bonferroni test with 5% significance. * GEE model with values expressed as mean ± standard error.

Outcomes and indicators are described according to the titles and their respective codes listed in the NOC.

**DISCUSSION**

The positioning of orthopedic patients was evaluated using the NOC, making it possible to identify the patients’ outcomes throughout the postoperative period, and a progressive improvement in the positioning of patients was found, indicating that NOC is a clinically useful tool for the Nursing Process.
In this study, data on the clinical evolution of Body positioning: self-initiated of patients over a follow-up period of up to four days are evidenced. It was observed that patients improved their ability to change the body position independently, with or without an auxiliary accessory. It is known that, in the postoperative period of total hip arthroplasty, the recommendation for these patients is to keep their legs abducted in a hip flexion below 90° to avoid dislocation of the prosthesis, which can be conservatively managed. In contrast, if the prosthesis dislocation occurs after five years of arthroplasty, surgical management is needed.\(^9\) It should be emphasized that evaluating these clinical conditions is essential to minimize the effects of surgical complications, given the difficulty in the patient’s initial movement.

Positioning and mobility, when affected, are generally assessed from a functional perspective on the individual’s difficulty in moving freely and may vary between individuals in similar conditions and the same person at different times. The use of the NOC makes it possible to monitor this evolution, allowing early intervention in Impaired physical mobility, as this nursing diagnosis is associated with changes in gait, which may increase the risk of falls, dependence on daily activities, and difficulty walking with or without the aid of auxiliary devices. Patients are encouraged to perform the correct exercises and leave the bed safely using devices that facilitate mobilization and positioning.\(^10\) It is believed that this evidence justifies the need for early interventions after arthroplasty based on the best nursing practices.\(^11\)

In this study, NOC scores were substantially compromised in the initial evaluation; however, there was a statistically significant improvement over the four-day follow-up (Table 1). It was noticed that the Body Positioning: self-initiated outcome obtained a substantially compromised score in the first assessment but showed a significant improvement and became mildly compromised (scores 2.01 and 4.73, respectively). The assessment of the patients’ positioning was made through the following observations: the verification of the adequate positioning of the patient while sitting on the bed or transferring from the bed to the chair and vice versa; if the patient took the first step with the operated limb and if the leg was kept straight with the weight distribution aided by crutches or walkers. In other words, we observed whether the patient was able to sit on the bed and stand up to walk. It is believed that the completeness of these movements indicates the progression of patients in terms of mobility, favoring the nurse’s clinical reasoning in determining assertive interventions as physical mobility stabilizes or improves. It was inferred, in another investigation carried out in 2012 at the Hospital de Clínicas de Porto Alegre with orthopedic patients, that, although there was a progressive evolution in the mean of the outcomes, nursing interventions were not related to these
changes. It is suggested that nursing interventions be evaluated to describe their effectiveness in patients’ results.

The indicators Moves from lying to sitting (020302), Moves from sitting to lying (020303), Moves from sitting to standing (020304), and Moves from standing to sitting (020305) presented mean scores in the first evaluation significantly inferior to the scores found on the second evaluation, and these were also significantly inferior to the scores found on the third and fourth days of follow-up, which did not differ between them. The difference between the first and the last evaluations was 2.71 points in the NOC scoring. Orthopedic patients are encouraged to move early in the immediate postoperative period. Even in the orthopedic bed, they may also have been instructed on how to correctly use the auxiliary devices to position themselves in the bed and to prepare to walk, given the evolution of these indicators.

It is understood that there is no way to prescribe the use of an auxiliary device, such as medical trapezes, walkers, or crutches, without educating the patient on how to use them. The medical trapeze can be adjusted from left to right to assist in the patient's movement while in the bed, facilitating the preparation to move from lying to sitting and vice versa. In a study carried out in Europe on the importance of auxiliary devices in the rehabilitation of hip and knee surgery, 95% of the subjects stated that auxiliary devices increased their ability to perform daily living activities and that they were extremely/partially useful in achieving early discharge. However, in a study that evaluated nursing records related to the education of patients undergoing hip arthroplasty, a significant association between nursing records and the length of hospital stay (p = 0.002) with a low positive correlation (r = 0.216) was found. The author believe that the presence of complications and the length of hospital stay directed educational actions to another focus and not to positioning. The findings of the present study indicate that the patients had minor positioning problems at the end of the evaluations, which indicates a probable understanding of nursing care. In this sense, NOC proved to be a clinically useful nursing assessment tool, as its clinical indicators made it possible to measure, objectively, the position of patients, both in and out of bed to the extent to which the patient progressed.

The evidence shown here can be integrated into clinical practice and used by nurses as important sources for assessing patient results, providing parameters for more accurate decision-making, and facilitating the elaboration of protocols for monitoring rehabilitation according to standardized nursing terminology. This is believed to provide a basis for the NOC’s scope in assessing different contexts of nursing care and the different parameters for the same care situation.
The limitations existing in this investigation refer to the fact that the sample is relatively small, composed of individuals from a single hospital. Another limitation is the fact that patients were under treatments performed by physiotherapists, which can interfere with the nursing outcomes. It is believed that analyzing the electronic records of physiotherapists and nurses, simultaneously, could maximize the impact of the study findings. Besides, the follow-up of patients was only at the hospital level. Assessments carried out in the outpatient or home setting after discharge could deepen the study findings and, through the implementation of other interventions, patients could reach the score of five in the NOC Likert scales. It is noteworthy that a patient with acute pain after arthroplasty cannot make a self-initiated position because he is afraid to perform the necessary movements for rehabilitation; however, the presence of pain and positioning results were not evaluated. It is understood that if this had been studied simultaneously, perhaps the findings would have been different.

However, it is believed that the use of NOC, as a standardized language, can provide comparability of data on sensitive nursing results as a standard way to assess the effectiveness of care. Based on the findings of this study, it is inferred that, as the patients' outcomes improve, the need for interventions may decrease providing support to assess the evolution of the patients' degree of dependence and clinical status. It is believed that studies like this can help initiate, adjust, or suspend nursing interventions. Also, the study findings and can guide nurses when reviewing nursing diagnoses according to the worsening, stabilization, or improvement of NOC scores to achieve better management of the Nursing Process in orthopedic rehabilitation.

**CONCLUSION**

A progressive improvement in the positioning of orthopedic patients has been demonstrated. It became evident that NOC is a clinically useful tool for evaluating the patient's outcomes during the implementation of the Nursing Process in clinical practice.

It was possible to observe the adequacy of the NOC indicators in evaluating the studied population. As implications for teaching, the findings favor NANDA-I, NIC, and NOC usage by novice nurses to make clinical decisions aiming at improving orthopedic patients' outcomes. As implications for research and assistance, the study reinforces that the compromise of clinical indicators and the impact of nursing interventions must be assessed, as they are sources of evidence for clinical practice and for the improvement of the quality of electronic health records.

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