Journal of Pediatric Nursing xxx (2018) xxx–xxx

Contents lists available at ScienceDirect

Journal of Pediatric Nursing

Validation of Clinical Indicators of the Nursing Diagnosis of Ineffective Protection in Adolescents With Cancer

Marília Mendes Nunes, RN, MsD [a,*], Marcos Venícios de Oliveira Lopes, RN, PhD [a], Viviane Martins da Silva, RN, PhD [a], Tânia Alteniza Leandro, RN, MsD [a], Nathaly Bianka Moraes Fróes, RN [a], Aline de Aquino Peres Almeida, Nursing student [a], Bianca Alves Sobreira, Nursing student [a], Vinícius Mendes Nunes, Medical student [b], Angélica Paixão de Menezes, RN [a], Gabriele de Lima Ferreira, RN [a]

[a] Nursing Department, Federal University of Ceará, 1115 Alexandre Baraúna st, Rodolfo Teófilo, Fortaleza, Ceará 60430-160, Brazil
[b] Faculty of Medicine, University of Fortaleza, 1321 Washington Soares st., Edson Queiroz, Fortaleza, Ceará 60811-905, Brazil

ARTICLE INFO

Article history:
Received 23 March 2017
Revised 4 May 2018
Accepted 4 May 2018
Available online xxxx

Keywords:
Nursing diagnosis
Protection
Cancer
Adolescent

ABSTRACT

Purpose: To validate the clinical indicators of the nursing diagnosis of Ineffective protection in adolescents with cancer based on diagnostic accuracy measurements.
Design and Methods: Measurements of sensitivity and specificity for the indicators were calculated using latent class analysis with random effects in a sample of 127 adolescents between 10 and 19 years of age.
Results: The prevalence of diagnosis was estimated at 93.7%. The indicators deficient immunity and weakness showed higher sensitivity values, whereas opportunistic infections, recurrent infections, insomnia, mucosal lesions, and coughing showed high specificity.
Conclusions: Seven indicators were clinically validated.
Practice Implications: The validation of clinical indicators provides nurses with the knowledge of useful signs and symptoms to identify early spectra of a nursing diagnosis or confirm their presence in a specific population. In clinical practice, this knowledge contributes to an accurate diagnostic inference and the planning of nursing interventions directed to the idiosyncrasies of individuals.

Background

The protection of the individual provides lines of defense against invading disease-causing substances and promotes the adaptation of the individual, playing a key role in maintaining health. In this sense, the NANDA-International (NANDA-I) taxonomy describes Ineffective protection as a "decrease in the ability to guard self from internal or external threats, such as illness or injury", inserting this term in the field of Health promotion and in the class Control of health. This nursing diagnosis comprises 17 defining characteristics and eight related factors (Herdman & Kamitsuru, 2014).

Nursing diagnoses represent a clinical judgment about human responses to health conditions/life processes, or vulnerability to these responses, from individuals, families, groups or communities. The components of a nursing diagnosis include defining characteristics, which refer to the signs or symptoms that are grouped as manifestations of a diagnosis, and related factors, which are etiologies, circumstances or influences for the diagnosis. Recently, two new components have been added to the structure of a NANDA-I taxonomy diagnosis: populations at risk, which include people who share characteristics that make them more susceptible to manifesting the diagnosis; and associated conditions, which are conditions that cannot be independently modified by the nurse, such as medical diagnoses and pharmaceutical agents (Herdman & Kamitsuru, 2014).

Some studies have been conducted to identify the diagnostic profile of different populations observed a high prevalence of ineffective protection among patients on hemodialysis (Tinôco et al., 2017) and patients undergoing liver transplantation (Ramos, Oliveira, & Braga, 2011).

Capellari and Almeida (2008) used the model proposed by Fehring to validate the content of 19 clinical indicators of ineffective protection in patients on hemodialysis, adding malnutrition to the 18 indicators described in the NANDA-I taxonomy. The authors observed deficient immunity, neurosensory impairment, dyspnea, itching and malnutrition as the main provisional indicators and emphasized that these effects were related to chronic kidney disease, which may lead to ineffective diagnosis in individuals undergoing hemodialysis.

Recently, Frazão (2015) validated the components of ineffective protection in patients undergoing hemodialysis through two steps: concept analysis and content analysis by specialists. Thus, this author identified that the proposal for this diagnosis in patients submitted to

* Corresponding author at: 71 Campo Amor Rocha st., Fátima, Fortaleza, Ceará 60415-080, Brazil.
E-mail address: marilia_mn@hotmail.com (M.M. Nunes).

https://doi.org/10.1016/j.pedn.2018.05.001
0882-5963/

hemodialysis includes the same definition presented in NANDA-I Taxonomy and the most appropriate location would be in the safety/protection domain and in the physical injury class. This study specified relevant clinical indicators for the identification of this diagnosis in patients undergoing hemodialysis: the presence of invaders in the bloodstream; nutritional disorders; increased number of hospitalizations; uncontrolled dry weight; infected vascular access; inadequate vascular access; increased systemic blood pressure; and fever. Similarly, the author added some factors that contribute to the manifestation of ineffective protection: absence of routine vaccines; non adherence to care related to vascular access; non adherence to infection control measures; non adherence to the prescribed diet; non adherence to drug therapy; and presence of comorbidities.

In this context, there is a lack of studies on this diagnosis in adolescents with cancer. In this specific population, the nurse should recognize the early signs and symptoms of the diagnosis of ineffective protection, considering the high vulnerability of this population to clinical conditions that may compromise the state of health and continuity of cancer treatment. Furthermore, the absence of definitions or evaluation of the defining characteristics in NANDA-I impairs the process of inference of this diagnosis. In addition, some characteristics present similar nomenclature, which, in clinical practice, may confuse the diagnostic reasoning of the nurse.

Validation studies can help to accurately infer nursing diagnoses in different health contexts. Given that a single clinical observation is insufficient to infer a diagnosis with certainty, it is necessary to obtain a set of clinical indicators and assess the relationship of these indicators with the most appropriate diagnostic hypotheses for a given situation (Lopes, Silva, & Araújo, 2013), such as cancer in adolescence.

The cancer corresponds to a group of several diseases that have in common the disordered growth of abnormal cells with invasive potential (American Cancer Society, 2015). In turn, childhood cancer affects children and adolescents between zero and 19 years and presents particular histopathological characteristics. These cancers, for the most part, are more aggressive and grow rapidly, but respond better to treatment and have a good prognosis (National Cancer Institute, 2014).

Although rare, childhood cancers are one of the leading causes of child deaths in developed countries. In addition, in most developing countries, childhood cancer, despite not being classified as a public health problem, is considered a priority health issue (American Cancer Society, 2015). Every year, >200,000 cases of childhood cancer are diagnosed. However, >80% of children with cancer can survive if they have access to quality care. Unfortunately, many children in low-income and middle-income countries are not adequately cared for, and as a result, >90% of childhood cancer deaths occur in low resource settings (WHO, 2017).

In addition to epidemiological aspects, the aggressiveness and the treatment of this disease can negatively interfere with the protection capacity of these individuals. Chemotherapeutic agents, for example, can inhibit the proliferation of T and B lymphocytes and their specificity for the immune response, impair the cell cycle and induce apoptosis through the disruption of DNA synthesis, enabling the inhibition of immune responses (Krisl & Doan, 2017).

Thus, the present study aimed to validate the clinical indicators of the nursing diagnosis Ineffective protection in adolescents with cancer and verify the prevalence of such diagnosis and the frequency of their clinical indicators.

Methods Headings

Design and Sample

A clinical validation study based on diagnostic accuracy measurements of clinical indicators for the nursing diagnosis Ineffective protection in adolescents with cancer was developed at a referral hospital for the treatment of childhood cancer in Northeast Brazil.

To estimate the sample size, we used the recommendations for latent class models (Swanson, Lindenberg, Bauer, & Crosby, 2012), which considers the number of clinical indicators to be evaluated. In the present study, a sample of six individuals was adopted for each clinical indicator. Because of the 17 defining characteristics included in the NANDA-I taxonomy and three clinical indicators observed in an integrative review of the literature for this diagnosis (Nunes, Leandro, Lopes, & Silva, 2017) were evaluated, the sample was estimated in 120 subjects (6×20).

However, 127 adolescents 10 to 19 years of age composed the final sample, reflecting the availability of a larger number of these patients during the collection period. After analyzing the data, two clinical indicators were not identified in the sample, changing the ratio from six to seven individuals per clinical indicator.

Adolescents with unstable hemodynamic conditions and/or diseases that could alter the clinical context of cancer, influence the identification of the nursing diagnosis under study or make it impossible to collect the necessary information were excluded from the study.

Data Collection

For data collection, we developed an instrument that included sociodemographic and clinical data. Data collection was performed through physical examination, interview and consultation of medical records and was based on conceptual and operational definitions of the clinical indicators of Ineffective protection elaborated from the literature. In the present study, the term clinical indicator was used to refer to the defining characteristics presented in NANDA-I and the signs and symptoms (opportunistic infections, recurrent infections, and injured oral mucosa) identified in the integrative review of the literature (Nunes et al., 2017).

The data collection team included five nurses trained to use the data collection instrument based on the operational definitions developed for each clinical indicator, as recommended by Lopes et al. (2013). The principal investigator based on information obtained from the research team's records established the status of each clinical indicator. This instrument was based on the operational definitions developed for each clinical indicator, which can be found in Appendix A.

Data Analysis

The data were analyzed using the statistical package R version 3.1.1. The descriptive analysis included the calculation of absolute frequencies, percentages, measures of central tendency and dispersion. For the proportions of categorical variables, 95% confidence intervals were calculated. The robust Jarque-Bera test was applied to verify adherence to the normal distribution.

To analyze the association between clinical indicators and sociodemographic variables, the chi-square test for independence or Fisher's exact test was applied according to the expected frequency of each category. The odds ratios (OR) and their respective 95% confidence intervals were used to measure the magnitude of the relationship between clinical indicators and categorical variables of interest. To evaluate the differences in quantitative variables among adolescents with and without clinical indicators, the Mann-Whitney test was applied.

The latent class analysis (LCA) method with random effects was used to verify the sensitivity and specificity of each indicator. This technique is used to measure the diagnostic accuracy of clinical indicators when there is no perfect reference standard based on the assumption that an unobserved or latent variable (nursing diagnosis) determines the associations among the observable variables (clinical indicators). A model of two latent classes of random effects was used to calculate the measures of accuracy with the respective 95% confidence intervals (Qu, Tang, & Kutner, 1996). Random effects models were applied when there was local dependence between the component variables. The likelihood ratio test (G^2) was applied to verify the goodness of fit of the latent class models. A clinical indicator was considered clinically

Please cite this article as: Nunes, M.M., et al., Validation of Clinical Indicators of the Nursing Diagnosis of Ineffective Protection in Adolescents With Cancer, *Journal of Pediatric Nursing* (2018), https://doi.org/10.1016/j.pedn.2018.05.001