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Validation of Clinical Indicators of Imbalanced Nutrition: Less Than Body Requirements in Early Childhood

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This is a clinical validation study of the nursing diagnosis of imbalanced nutrition: less than body requirements based on the diagnostic accuracy measures. Measures of sensitivity and specificity were calculated based on the latent class analysis method using a random effects model in a sample of 123 children between 0 and 6 years old. The prevalence of the diagnosis was estimated to be 27.6% using the latent class model. Indicators that exhibited the best measures of diagnostic accuracy included insufficient interest in food and satiety immediately upon ingesting food. A total of seven clinical indicators were validated clinically.
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BEST CLINICAL PRACTICE depends on the ability to identify clear, precise and accurate clinical indicators that represent the phenomena that delimit the body of knowledge of a profession. In this context, nursing diagnoses represent the human responses of individuals for whose care nurses are directly responsible. To this end, the identification of a nursing diagnosis depends on defining characteristics (signs and symptoms) externalized by patients and represents clinical indicators that should be validated in specific populations. These clinical validation processes allow the nursing diagnoses to be refined after identifying the diagnostic accuracy of each clinical indicator and to expand the evidence supporting such diagnoses.

Unbalanced nutrition is one of the most frequent nursing diagnoses among vulnerable populations, including children (Lima, de, Motta, Santos, & Silva, 2004; Ribeiro, Silva, Guerra, & Lima, 2011), adults (Lamb, Parr, Lamb, & Warren, 2009; Lucena et al., 2011; Rocha, Maia, & Silva, 2006), and the elderly (Almeida et al., 2008). However, most of the studies only describe the prevalence of unbalanced nutrition without describing any processes to clinically validate this phenomenon as a nursing diagnosis.

The NANDA International (NANDA-I) taxonomy lists 21 diagnoses in the domain Nutrition, and the nutritional imbalance states are represented by three such diagnoses: imbalanced nutrition: less than body requirements, obesity and overweight (Herdman & Kamitsuru, 2014). Many articles have focused on increased nutrient intake in response to the global obesity epidemic. However, few clinical validation studies have been developed for the nursing diagnosis corresponding to nutritional imbalance even though nutritional deficiencies are prevalent in many countries, especially in developing or underdeveloped countries.

Unbalanced nutrition poses considerable risks for human beings. Famine and unbalanced nutrition contribute to the premature death of mothers, infants and children in early childhood as well as to poor physical and mental

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development in young (Brundtland, 2000). Around the world, approximately 115 million children are underweight. Furthermore, growth delay, which is considered an indicator of chronic malnutrition, hinders the development of 171 million children under 5 years (World Health Organization, 2014). Moreover, in developed countries, the costs of hospitalization are increased when patients exhibit malnutrition (Elia, Russell, & Stratton, 2010).

Thus, early and accurate detection of an imbalance in the metabolic requirements due to inadequate nutrient intake is the first step in minimizing the immediate and late effects of malnutrition. The literature describes a number of signs and symptoms that characterize nutritional energy and protein deficiency as well as deficiencies of various vitamins and minerals: pale inner tongue and lips, lack of energy, loss of appetite, growth inhibition, bone abnormalities, delayed growth, apathy, dry skin, dry and brittle hair, abdominal and/or lower limb edema, loss of taste, irritability, excessive crying, infections, diarrhea, skin lesions, hair loss, slow thinking, neurological damage, and impaired wound healing (Knudsen, 2012).

Most of these signs and symptoms are associated with extremely severe conditions of malnutrition. However, the identification of clinical indicators in the early stages of nutritional imbalance can assist in the early identification of this phenomenon and aid in clinical screening work. The NANDA-I defines imbalanced nutrition: less than body requirements as insufficient nutrient intake to meet metabolic needs (Herdman & Kamitsuru, 2014). In principle, this diagnosis reflects pre-clinical malnutrition, especially if compared with the definition of malnutrition presented by the World Health Organization, which describes a nutritional deficiency (Blössner & De Onis, 2005).

On the NANDA-I taxonomy, imbalanced nutrition: less than body requirements exhibits 22 defining characteristics, including the following: abdominal cramping; abdominal pain; alteration in taste sensation; body weight 20% or more below ideal weight range; capillary fragility; diarrhea; excessive hair loss; food aversion; food intake less than the recommended daily allowance (RDA); hyperactive bowel sounds; insufficient information; insufficient interest in food; insufficient muscle tone; misinformation; misperception; pale mucous membranes; perceived inability to ingest food; satiety immediately upon ingesting food; sore buccal cavity; weakness of muscles required for mastication; weakness of muscles required for swallowing; and weight loss with adequate food intake (Herdman & Kamitsuru, 2014).

The defining characteristics described by NANDA-I are similar to the signs and symptoms associated with more severe nutritional problems, although there is not a complete equivalence between the clinical indicators. In addition, some defining characteristics seem to refer to etiologic factors, such as misperception and misinformation. Furthermore, signs and symptoms often associated with nutritional changes are not included in the list of defining characteristics, such as irritability, slow thinking, excessive crying, dry and brittle hair, dry skin, and abdominal and/or lower limb edema.

The lack of important clinical indicators and/or the confounding of the cause–effect relationship between the elements that make up a diagnosis impair the diagnostic inference and subsequent decision making, leading to poor health outcomes. Furthermore, the prevalence of this diagnosis may be underestimated and lead clinicians to prioritize other supposedly more prevalent diagnoses. Thus, the present study aimed to validate the clinical indicators of the nursing diagnosis of imbalanced nutrition: less than body requirements in early childhood. Specifically, this study aimed to estimate the prevalence of the diagnosis and the frequency of its clinical indicators.

Methods

Design and Sample

This study is a clinical validation study based on measures of diagnostic accuracy for clinical indicators of the nursing diagnosis imbalanced nutrition: less than body requirements in early childhood. The study was developed in a non-governmental organization (NGO) that works to combat child malnutrition in northeastern Brazil. Data collection began after the necessary approvals by the ethics committee of the institution responsible for research and the consent of the parents or guardians to the terms of consent.

To estimate the sample size, we used the formula $n = [Z_{\alpha}^2.Se.(1 - Se)]/(L^2.P)$ (Zhou, Obuchowski, & McClish, 2012). The sample size was set at 123 children and was calculated assuming a confidence level of 95% (Z_{α}), sensitivity (SE) of 80% and a precision of estimates (L) of 10%. For prevalence (P), the estimated value of 0.5 was used, suggesting that at least 50% of the population under study exhibited a positive diagnosis, given that no studies that have identified this parameter. Children between 0 and 6 years old were included in the study. Children were excluded if they exhibited cerebral palsy, signs of infection or any indication of hospitalization due to clinical instability.

Data Collection

For data collection, an instrument was developed based on the defining characteristics of the nursing diagnosis "Imbalanced Nutrition: less than body requirements", according to the NANDA-I Taxonomy (Herdman & Kamitsuru, 2014) and on the relevant literature about the theme. The instrument for data collection also included sociodemographic data and six other clinical indicators described in the literature as signs and symptoms indicative of childhood nutritional deficiency that were not listed by NANDA-I as defining characteristics of the diagnosis.

The six clinical indicators included were as follows: irritability, slow thinking, excessive crying, dry and brittle hair, dry skin, and abdominal and/or lower limb edema. These clinical indicators were identified after a literature review of major nutritional disorders (Coutinho, Gentil, & Toral, 2008; Nichols, 2014; Renner et al., 2013). In this study, we adopted the generic term clinical indicator to refer

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