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# Clinical Differentiation of Respiratory Nursing Diagnoses among Children with Acute Respiratory Infection

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The aim of this study was to identify the defining characteristics that allow clinical differentiation of the nursing diagnoses, ineffective breathing pattern (IBP), ineffective airway clearance (IAC), and impaired gas exchange (IGE). A secondary analysis with a cohort design was developed from 1128 records obtained during the hospital stay of 136 children with acute respiratory infection. Groups of defining characteristics with greater differentiation capacity were identified by multiple correspondence analyses. The results showed that the defining characteristics that better differentiate the studied diagnoses are agitation, irritability and diaphoresis for IGE; dyspnea, use of accessory muscles to breathe, orthopnea, and abnormal breathing pattern for IBP and excessive sputum, absence of cough, difficulty verbalizing, nasal flaring, and adventitious breath sounds for IAC. Twelve defining characteristics that can assist clinicians to differentiate the three main respiratory nursing diagnoses among children with acute respiratory infection were identified in this study.


STUDIES DEALING WITH nursing diagnoses and their components can produce data that help nurses to examine the way in which the evidence fits a certain diagnosis. This type of study facilitates the use of nursing diagnoses to provide nurses with a diagnostic language. Strategies aimed at such an approach are recommended and encouraged in view of their contribution to improving the skills used by nurses in the diagnostic reasoning process (Lunney, 2008).

Thus, studies aimed to differentiate between inter-related nursing diagnoses are useful to reduce the uncertainties that may arise during the diagnostic inference process. The implication of such diagnostic processes can be difficult if the diagnoses have similar characteristics or require the incorporation of information obtained from others. This problem can be worsened if the nurse does not know the relevance of each defining characteristic for each diagnosis. Moreover, even specific characteristics for a diagnosis may not necessarily be effective in multiple scenarios of clinical practice to allow for a differential diagnosis in a clinically uncertainty situation.

The nursing diagnoses, ineffective breathing pattern (IBP – Code 00032), ineffective airway clearance (IAC –

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Code 00031), and impaired gas exchange (IGE – Code 00030) represent human responses characterized by respiratory impairment that have strong clinical relationships to each other. These diagnoses share the defining characteristics of dyspnea, orthopnea, restlessness, cyanosis and nasal flaring, and they have other characteristics that are similar or incorporate parts of the information from other characteristics. For example, abnormal breathing pattern is a defining characteristic of IGE and is related indirectly to the characteristics of tachypnea, orthopnea, and dyspnea that comprise the IBP diagnosis (Herdman & Kamitsuru, 2014).

Despite the fact that the diagnoses of IBP, IAC, and IGE exhibit similar defining characteristics, they were developed from the concepts of ventilation, permeability and gas exchange. Thus, it is conjectured that the physiological relationship between these concepts generates shared defining characteristics and directly influences the establishment of nursing interventions and the achievement of positive outcomes of care.

Therefore, the establishment of defining characteristics with good discriminating ability minimizes the discrepancies in clinical evaluations and assists in the identification of the nursing diagnosis that represents the true clinical condition. Generally, nurses identify a set of defining characteristics and verify the relationship between the most plausible diagnoses of a particular situation with the defining characteristics presented by the patient (Lopes, Silva, & Araujo, 2012). Identification of each new characteristic can confirm a suspected diagnosis, eliminate another, or even redirect the nurse's attention to a human response not yet considered. At this point, the degree of knowledge of the relevance of each characteristic in regard to the diagnostic hypotheses assists with a more precise identification of the most credible nursing diagnoses for a specific clinical condition.

The prevalence of respiratory nursing diagnoses in individuals with different types of disease is relevant to nursing care because of the relationship between the respiratory system and other vital processes. Additionally, some populations are particularly sensitive to respiratory changes, such as children with acute respiratory infection (ARI) (Fleming, Pannell, & Cross, 2005). Although the ARIs include a wide range of diseases with different clinical spectra, previous studies have reported the joint or isolated occurrence of IBP, IAC, and IGE. However, few studies have aimed at establishing differentiating clinical indicators for these nursing diagnoses.

Pascoal et al. (2012) assessed children with ARI and found that at least 42% of the samples had a joint occurrence of IBP, IAC, and IGE on the first day of evaluation. However, the isolated prevalence of each diagnosis reached 91.9% for IAC, 64% for IBP, and 42.6% for IGE. Another study that also evaluated children with ARI found a relatively high prevalence of IBP (59.6%), IAC, (37.7%), and IGE (27.2%), but it did not describe the percentage of children who presented concomitantly with the three diagnoses (Andrade, Chaves, Silva, Beltrão, & Lopes, 2012).

ARI corresponded to the most common group of respiratory diseases of childhood (Silva, Paiva, Silva, & Nascimento, 2012) and caused changes that negatively impacted the respiratory system. Several factors contribute to the increased susceptibility of a child to the development of respiratory problems, including anatomical peculiarities and physiological and immunological characteristics (Matsuno, 2012). Therefore, these respiratory changes contribute to the development of characteristic signs and symptoms of respiratory nursing diagnoses in several clinical spectra.

The clinical amplitude ranges from a mild respiratory impairment to global impairment of respiratory function and induces the need for specific care plans for each condition that, when defined improperly, can compromise the care outcomes. Thus, the aim of this study was to identify which defining characteristics which all allow clinical differentiation of IBP, IAC, and IGE in children with ARI.

## Methods

### Design and Sample

This is a secondary analysis using a cohort design, developed to establish clinical parameters of differentiation of the IBP, IAC, and IGE nursing diagnoses based on the strength of association among their defining characteristics. The data consisted of 1128 records obtained from a cohort of 136 children with ARI followed for a period of hospitalization ranging between six and ten days in two pediatric hospitals in northeastern Brazil. The ethics committee of the institutions evaluated and approved the study, and parents or guardians were informed about the objectives of the study and consented to the data collection and signed an informed consent form.

The original cohort consisted of children aged between zero and five years (mean: 20.35 months, SD = 3.11) and admitted to the hospital in less than 48 hours; most of the subjects were male (58.1%) and diagnosed with pneumonia (85.3%), although other less severe ARI were identified, such as bronchiolitis, sinusitis, pharyngitis and tonsillitis. Children with chronic diseases that altered the specific clinical status of the ARI (e. g., congenital heart disease, cerebral palsy) were excluded from the original cohort.

The sample size was based on the recommendation of Menexes and Papadimitriou (2004) for studies with multiple categorical variables, which suggest that the minimum sample size should be calculated from the number of variables in pairs (q) by the formula: q. (q − 1)/2. The present study included 30 defining characteristics that make up the three nursing diagnoses. Thus, a minimum sample of 435 records (30×29/2) would be required to perform the analysis. We decided to work with all available records of the cohort, totaling 1128 observations.

### Data Collection

The data of the original cohort were collected from an instrument based on the defining characteristics of IBP, IAC, and IGE, as described in NANDA International terminology