Original Article

Content validity of ineffective airway clearance clinical indicators

Validade de conteúdo dos indicadores clínicos de desobstrução ineficaz de vias aéreas

Validez de contenido de los indicadores clínicos de desobstrucción ineficaz de las vías aéreas

Lívia Maia Pascoal[1] https://orcid.org/0000-0003-0876-3996
Marcos Venícios de Oliveira Lopes[2] https://orcid.org/0000-0001-5867-8023
Camila Maciel Diniz[2] https://orcid.org/0000-0003-4344-7737
Marília Mendes Nunes[2] https://orcid.org/0000-0001-7589-6962
Viviane Martins da Silva[2] https://orcid.org/0000-0002-8033-8831
Nirla Gomes Guedes[2] https://orcid.org/0000-0003-0405-7517
Angélica Paixão de Menezes[2] https://orcid.org/0000-0001-9804-2177
Marcelino Santos Neto[1] https://orcid.org/0000-0002-6105-1886

How to cite:
Pascoal LM, Lopes MV, Diniz CM, Nunes MM, Silva VM, Guedes NG, et al. Content validity of ineffective airway clearance clinical indicators. Acta Paul Enferm. 2022;35:eAPE039007434.

DOI
http://dx.doi.org/10.37689/acta-ape/2022AO0074349

Descritores
Diagnóstico de enfermagem; Estudos de validação; Sistema respiratório; Sinais e sintomas respiratórios; Obstrução das vias respiratórias

Keywords
Nursing diagnosis; Validation study; Respiratory system; Signs and symptoms, respiratory; Airway obstruction

Descriptores
Diagnóstico de enfermería; Estudio de validación; Sistema respiratório; Signos y síntomas respiratórios; Obstrucción de las vías aéreas

Submitted
March 28, 2021

Accepted
September 29, 2021

Corresponding author
Lívia Maia Pascoal
E-mail: livia_mp@hotmail.com

Associate Editor (Peer review process):
Juliana de Lima Lopes
(https://orcid.org/0000-0001-6915-6781)
Escola Paulista de Enfermagem, Universidade Federal de São Paulo, SP, Brazil

Abstract

Objective: To identify the most relevant clinical indicators for the Ineffective airway clearance Nursing Diagnosis.

Method: This is a methodological study of content analysis organized into a conceptual definition of the phenomenon of interest, construction of the phenomenon of interest structure and analysis by judges on the constructed structure.

Results: Twenty-one clinical indicators were identified. Only Increased breath sounds and Subcostal retraction were not significantly relevant for the diagnosis.

Conclusion: The most relevant indicators for the Ineffective airway clearance diagnosis were: Dyspnea, Alteration in respiratory rate, Adventitious respiratory noises, Tachypnea, Excessive sputum, Ineffective cough, Decreased breathing sounds, Orthopnea, Cyanosis, Restlessness, Difficulty verbalizing and Use of accessory muscles to breathe.

Resumo

Objetivo: Identificar os indicadores clínicos mais relevantes para o Diagnóstico de Enfermagem Desobstrução ineficaz de vias aéreas.

Método: Estudo metodológico de análise de conteúdo organizado em três fases: definição conceitual do fenômeno de interesse, construção da estrutura do fenômeno de interesse e análise dos juízes sobre a estrutura construída.

Resultados: Foram identificados 21 indicadores clínicos. Apenas Sons respiratórios aumentados e Retração subcostal não foram indicadores significativamente relevantes para o diagnóstico.

Conclusão: Os indicadores de maior relevância para o diagnóstico Desobstrução ineficaz de vias aéreas foram: Dispneia, Mudanças no ritmo respiratório, Ruídos adventícios respiratórios, Taquipneia, Acúmulo excessivo de muco, Tosse ineficaz, Sons respiratórios diminuídos, Ortopneia, Cianose, Inquietação, Dificuldade para verbalizar e Uso da musculatura acessória para respirar.

Resumen

Objetivo: Identificar a los indicadores clínicos más relevantes para el Diagnóstico de Enfermería Desobstrucción ineficaz de las vías aéreas.

Métodos: Estudio metodológico de análisis de contenido organizado em tres fases: definición conceptual del fenómeno de interés, construcción de la estructura del fenómeno de interés y análisis de los jueces sobre la estructura construida.

[1]Center for Social Sciences, Health and Technology, *Universidade Federal do Maranhão*, Imperatriz, MA, Brazil.
[2]Department of Nursing, *Universidade Federal do Ceará*, Fortaleza, Ceará, CE, Brazil.
Conflicts of interest: nothing to declare.

Resultados: Se identificaron 21 indicadores clínicos. Únicamente Sonidos respiratorios aumentados y Retracción subcostal no fueron indicadores significantemente relevantes para el diagnóstico.

Conclusión: Los indicadores de mayor relevancia para el diagnóstico Desobstrucción ineficaz de las vías aéreas fueron: Disnea, Cambios en el ritmo respiratorio, Ruidos adventicios respiratorios, Taquipnea, Acúmulo excesivo de mucosidad, Tos ineficaz, Sonidos respiratorios disminuidos, Ortopnea, Cianosis, Inquietud, Dificultad para verbalizar y Uso de la musculatura accesoria para respirar.

Introduction

The accurate identification of signs and symptoms manifested by patients requires a theoretical and conceptual framework that provides professionals with precise information about the observed fact, as well as that allows differentiation between similar concepts. Some human responses in nursing – nursing diagnoses – present in their structures concepts that overlap, hindering the process of diagnostic inference. An example of this can be observed among respiratory diagnoses brought by the Taxonomy NANDA International (NANDA-I),[1] as the ineffective airway clearance (IAC) diagnosis.

IAC is defined, according to the NANDA-I classification, as an "inability to eliminate secretions or obstructions of the respiratory tract to maintain an unobstructed airway."[1] This condition can be identified in different clinical contexts, as postoperative patients of thoracic or abdominal surgeries,[2] hospitalized children with acute respiratory infection[3] and children with asthma.[4] This serves as a warning considering recent events in world public health caused by viral respiratory disorders – H1N1 influenza in 2009, Middle Eastern respiratory syndrome in 2012 and the disease by the new coronavirus in 2019 (COVID-19), which brought similar clinical conditions of respiratory impairment, such as hypoxemia, changes in respiratory pattern, dyspnea and cyanosis.[5,6] These clinical indicators have been pointed out as a sign of severity, alerting professionals to patients' clinical picture.[7-9] Such clinical manifestations are presented in diagnoses of NANDA-I as IAC[1] and serve as guides for the construction of a therapeutic plan. Accurate identification of signs and symptoms may warn of serious events, prompting nurses to provide precise and rapid interventions, such as repositioning patients and offering oxygen.[10,11]

However, in the current IAC structure, conceptual gaps are identified as the absence of clinical indicators important for diagnosis and the presence of elements with overlapping nomenclatures, making it difficult to identify the essential elements of the phenomenon. Despite having been clinically studied,[4,12] IAC has been little explored regarding its diagnostic content. With this, the process of diagnostic validation can be impaired, since its conceptual stage reveals important information about the concepts involved in the phenomenon of interest. Thus, the following question arose: which clinical indicators are most relevant for IAC diagnosis?

IAC is based on the conceptual core of Airway Permeability, as it is associated with an airflow that extends from the nasal cavities to the pulmonary capillary alveoli.[13] Currently, this diagnosis has 13 clinical indicators listed in NANDA-I:[1] Alteration in respiratory rate, Alteration in breathing pattern, Absence of cough, Cyanosis, Difficulty verbalizing, Dyspnea, Excessive sputum, Restlessness, Wide-eyed, Orthopnea, Adventitious respiratory noises, Decreased breathing sounds, and Ineffective cough. However, there seem to be other important indicators for the diagnostic inference of IAC, such as the manifestation of increased breath sounds, altered thoraco-vocal fremitus and altered chest excursion.[14]

Thus, validation studies are suggested to recognize the clinical indicators that best represent the concept and which are irrelevant to the manifestation of the phenomenon,[15] based on the judgment of experts on the subject. Among these studies is content validity, which is important in the validation process of a nursing phenomenon, because it precedes clinical validation, offering structural and conceptual support of the diagnosis to be studied.

This study aimed to identify the clinical indicators most relevant for IAC.

Methods

This is a methodological study of content analysis to verify the adequacy of clinical indicators of IAC regarding representativeness for the nursing phenomenon. The study was organized into three phases: conceptual definition of the phenomenon of interest (Nursing Diagnosis), construction of the Nursing Diagnosis structure and content analysis of the diagnosis studied by nurse judges. The two initial stages are dedicated to the theoretical character of the process, in which the identification of concepts related to diagnosis and the construction of their conceptual and operational definitions occur, aiming at a better understanding of this relationship. Then, the concepts and their respective definitions are submitted to critical analysis by experts.[16] All ethical aspects in research were respected, according to Resolution 466/12.

The first stage consisted of the conceptual definition of the phenomenon of interest through a search in the literature, so that the representative elements of the phenomenon under study (IAC) and their respective definitions were raised. For this, the questions that led the search were: What are the events or situations that occur as a consequence of a physiological change in the concept? How are these events or situations defined and measured? Considering the absence of specific protocols for the study of validity of diagnosis content, the present study used, in the first stage, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[17] recommended for systematic review studies and meta-analysis.

The search was conducted using the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Latin American and Caribbean Literature in Health Sciences (LILACS) and PubMed databases. The controlled descriptor used in the search was "permeability" with the uncontrolled descriptor "airways", interconnected by the Boolean operator "AND". The descriptors were also used in Portuguese and Spanish. Specific periods of publication of the studies were not considered.

Studies that reported information about the analyzed concept, answered the guiding questions and in Portuguese, English or Spanish were included. Ninety-three studies were identified when the mentioned descriptors were used. After reading titles and abstracts, seven studies were obtained, which followed for complete reading. After reading in full, only one study[18] was included in the final sample. Additionally, technical books[13,19-21] were used to assist in identifying conceptual and operational definitions of concepts pertaining to airway permeability, due to the limited amount of literature addressing such definitions.

The second stage[16] had three nurses who were specialists in the theme, forming the Consensus Group. These nurses were invited to contribute to the study due to experience with theoretical and clinical studies on nursing diagnoses, especially those on respiratory function and care practice. They analyzed and discussed the findings for the concept of airway permeability, establishing IAC indicators as well as its conceptual and operational definitions. The elements identified in the search and their respective definitions were organized and described in consensus by the group.

Finally, the following clinical indicators for IAC were obtained from the NANDA-I classification:[1] Absence of cough, Cyanosis, Difficulty verbalizing, Dyspnea, Restlessness, Orthopnea, Adventitious respiratory noises, Decreased breathing sounds and Ineffective cough. The indicators listed in the literature were: Alteration in respiratory rate, Tachypnea, Excessive mucus, Use of accessory muscles to breathe, Hypoxemia, Diminished breath sounds, Increased breath sounds, Subcostal retraction, Bradypnea, Altered thoraco-vocal fremitus, Altered chest excursion and Ineffective sputum.

The indicators' concepts for respiratory sounds were differentiated as follows: diminished breath sounds represented the absence of production of vesicular murmurs in at least one area of the lung; breathing sounds referred to decreased volume of vesicular murmurs in at least one lung area; and increased breath sounds corresponded to increased volume of sound of vesicular murmurs in at least one lung area.[20]

The last phase consisted of analysis by nurse judges on the structure built in the two previous

phases.[16] A way to analyze judge assessments is by applying the binomial test for comparison of proportions. For this test to be used, it is necessary that each item assessed by a judge be presented dichotomously as appropriate or inadequate. Subsequently, the number of judges who classified the clinical indicator as adequate is calculated, and a binomial statistical test is applied to the item in order to estimate whether the proportion of judges is greater than or equal to a certain pre-established value.[22,23]

This last stage was subdivided into selection of judges and analysis of the structure built for the phenomenon of interest. The selection of judges recommended theoretical knowledge and care practice on the subject. Thus, the group was composed by reviewers that had as their starting point the minimum experience of 5 years in the theme studied and/or population at risk for diagnosis, whether in the theoretical or care context.[22,24] The search for judges with the profile described was done on the *Plataforma Lattes* and in research groups on nursing diagnoses/taxonomies. Moreover, the "snowball" sampling strategy was used to obtain new judges by indicating previously invited reviewers.[25]

The sample of reviewers was calculated based on the statistical criteria of minimum proportion (P) of 85% agreement regarding the pertinence of each component assessed and the difference (e) of 15% in relation to agreement, including a range of 75% to 100% in said agreement. Thus, the formula $n = Z\alpha^{2}.P.(1-P)/and^{2}$ was applied, including significance level (Zα) 95%.[22] After replacing the values in the formula, the final sample was at least 22 judges.

After the request, the data collection form was sent to the judges electronically. This instrument included information related to judge profile and clinical indicators, such as the conceptual and operational definitions of each indicator and their relevance to the manifestation of IAC. Furthermore, the criteria of clarity and accuracy were also used to determine whether the conceptual and operational definitions were representative, in fact, of the clinical indicators. The answers were classified dichotomically as adequate or inadequate.

Initially, a period of 1 month was established for the return of the completed material, but it was necessary to extend the deadline by up to 30 days, in order to achieve a more significant return rate. Thus, among the 54 nurses who agreed to participate in this study, 15 did not complete their participation, resulting in a final sample of 39 nurse judges.

The data were arranged in excel 2010 spreadsheets and analyzed with the support of softwares Statistical Package for the Social Sciences (SPSS), version 21.0, and R, version 2.12.1. The judge characterization information was analyzed by descriptive statistics, and the variables were presented in complete values and in percentages as well as in mean or median. The clinical indicators were studied for relevance, clarity and accuracy through binomial test, considering the Content Validity Index of the appropriate item when greater than or equal to 85% (Item Content Validity Index ≥0.85).[22] Thus, the item with a p-value >0.05 in each of these analyses was considered relevant, clear and/or accurate. Moreover, the global Content Validity Index was obtained according to the mean proportions of the items described as relevant before the binomial test alone for each clinical indicator.

Results

Judge profile is set out in Table 1. Most of them participated in a study group on nursing terminologies (76.9%). Among participants, 79.5% reported developing studies on nursing terminologies, 66.7% related to respiratory changes and 64.1% to respiratory nursing diagnoses. Regarding the use of nursing diagnoses, the judges reported their use in clinical practice and teaching in 74.4% and 66.7%, respectively. Another highlight was the significant number of judges (94.9%) who reported providing nursing care to patients with respiratory alterations or respiratory nursing diagnoses and frequently identifying these diagnoses in their care practice (79.5%).

Table 1. Judge profile (n=39)

Variables	n(%)
Sex	
Female	37(94.9)
Male	2(5.1)
Geographical region	
Northeast	25(64.1)
Southeast	10(25.7)
South	2(5.1)
Center-West	2(5.1)
Titration*	
Graduated/specialist (attending a master's degree course)	4(10.5)
Specialist	6(15.8)
Master's degree holder	22(57.9)
PhD	6(15.8)
Current occupation	
Assistance nurse	23(59.0)
Professor	11(28.2)
Graduate student	5(12.8)
Institution of work in the last 12 months	
More than one occupation	16(41.0)
Hospital	12(30.8)
Teaching institution	11(28.2)
Development of a study on nursing terminologies	31(79.5)
Development of a study on respiratory nursing diagnoses	25(64.1)
Development of study on respiratory changes	26(66.7)
Participation in a research group on nursing terminologies	30(76.9)
Use of nursing diagnosis in clinical practice*	29(74.4)
Use of nursing diagnosis in teaching*	26(66.7)
Nursing care for patients with respiratory alterations or respiratory nursing diagnoses	37(94.9)
Identification of respiratory nursing diagnoses	
Often	31(79.5)
Few times	5(12.8)
Never	3(7.7)

	Mean	Standard deviation	Median	Interquartile range
Age	33.33	7.4	31	7
Time of professional training	9.28	7.1	7	4

*Missings

Nurse judges' assessment regarding the relevance of clinical indicators for the manifestation of IAC is exposed in Table 2, in which the nomenclatures identified in the integrative review and submitted to validation are also presented. The results show that, of the 21 clinical indicators analyzed, only two were not considered relevant for this diagnosis (Increased breath sounds and Subcostal retraction). The global Content Validity Index calculated based on clinical indicators relevant to IAC was 0.85 (95% confidence interval 0.82-0.87). Thus, the most relevant indicators were Dyspnea, Alteration in respiratory rate, Adventitious respiratory noises, Tachypnea, Excessive mucus, Ineffective cough, Decreased breathing sounds, Orthopnea, Cyanosis, Difficulty verbalizing, Restlessness and Use of accessory muscles to breathe.

Table 2. Relevance of clinical indicators of Ineffective airway clearance according to judges' analysis (n=39)

Clinical indicators	IAC diagnosis	
	n(%)	p-value*
Dyspnea	39(100.0)	1.000
Alteration in respiratory rate	36(100.0)	1.000
Adventitious respiratory noises	39(100.0)	1.000
Tachypnea	37(97.4)	0.997
Excessive sputum†	37(97.4)	0.997
Ineffective cough	37(97.4)	0.997
Decreased breathing sounds	36(97.3)	0.997
Orthopnea	35(94.6)	0.981
Cyanosis	36(92.3)	0.945
Restlessness	35(89.7)	0.856
Difficulty verbalizing	34(89.5)	0.842
Use of accessory muscles to breathe	33(89.2)	0.826
Hypoxemia	32(84.2)	0.514
Diminished breath sounds	30(83.3)	0.459
Absence of cough	30(81.1)	0.315
Ineffective sputum	30(78.9)	0.201
Altered chest excursion	29(76.3)	0.105
Altered thoraco-vocal fremitus	28(75.7)	0.092
Bradypnea	29(74.4)	0.057
Subcostal retraction	28(73.7)	0.049
Increased breath sounds	24(66.7)	0.004

*P-value corresponding to significance level for the indicator relevance (binomial test); †nomenclature suggested by judges for Excessive mucus. IAC - Ineffective airway clearance

The criteria of clarity and precision applied to the conceptual and operational definitions presented adequacy for all assessed indicators. The results of the analysis can be observed in Table 3. Even though they were adequate, some definitions were reformulated, according to suggestions given by the judges, in order to make them more relevant to the indicator to which they referred. In Bradypnea, the reference standards for respiratory incursions were subdivided for ages from zero to 3 months (<35 pm), 3 to 6 months (<30 pm), 6 to 12 months (<25 pm), 1 to 3 years (<20 irpm), 3 to 6 years (<20 irpm), 6 to 11 years (<14 irpm) and above 12 years (<12 pm). The reference standards for Hypoxemia were also modified, highlighting the values of partial oxygen pressure in the presence of indicator for adults and children (PaO_2<60mmHg) and newborn (PaO_2<40mmHg).

Table 3. Judges' analysis, regarding the clarity and accuracy criteria, for the conceptual and operational definitions of Ineffective airway clearance diagnosis (n=39)

Clinical indicators	Conceptual definition				Operational definition			
	Clarity		Accuracy		Clarity		Accuracy	
	n(%)	p-value*	n(%)	p-value*	n(%)	p-value*	n(%)	p-value*
Restlessness	39(100.0)	1.000	34(87.2)	0.715	37(97.4)	0.997	33(86.8)	0.693
Subcostal retraction	38(100.0)	1.000	36(94.7)	0.984	38(100.0)	1.000	37(97.4)	0.997
Cyanosis	38(97.4)	0.998	39(100.0)	1.000	35(89.7)	0.856	37(94.9)	0.986
Tachypnea	37(97.4)	0.997	37(97.4)	0.997	38(97.4)	0.998	36(92.3)	0.945
Alteration in respiratory rate	37(97.4)	0.997	35(89.7)	0.856	35(89.7)	0.856	31(79.5)	0.222
Ineffective cough	37(97.4)	0.997	36(94.7)	0.984	35(92.1)	0.938	33(86.8)	0.693
Difficulty verbalizing	37(97.4)	0.997	35(92.1)	0.938	36(94.7)	0.984	34(89.5)	0.842
Use of accessory muscles to breathe	37(97.4)	0.997	35(92.1)	0.938	38(100.0)	1.000	36(94.7)	0.984
Adventitious respiratory noises	36(97.3)	0.997	37(100.0)	1.000	36(94.7)	0.984	37(97.4)	0.997
Dyspnea	37(94.9)	0.986	33(84.6)	0.541	39(100.0)	1.000	36(92.3)	0.945
Orthopnea	37(94.9)	0.986	37(94.9)	0.986	37(94.9)	0.986	34(87.2)	0.715
Bradypnea	36(94.7)	0.984	36(92.3)	0.945	35(94.6)	0.981	29(76.3)	0.105
Decreased breathing sounds	36(94.7)	0.984	37(97.4)	0.997	35(92.1)	0.938	37(97.4)	0.997
Diminished breath sounds	36(94.7)	0.984	33(86.8)	0.693	36(94.7)	0.984	36(94.7)	0.984
Hypoxemia	36(94.7)	0.984	34(89.5)	0.842	33(89.2)	0.826	31(83.8)	0.487
Excessive sputum†	35(89.7)	0.856	36(92.3)	0.945	35(89.7)	0.856	31(79.5)	0.222
Absence of cough	34(89.5)	0.842	33(86.8)	0.693	34(91.9)	0.930	35(92.1)	0.938
Altered thoraco-vocal fremitus	34(89.5)	0.842	36(94.7)	0.984	33(91.7)	0.922	33 (91.7)	0.922
Ineffective sputum	34(89.5)	0.842	32(84.2)	0.514	33(86.8)	0.693	31 (81.6)	0.341
Altered chest excursion	33(86.8)	0.693	35(92.1)	0.938	36(94.7)	0.984	37 (97.4)	0.997
Increased breath sounds	32(86.5)	0.669	29(76.3)	0.105	31(83.8)	0.487	28 (75.7)	0.092

*p-value corresponding to the level of significance for the indicator relevance (binomial test); † nomenclature suggested by judges for Excessive mucus.

Another change was applied to Excessive mucus, changing its title to Excessive sputum. The judges suggested small changes in the conceptual definition of this indicator, which began to encompass the types of mucus (serous, mucoid, purulent or hemoptoic) that are not satisfactorily eliminated by the organism when compared to a healthy organism. Furthermore, the reformulated operational definition highlighted the use of pulmonary auscultation to investigate possible adventitious noises that indicated the presence of respiratory secretion, and not only the verbal report of elimination of secretions through the nose and/or mouth, as previously defined.

The Ineffective cough indicator has also changed its definitions. The judges suggested the introduction of the term "foreign body" in the conceptual description, resulting in a definition that referred to the decrease in cough efficacy in mobilizing and eliminating secretions and/or foreign bodies from the airways. It was also suggested introducing the assessment mode referring to the term "foreign body" added. For this, the reviewer should observe whether there was a cough reflex capable of mobilizing and eliminating the foreign body present in the airways only through the aid of clearance techniques.

Discussion

The difficulties encountered during the study involved the low participation of judges (58.06%), the rate of return of the instruments (72.22%) and the delay to respond to the material, and it is necessary to extend the deadline in more than 90% of the cases. The judges' recent titration and reduced experience time also set up limiting factors for the use of the results of this study. It is suggested the preparation of studies, at the clinical level, to validate the content of IAC indicators, seeking to identify the manifestation of diagnosis in specific populations.

Knowing the set of elements that best represents IAC directs the clinical reasoning process, leading to early identification of diagnosis and, consequently, to a more efficient treatment. This becomes important in the present global health scenario affected by severe acute respiratory syndrome virus 2 (SARS-

CoV-2), since, within this set, indicators associated with severe clinical conditions of COVID-19, such as hypoxemia, dyspnea, alteration in respiratory rate and cyanosis are highlighted.[7-9]

Tachypnea was considered an important indicator of pulmonary permeability impairment, although it is not reported in the NANDA-I classification for IAC. Identifying the presence of Tachypnea in the current world health scenario serves as a warning to a poor prognosis of COVID-19, since the occurrence of this indicator can increase the occurrence of severity in patients' clinical picture by almost 40%.[26-28] Thus, tachypnea is a relevant indicator for assessing IAC.

Additionally, in a clinical scenario distinct from covid-19, signs of pulmonary involvement, such as the presence of abnormal pulmonary sounds, adventitious respiratory sounds, excess mucus and ineffective cough, were also pointed out as relevant indicators for the occurrence of IAC. This fact corroborates what was observed in clinical studies, which identified the adventitious respiratory noises, Excessive sputum and Ineffective cough among patients in the postoperative period of thoracic and abdominal surgery.[29] These indicators, as well as the Decreased breathing sounds indicator, were also identified in children with acute respiratory infection and indicated as associated with a worse prognosis for IAC.[30,31]

Some changes were suggested by the judges, such as the elimination of Ineffective sputum. Although this indicator presented statistical relevance for IAC, the judges pointed out that its conceptual definition was overdue with that of Ineffective cough, suggesting the incorporation of information from both. The main items for the assessment of this indicator are related to individuals' ability to eliminate secretions or foreign bodies present in the airway through cough. Therefore, given the similarities between the two indicators, the judges suggested that only Ineffective cough remained in the final list.

Another suggested change corresponds to the change in the title of Excessive mucus to Excessive sputum. Although the indicator was considered relevant, the judges suggested this change, because they believed that the accumulation of secretion would be more representative of this diagnosis than only excessive production. The literature explains that, physiologically, the organism produces a small daily amount of mucus.[32] However, in situations of diseases, the amount of goblet cells can increase, and the glands may suffer hypertrophy, causing increased secretion and higher viscosity of mucus. Thus, airway obstruction may occur if the individual cannot eliminate such secretions.[33] This fact was observed in another study, and this indicator was associated with a higher probability of IAC identification in children with acute respiratory infection.[3]

In addition to these modifications, it is important to highlight that, although the Bradypnea indicator is relevant for IAC, it should be analyzed with caution in future studies, because the p-value obtained was very close to the cut-off point established for excluding indicators from the final list. Although there are studies that evidence the relationship between altered respiratory rate and IAC, there are still few studies involving tachypnea and bradypnea specifically.[4,18,34]

According to judges' analysis, only the indicators Increased breath sounds and Subcostal retraction were not considered relevant for IAC. The latter was not considered relevant for the inference of this diagnosis, as it concerns only a progression of the obstructive respiratory condition.

With regard to the Increased breath sounds indicator, impairment in respiratory permeability may produce an increase in the volume of vesicular murmurs. This can be explained by the pulmonary parenchyma consolidation, which interferes with permeability, preventing air flow from reaching the alveolar space due to the accumulation of bacteria, solid cellular remains, liquids and red blood cell, which replace alveolar air. Thus, when the inspired air reaches the alveoli, it reaches a solid lung tissue that conducts sound more effectively to the surface, producing louder respiratory noises.[20,26]

Also, considering the presence of secretion in the large airways, the vibration caused by air passage can produce snoring, which consists of a type of adventitious noise, whose characteristic is a serious sound and that can be auscultated both in inspiration and expiration.[20,21]

In this context, studies on the pediatric population with asthma and/or acute respiratory infection also included Increased breath sounds during the study. However, the results obtained did not show a statistically significant relationship between the indicator and the manifestation of IAC, which corroborates the judges' recommendations in this study.[4,18]

Understanding the conceptual and operational aspects of clinical indicators of IAC makes it possible to identify them more clearly in the face of manifestations of individuals with respiratory impairment. In particular, the operational definitions of each element provide instrumental support to nurses, allowing a targeted assessment for an effective identification of diagnosis.

Therefore, the early identification of IAC indicators favors the choice of quick and precise nursing interventions, such as oxygen therapy, airway aspiration, ventilatory assistance, positioning and monitoring of vital signs, among others suggested by the Nursing Interventions Classification (NIC).[35] It is also essential that the interventions are in harmony with that evidenced by clinical indicators, because financial and organizational aspects need to be considered in the current scenario, in which there is a scarcity of resources to suppress the needs of those who are seriously ill.

Conclusion

The most relevant indicators for IAC, which serve as a warning for early identification by nurses, were Dyspnea, Alteration in respiratory rate, Adventitious respiratory noises, Tachypnea, Excessive sputum, Ineffective cough, Decreased breathing sounds, Orthopnea, Cyanosis, Restlessness, Difficulty verbalizing and Use of accessory muscles to breathe. Among them are Dyspnea, Alteration in respiratory rate and Adventitious respiratory noises, for presenting unanimous consensus among judges about its relevance to the manifestation of IAC. The results of this study should be submitted to a committee for development and Nursing Diagnosis studies of the NANDA-I taxonomy, since IAC is subject to be removed from the next versions due to lack of scientific evidence that improves its Level of Evidence within the classification. The diagnosis IAC can be identified in contexts of clinical severity among children with asthma, patients in cardiac postoperative period and individuals with Covid-19, which emphasizes its importance within nursing practice.

Acknowledgments

The present work was carried out with the support of Maranhão Scientific Research and Development Support Foundation (FAPEMA - *Fundação de Amparo à Pesquisa e Desenvolvimento Científico do Maranhão*).

Collaborations

Pascoal LM, Lopes MVO, Diniz CM, Nunes MM, Silva VM, Guedes NG, Menezes AP and Santos Neto M collaborated with study conception, data analysis and interpretation, article writing, critical review of relevant intellectual content and approval of the final version to be published.

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