

ORIGINAL PAPER

VALIDATION OF NANDA INTERNATIONAL DIAGNOSES AT AN INTENSIVE CARE UNIT

Dagmar Šerková¹, Jana Marečková²¹Department of Nursing and Midwifery, Faculty of Medicine, University of Ostrava, Czech Republic (student)²Department of Anthropology and Health Education, Faculty of Education, Palacký University Olomouc, Czech Republic

Received January 28, 2019; Accepted May 26, 2019. Copyright: This is an open access article distributed under the terms of the Creative Commons Attribution International License (CC BY). <http://creativecommons.org/licenses/by/4.0/>

Abstract

Aim: The aim of the study was to conduct content validation of selected NANDA International diagnoses for an Interdisciplinary Intensive Care Unit (IICU), and to identify the degree of diagnostic significance of their selected defining characteristics and relevant or risk factors. **Design:** Descriptive study. **Methods:** The set of NANDA International diagnoses and selected characteristics for validation was compiled using the following methods: 1) Content analysis of a form for planning nursing care at the IICU, Nový Jičín Hospital; 2) Literature search and selection of diagnoses from the studies found; and 3) Consensus between two experts. Subsequently, 32 nursing diagnoses with 100 defining characteristics, 72 related factors and 73 risk factors were included in the study (i.e., a total of 245 characteristic signs). The sample of clinical experts conducting the validation consisted of 17 general nurses from the participating department. Fehring's Diagnostic Content Validation (DCV) tool was used. **Results:** Total DCV score > 0.6 was identified in 16 nursing diagnoses, while values below 0.6 were calculated for the same number of validated diagnoses. The number of major characteristics of diagnoses (DCV \geq 0.80) was 28. The number of minor characteristics (DCV 0.79 – 0.51) was 176, while 41 nursing characteristics of nursing diagnoses were considered diagnostically insignificant (DCV < 0.5). **Conclusion:** On the basis of the validation study results, 16 nursing NANDA International diagnoses with 102 valid diagnostic characteristics were recommended for nursing diagnostics in lucid adult patients at the IICU, Nový Jičín Hospital.

Keywords: adult patient, content validation, DCV model, intensive care, NANDA International, nursing diagnosis.

Introduction

The verification of selected components of the comprehensive classification of NANDA International nursing diagnostics before they are implemented in practice in a particular workplace is one of the fundamental principles of how this diagnostic system should be used. This is due to the fact that patients, whose deviations from functionality are described in nursing diagnostics, are influenced by their specific condition, type of healthcare, age, and many other factors. The aim of the study was to create a set of valid diagnoses with NANDA International characteristics for lucid adult patients at the Interdisciplinary Intensive Care Unit (IICU), Nový Jičín Hospital. The validity of nursing diagnoses and their characteristics has been the subject of many Czech and international studies. Since 2000, dozens of validation studies have been published in periodicals such as the *Central European Journal of Nursing and Midwifery*, the *International Journal of Nursing*

Knowledge, the *International Journal of Nursing Terminologies and Classifications*, the *Journal of Advanced Nursing*, and *Kontakt*. Collectives of authors in Brazil, the Czech Republic, Ireland, Japan, Portugal, Slovakia, Spain, and the U.S. have carried out research with the aim of verifying the validity of nursing diagnoses. Validation of NANDA International nursing diagnoses has been conducted in the context of various departments and is detailed by authors of 76 studies (the search was carried out in seven databases for 1/2000–6/2018). It has been conducted in standard, intensive, long-term, outpatient care in midwifery and neonatology departments. The most frequently used validation tools are the two Fehring models: the Diagnostic Content Validity (DCV) model, and the Clinical Diagnostic Validity (CDV) model (Fehring, 1987). The following six expert teams have researched suitable nursing diagnoses for adult ICU patients: Lucena and de Barros (2006), de Carvalho et al. (2008), Salgado and Chianca (2011), Castellan et al. (2016), Ferreira et al. (2016) and Cabral et al. (2017).

Corresponding author: Dagmar Šerková, Department of Nursing and Midwifery, Faculty of Medicine, University of Ostrava, Syllabova 19, Ostrava, Czech Republic; email: dasa.serkova@volny.cz

Aim

The objective of the study was to conduct an extensive content validation of selected NANDA International diagnoses for lucid adult inpatients at the IICU, Nový Jičín Hospital, including definition of the degree of diagnostic significance of the selected sample of defining characteristics (hereinafter “DC”), related factors (hereinafter “RF”), and risk factors (hereinafter “RiF”).

Methods

Design

Descriptive study.

Sample

Since the objective of the study was to verify the validity of selected NANDA International diagnostic components for the needs of a particular nursing team, the criteria for selecting experts in the Czech and Slovak Republics (Zeleníková et al., 2010) were slightly loosened. Both fundamental criteria, i.e., a) education in nursing, and b) defined minimum of clinical experience were substantiated for all 17 participating assessors. Twelve nurses were graduates of secondary medical school/vocational medical college, five nurses had a Bachelor’s degree, none had a Master’s degree. All assessors met the criterion of at least one year of clinical work experience at the relevant department (i.e., an adult intensive care unit). Ten nurses had more than 10 years of experience, six nurses 5–10 years, and one assessor had 1–5 years. The first of the secondary criteria: specialization in anaesthesiology and intensive care (relevant to the validation study), was met by eight assessors. A further two secondary criteria: a) diploma thesis, PhD thesis, or dissertation related to nursing diagnostics; and b) an article published in an expert periodical, were not met by any of the assessors. Marking of the experts ranged between 3 and 7 points (7 pts – one

nurse; 6 pts – six nurses; 5 pts – one nurse; 4 pts – six nurses and 3 pts – three nurses).

Data collection

Data were collected using a protocol prepared in accordance with DCV model methodology (Fehring, 1987), the concept of which is shown in Table 1. Before data collection, all assessors received instruction on the correct way to complete the form, and were made aware of the importance of completing the form responsibly. Data collection was conducted with the consent of the management of the department, from 1 December to 21 December, 2017.

Set of diagnoses for validation

We applied the following methods for the creation of the set of NANDA International nursing diagnoses for validation: 1) Content analysis of a form for planning nursing care at the participating department; 2) Literature search; 3) File creation of nursing diagnoses for validation (selection from studies on nursing diagnoses occurring in adult intensive care); and 4) Consensus between two experts.

1) Content Analysis of the IICU Form for Nursing Care Planning

The authors of the study performed an independent assessment of the following three phenomena: 1) Name of the nursing problem (17 results, four in accordance with NANDA International); 2) Characteristics of nursing diagnoses (27 results, two in accordance with NANDA International); and 3) International numeric code (no result for any nursing diagnoses). The accord of the names of nursing diagnoses with the formulation of characteristics was considered in the context of the NANDA International 2015–2017 classification (Herdman, Kamitsuru, 2014). All authors used these outputs when proposing the set of diagnoses to be validated (see Table 2).

Table 1 Protocol for data collection – part

CONSTIPATION 00011					
<i>DC¹ – selected defining characteristics for the IICU²</i>	marking diagnostic significance for the IICU				
	<i>lowest</i>				<i>highest</i>
abdominal pain	1	2	3	4	5
decrease in stool frequency	1	2	3	4	5
distended abdomen	1	2	3	4	5
vomiting	1	2	3	4	5
<i>RF³ – selected related factors for the IICU</i>	marking diagnostic significance for the IICU				
	<i>lowest</i>				<i>highest</i>
postsurgical bowel obstruction	1	2	3	4	5
decrease in gastrointestinal motility	1	2	3	4	5
pharmaceutical agent	1	2	3	4	5

¹DC – defining characteristics; ²IICU – Interdisciplinary intensive care unit; ³RF – related factors

2) Literature Search and Selection of Diagnoses from the Studies

In order to obtain up-to-date information, two structured searches were conducted in MEDLINE databases (PubMed), CINAHL Plus with Full Text, and Wiley Online Library, and in OpenGrey, a multidisciplinary European database of grey literature. The authors also used the following online search engines: MedNar, Google Scholar, and Bibliographia medica Českoslovacca – BMČ (MEDVIK interface). The first search was intended to find studies mentioning the occurrence of NANDA International diagnoses at intensive care units. The scoping question (Klugarová et al., 2015) was formulated following P-Co-Co format with the following wording: “Which nursing diagnoses occur in adult patients at intensive care units?” The primary passwords for P (Participant) were: adult patient (dospělý pacient); for Co (Concept): nursing diagnoses (ošetřovatelská diagnóza); and for Co (Context): intensive care unit (jednotka intenzivní péče). Primary passwords were extended by adding analogical terms and synonyms such as: P – adult, grown, mature (dospělý, zletilý, vyspělý); Co – nursing diagnos*, nursing process, nursing assessment (ošetřovatelská/é diagnóza/y, ošetřovatelský proces, ošetřovatelské posouzení); and Co – ICU, emergency, critical care, intensive care (JIP, intenzivní péče). The following limitations were applied: title, abstract, and English and Czech for the publication period 1/2000–8/2017. A total of 655 abstracts were found. After eliminating duplicate finds and irrelevant texts, we were left with six unabridged relevant studies.

The second search focused on obtaining validation studies conducted at intensive care units for adults. The following scoping question was formulated: “Which studies present validation of nursing diagnoses in the context of adult intensive care?”: P – nursing diagnosis (ošetřovatelská diagnóza); Co – validation (validace); Co – adult intensive care (intenzivní péče u dospělých); limited to English and Czech for the publication period of 1/2000–12/2018. A total of 46 abstracts were found. After eliminating duplicate finds and irrelevant texts, only one study with NANDA International diagnoses validation for adult ICU patients remained (Bocková, Marečková, Zapletalová, 2015).

3) Selection of nursing diagnoses from the studies

After examining the research articles found we prepared a set of 78 nursing diagnoses, 19 with occurrence frequency in adult patients exceeding 50%. Table 2 shows the set with the names of the nursing diagnoses and their codes.

4) Consensual agreement

The outputs of the content analysis of ICU documentation and proposal of diagnoses (see Table 2) were applied in the second validation study. The final set of 32 nursing diagnoses (Table 3) with their selected characteristics was compiled by consensual agreement between the authors of this study.

Data analysis

Data were processed using the Diagnostic Content Validation (DCV) model published in Heart and Lung (Fehring, 1987). In accordance with the DCV method, the 245 characteristics indicated by the experts were given the following weighting on the Likert scale: 5 = 1; 4 = 0.75; 3 = 0.5; 2 = 0.25; and 1 = 0. For each characteristic (DC = defining characteristics, RF = related factors, RiF = risk factors) a weighted average was calculated, i.e., DCV score for the characteristic. Result interpretation: the major characteristics of nursing diagnoses are, according to Fehring, those whose DCV score is ≥ 0.8 ; DCV characteristics for minor values are 0.79 – 0.51; and for insignificant characteristics $DCV \leq 0.50$.

The value for total DCV score for each diagnosis was calculated, in accordance with Fehring (1987), by adding together DCV scores of characteristics with values > 0.5 (characteristics with lower DCV were excluded), and dividing the sum by the number of validated characteristics. The validity of a diagnosis as a whole was interpreted in accordance with Fehring (1986); thus, nursing diagnoses with total DCV score < 0.60 were excluded from the diagnostic set for the ICU. Statistic processing of the data was conducted using descriptive statistics (frequency tables, arithmetic average, standard deviation) in Stata v. 13.

Results

The following section features an overview of significant results (comprehensive extensive data is shown in Tables 4 and 5). The total DCV scores for validated nursing diagnoses ranged between 0.30 and 0.76, with the highest values for Acute confusion 00128 (0.76) and Constipation 00011 (0.76). The lowest DCV total was for Anxiety 00146 (0.30). Values of total DCV score ≥ 0.60 (on which basis the diagnostic validity is determined) were documented for 16 nursing diagnoses, meaning they are valid for nursing diagnostics at the ICU. They include the following eight “current diagnoses” which are used as names of nursing problems in individuals with dysfunctional health patterns (Gordon, 1987). For Constipation 00011, assessors indicated decrease in stool frequency as a major DC (DCV score of 0.85); minor diagnostic significance was expressed for DC:

Table 2 Provisional proposal of diagnoses for validation study 1

code	diagnosis	code	diagnosis	code	diagnosis
00004	Risk for infection ^{1,2}	00039	Risk for aspiration ²	00134	Nausea ^{1,2}
00005	Risk for imbalanced body temperature ^{1,2}	00046	Impaired skin integrity ^{1,2}	00155	Risk for falls ^{1,2}
00011	Constipation ^{1,2}	00085	Impaired physical mobility ^{1,2}	00173	Risk for acute confusion ^{1,2}
00013	Diarrhea ^{1,2}	00091	Impaired bed mobility ²	00196	Dysfunctional GIT motility ^{1,2,3}
00014	Bowel incontinence ²	00102	Feeding self-care deficit ^{1,2}	00198	Disturbed sleep pattern ^{1,2}
00015	Risk for constipation ²	00103	Impaired swallowing ^{1,2}	00201	Risk for ineffective cerebral tissue perfusion ¹
00020	Functional urinary incontinence ^{1,2}	00108	Bathing self-care deficit ^{1,2}	00206	Risk for bleeding ²
00023	Urinary retention ²	00109	Dressing self-care deficit ^{1,2}	00213	Risk for vascular trauma ^{1,2}
00029	Decreased cardiac output ²	00110	Toileting self-care deficit ^{1,2}	00240	Risk for decreased cardiac output ^{1,2}
00030	Impaired gas exchange ^{1,2}	00125	Powerlessness ¹	00249	Risk for pressure ulcer ²
00032	Ineffective breathing pattern ^{1,2}	00128	Acute confusion ^{1,2}	00254	Risk for perioperative hypothermia ²
00033	Impaired spontaneous ventilation ²	00132	Acute pain ^{1,2}		
Search outputs and Provisional proposal of diagnoses for validation study 2					
00001	Imbalanced nutrition: more than body requirements	00043	Ineffective protection	00150	Risk for suicide
		00044	Impaired tissue integrity	00155	Risk for falls
		00045	Impaired oral mucous membrane	00173	Risk for acute confusion
00002	Imbalanced nutrition, less than body requirements	00046	Impaired skin integrity	00179	Risk for unstable blood glucose level
00004	Risk for infection	00047	Risk for impaired skin integrity	00195	Risk for electrolyte imbalance
00005	Risk for imbalanced body temperature	00049	Decreased intracranial adaptive capacity	00196	Dysfunctional GIT motility
00006	Hypothermia			00197	Risk for dysfunctional GIT motility
00007	Hyperthermia	00051	Impaired verbal communication	00198	Disturbed sleep pattern
00008	Ineffective thermoregulation	00052	Impaired social interaction	00200	Risk for decreased cardiac tissue perfusion
00011	Constipation			00201	Risk for ineffective cerebral tissue perfusion
00013	Diarrhea	00054	Risk for loneliness		
00015	Risk for constipation	00063	Dysfunctional family processes	00202	Risk for ineffective GIT perfusion
00016	Impaired urinary elimination	00085	Impaired physical mobility	00204	Ineffective peripheral tissue perfusion
00024	Ineffective cerebral tissue perfusion	00086	Risk for peripheral neurovascular dysfunction	00205	Risk for shock
00025	Risk for imbalanced fluid volume	00091	Impaired bed mobility	00206	Risk for bleeding
00026	Excess fluid volume	00093	Fatigue	00214	Impaired comfort
00027	Deficient fluid volume	00095	Insomnia	00219	Risk for dry eye
00028	Risk for deficient fluid volume	00103	Impaired swallowing	<i>incorrectly formulated diagnoses (by authors):</i>	
		00108	Bathing self-care deficit	Acute pain/Chronic pain	
00029	Decreased cardiac output	00110	Toileting self-care deficit	Acute confusion/Risk for falls	
00030	Impaired gas exchange	00123	Unilateral neglect	Ineffective breathing pattern/Ineffective airway clearance	
00031	Ineffective airway clearance	00128	Acute confusion	Impaired physical mobility /Impaired bed mobility	
		00129	Chronic confusion	Deficient/Excess fluid volume	
00032	Ineffective breathing pattern	00131	Impaired memory	Risk for spontaneous ventilation *	
00033	Impaired spontaneous ventilation	00132	Acute pain	Risk for changed respiratory function **	
		00133	Chronic pain		
00034	Dysfunctional ventilatory weaning response	00134	Nausea	Decreased cardiac tissue perfusion *	
		00136	Grieving	Risk for transmission of infection *	
00035	Risk for injury	00146	Anxiety		
00039	Risk for aspiration	00149	Risk for relocation stress syndrome		
00040	Risk for disuse syndrome				

¹first expert; ²second expert; ³GIT – gastrointestinal tract; *(de Carvalho et al., 2008); ***(Lucena, de Barros, 2006)

Table 3 Final set of nursing NANDA International diagnoses for validation study

code	diagnosis	code	diagnosis
00004	Risk for infection	00102	Feeding self-care deficit
00005	Risk for imbalanced body temperature	00103	Impaired swallowing
00007	Hyperthermia	00108	Bathing self-care deficit
00011	Constipation	00109	Dressing self-care deficit
00013	Diarrhea	00110	Toileting self-care deficit
00015	Risk for constipation	00128	Acute confusion
00026	Excess fluid volume	00132	Acute pain
00027	Deficient fluid volume	00134	Nausea
00030	Impaired gas exchange	00146	Anxiety
00031	Ineffective airway clearance	00155	Risk for falls
00032	Ineffective breathing pattern	00173	Risk acute confusion
00039	Risk for aspiration	00198	Disturbed sleep pattern
00040	Risk for disuse syndrome	00206	Risk for bleeding
00085	Impaired physical mobility	00240	Risk for decreased cardiac output
00086	Risk for peripheral neurovascular dysfunction	00249	Risk for pressure ulcer
00091	Impaired bed mobility	00254	Risk for perioperative hypothermia

abdominal pain (0.66), distended abdomen (0.76), and vomiting (0.76). A major RF was postsurgical bowel obstruction (0.84); minor RFs were: decrease in gastrointestinal motility (0.72), and pharmaceutical agent (0.69); none of the validated characteristics of this diagnosis was assessed as insignificant. The major DC of Diarrhea 00013 was loose liquid stool > 3×24 hours (0.84); minor DCs were: abdominal pain (0.66), cramps (0.65), and bowel urgency (0.56). No characteristic was assessed as a major RF; minor RFs included: infection (0.74), enteral feedings (0.78), and treatment (0.76); none was marked as insignificant. For Impaired gas exchange 00030, no validated DCs were marked as major; minor DCs included: abnormal arterial blood gases (0.78), abnormal breathing pattern (0.66), abnormal skin colour (0.75), cyanosis (0.69), somnolence (0.68), and dyspnoea (0.74). Major RFs included: alveolar-capillary membrane changes (0.82), and ventilation-perfusion imbalance (0.90); with no minor or insignificant RFs. The major DCs in Deficient fluid volume 00027 were: decrease in blood pressure (0.85), and decrease in urine output (0.82); minor DCs were: decrease in venous filling (0.54), dry skin (0.53), tachycardia (0.78), and dry mucous membranes (0.63). No major RF was classified; minor RFs were: compromised regulatory mechanisms (0.44). Acute confusion 00128 was represented by the following major DCs: restlessness (0.82), agitation (0.88), and alteration in level of consciousness (0.85); minor DCs were: alteration in psychomotor functioning (0.68), and hallucination (0.72). Major RFs were: delirium (0.88), and dementia (0.85); minor RFs were: age ≥ 60 let (0.59), and alteration in sleep-wake cycle (0.56); no characteristic was marked as diagnostically insignificant. In Dressing self-care deficit 00109, no DC was marked as major; minor DCs included: musculoskeletal impairment (0.74),

neuromuscular impairment (0.69), environmental barrier (0.51), and pain (0.71). No RF was classified as major; minor RFs included: alteration in cognitive functioning (0.56), and weakness (0.57); with no diagnostically insignificant characteristics for the diagnosis. There were no major DCs for Hyperthermia 00007; minor DCs were: skin warm to touch (0.63), flushed skin (0.54), and vasodilatation (0.60). The RF set included no major characteristics; minor RFs were: dehydration (0.65), sepsis (0.78), and trauma (0.75); all the observed diagnoses characteristics were considered diagnostically secondary to various degrees. No major DC was identified for Ineffective airway clearance 00031; minor DCs were: alteration in respiratory rate (0.78), cyanosis (0.79), dyspnoea (0.74), excessive sputum (0.65) and restlessness (0.57); absence of cough (0.44) was assessed as diagnostically insignificant. A major RF was infection (0.81); minor RFs included: chronic obstructive pneumonia disease – COPD (0.71), exudate in the alveoli (0.57), neuromuscular impairment (0.68), and asthma (0.57).

Potential nursing diagnoses, commonly used for designating potentially dysfunctional needs (Gordon, 1987) also included eight NANDA International diagnoses. Risk for constipation 00015 had major RiFs: postsurgical bowel obstruction (0.84), and decrease in gastrointestinal motility (0.81); minor RiFs were: dehydration (0.63), tumour (0.65), and pharmaceutical agents (0.72); recent environmental change (0.46) was assessed as diagnostically insignificant. There were no major RiFs for Risk for peripheral neurovascular dysfunction 00086; minor RiFs were: mechanical compression (0.74), orthopaedic surgery (0.62), trauma (0.65), and vascular obstruction (0.54); experts marked none of the observed RiFs as diagnostically insignificant.

Table 4 Validation results – total DCV over 0.6 – included in the set for diagnostics in the ICU

INEFFECTIVE AIRWAY CLEARANCE 00031 total DCV ¹ score: 0.63			IMPAIRED GAS EXCHANGE 00030 total DCV score: 0.75			RISK FOR PRESSURE ULCER 00249 total DCV score: 0.68		
<i>DCs</i>	<i>DCV</i>	<i>SD</i>	<i>DCs</i> ²	<i>DCV</i>	<i>SD</i> ³	<i>RiF</i> ⁴	<i>DCV</i>	<i>SD</i>
alteration in respiratory rate	0.78	0.17	abnormal arterial blood gases	0.78	0.25	Norton score ≤ 25 p	0.65	0.23
absence of cough	0.44	0.21	abnormal skin colour	0.75	0.28	decrease mobility	0.72	0.21
cyanosis	0.79	0.22	abnormal breathing pattern	0.66	0.26	decrease in tissue oxygenation	0.62	0.20
dyspnoea	0.74	0.21	cyanosis	0.69	0.29	dry skin	0.53	0.21
excessive sputum	0.65	0.20	somnolence	0.68	0.28	extremes of age	0.65	0.25
restlessness	0.57	0.21	dyspnoea	0.74	0.29	extremes of weight	0.69	0.27
RF ⁵	DCV	SD	RF	DCV	SD	hip fracture	0.63	0.24
COPD ⁶	0.71	0.31	alveolar-capillary membrane changes	0.82	0.26	history of pressure ulcer	0.81	0.23
exudate in the alveoli	0.57	0.29	ventilation-perfusion imbalance	0.90	0.18	shearing forces	0.85	0.18
infection	0.81	0.19				inadequate nutrition	0.56	0.14
neuromuscular impairment	0.68	0.26				pharmaceutical agents	0.71	0.16
asthma	0.57	0.23				physical immobilization	0.72	0.23
HYPERTHERMIA 00007			DIARRHOEA 00013			RISK FOR CONSTIPATION 00015		
total DCV score: 0.66			total DCV score: 0.71			total DCV score: 0.73		
DCs	DCV	SD	DCs	DCV	SD	RiF	DCV	SD
skin warm to touch	0.63	0.20	abdominal pain	0.66	0.25	postsurgical bowel obstruction	0.84	0.20
flushed skin	0.54	0.28	cramping	0.65	0.20	dehydration	0.63	0.27
vasodilatation	0.60	0.23	loose liquid stools>3 in 24 hours	0.84	0.22	recent environmental change	0.46	0.18
RF	DCV	SD	RF	DCV	SD	tumor	0.65	0.22
dehydration	0.65	0.23	infection	0.74	0.26	pharmaceutical agent	0.72	0.23
sepsis	0.78	0.20	enteral feedings	0.78	0.20	decreased in gastrointestinal motility	0.81	0.21
trauma	0.75	0.20	treatment regimen	0.76	0.27			
RISK FOR ASPIRATION 00039			DEFICIENT FLUID VOLUME 00027, total DCV score: 0.69			DRESSING SELF-CARE DEFICIT 00109, total DCV score: 0.63		
total DCV score: 0.73			total DCV score: 0.69			total DCV score: 0.63		
RiF	DCV	SD	DCs	DCV	SD	DCs	DCV	SD
decrease in GIT motility	0.71	0.27	decrease in blood pressure	0.85	0.15	musculoskeletal impairment	0.74	0.24
decrease in level of consciousness	0.82	0.21	decreased in venous filing	0.54	0.22	neuromuscular impairment	0.69	0.24
enteral feedings	0.78	0.17	dry skin	0.53	0.28	environmental barrier	0.51	0.26
presence oral/nasal tube	0.69	0.21	decrease in urine output	0.82	0.17	pain	0.57	0.20
increase in gastric residual	0.63	0.20	dry mucous membranes	0.63	0.28	RF	DCV	SD
ACUTE CONFUSION 00128,			RF	DCV	SD	alteration in cognitive functioning	0.56	0.19
total DCV score: 0.76			active fluid volume loss	0.68	0.21	weakness	0.57	0.21
DCs	DCV	SD	compromised regulatory mechanism	0.44	0.23			
restlessness	0.82	0.21				RISK FOR INFECTION 00004		
agitation	0.88	0.18				total DCV score: 0.67		
alteration in level of consciousness	0.85	0.20	CONSTIPATION 00011,			RiF	DCV	SD
alteration in psychomotor functioning	0.68	0.28	total DCV score: 0.76			exposure to disease outbreak	0.68	0.25
hallucination	0.72	0.23	DCs	DCV	SD	invasive procedure	0.90	0.15
RF	DCV	SD	abdominal pain	0.66	0.23	immunosuppression	0.54	0.25
age ≥ 60 years	0.59	0.22	decreased in stool frequency	0.85	0.22	leukopenia	0.56	0.21
alteration in sleep-wake cycle	0.56	0.27	distended abdomen	0.76	0.22	RISK FOR BLEEDING 00206		
delirium	0.88	0.20	vomiting	0.78	0.28	total DCV score: 0.68		
dementia	0.85	0.22	RF	DCV	SD	RiF	DCV	SD
RISK FOR PERIPHERAL NEUROVASCULAR DYSFUNCTION 00086			postsurgical bowel obstruction	0.84	0.22	gastrointestinal condition	0.69	0.26
total DCV score: 0.64			decreased in gastrointestinal motility	0.72	0.28	history of falls	0.59	0.15
RiF	DCV	SD	pharmaceutical agent	0.69	0.26	treatment regimen	0.75	0.20
mechanical compression	0.74	0.26	RISK FOR DECREASED CARDIAC OUTPUT 00240			aneurysm	0.63	0.29
orthopaedic surgery	0.62	0.24	total DCV score: 0.73			impaired liver function	0.60	0.32
trauma	0.65	0.23	RiF	DCV	SD	trauma	0.78	0.20
vascular obstruction	0.54	0.25	altered stroke volume	0.63	0.25	RISK FOR DISUSE SYNDROME 00040 total DCV score: 0.68		
			alteration in heart rate	0.79	0.18	RiF	DCV	SD
			alteration in heart rhythm	0.76	0.19	prescribed immobility	0.71	0.20
						pain	0.71	0.24
						mechanical immobility	0.62	0.24

¹DCV – Diagnostic Content Validation; ²DCs – defining characteristics; ³SD – standard deviation; ⁴RiF – risk factor; ⁵RF – related factor; ⁶COPD – Chronic Obstructive Pulmonary Disease

Table 5 Validation results – total DCV below 0.6 – excluded from the set for diagnostics in the ICU (first part)

IMPAIRED SWALLOWING 00103 total DCV ¹ score: 0.41			FEEDING SELF-CARE DEFICIT 00102, total DCV score: 0.51			ANXIETY 00146 total DCV score: 0.30		
<i>DCs</i> ²	<i>DCV</i>	<i>SD</i> ³	<i>DCs</i>	<i>DCV</i>	<i>SD</i>	<i>DCs</i>	<i>DCV</i>	<i>SD</i>
gagging prior to swallowing	0.38	0.20	impaired ability to bring food to the mouth	0.79	0.20	fidgeting	0.35	0.23
difficulty swallowing	0.71	0.22	impaired ability to open containers	0.47	0.23	insomnia	0.57	0.25
epigastric pain	0.46	0.27	impaired ability to prepare food	0.54	0.18	restlessness	0.65	0.25
vomiting	0.94	0.11	RF ⁴	DCV	SD	irritability	0.56	0.24
food refusal	0.62	0.25	alteration in cognitive functioning	0.56	0.21	fear	0.47	0.21
heartburn	0.34	0.26	fatigue	0.47	0.15	worried	0.47	0.17
alteration in head position	0.28	0.20	musculoskeletal impairment	0.78	0.17	hand tremor	0.46	0.20
RF	DCV	SD	neuromuscular impairment	0.74	0.21	increase in perspiration	0.51	0.21
mechanical obstruction	0.82	0.23	pain	0.69	0.19	voice quivering	0.35	0.18
laryngeal abnormality	0.43	0.29	ACUTE PAIN 00132, total DCV score: 0.54			nausea	0.49	0.19
brain injury	0.79	0.20	<i>DCs</i>	<i>DCV</i>	<i>SD</i>	diarrhoea	0.49	0.19
trauma	0.60	0.28	appetite change	0.49	0.19	exchange in physiological function	0.57	0.25
EXCESS FLUID VOLUME 00026 total DCV score: 0.36			change in physiological parameter	0.81	0.17	RF	DCV	SD
<i>DCs</i>	<i>DCV</i>	<i>SD</i>	self-report of intensity using standard. pain scale	0.85	0.18	exposure to toxin	0.76	0.27
adventitious breathsounds	0.35	0.23	positioning to ease pain	0.63	0.28	major change	0.47	0.25
alteration in respiratory pattern	0.60	0.22	hopelessness	0.32	0.25	stressors	0.53	0.21
jugular vein distension	0.47	0.20	facial expression of pain	0.62	0.28	threat to current status	0.59	0.25
oedema	0.84	0.23	RF	DCV	SD	INEFFECTIVE BREATHING PATTERN 00032 total DCV score: 0.54		
anasarca	0.60	0.33	physical injury agent	0.85	0.20	<i>DCs</i>	<i>DCV</i>	<i>SD</i>
azotaemia	0.35	0.22	TOILETING SELF-CARE DEFICIT 00110. total DCV score: 0.48			abnormal breathing	0.75	0.22
dyspnoea	0.49	0.19	<i>DCs</i>	<i>DCV</i>	<i>SD</i>	pattern	0.75	0.22
increase in CVP ⁵	0.75	0.15	it does not come to the toilet	0.74	0.21	dyspnoea	0.75	0.22
paroxysmal nocturnal dyspnoea	0.49	0.22	impaired ability to reach toilet	0.57	0.28	decrease in vital capacity	0.59	0.25
intake exceeds output	0.79	0.20	impaired ability to flush toilet	0.43	0.30	prolonged expiration phase	0.53	0.20
RF	DCV	SD	RF	DCV	SD	use of accessory muscles to breathe	0.50	0.23
compromised regulatory mechanism	0.38	0.24	decrease in motivation	0.41	0.23	RF	DCV	SD
excessive fluid intake	0.74	0.24	alteration in cognitive functioning	0.57	0.23	musculoskeletal impairment	0.75	0.22
IMPAIRED BED MOBILITY 00091 total DCV score: 0.57			impaired mobility	0.75	0.20	neurological impairment	0.72	0.21
<i>DCs</i>	<i>DCV</i>	<i>SD</i>	pain	0.71	0.20	pain	0.72	0.17
impaired ability to move between sitting and supine positions	0.63	0.27	RISK FOR ACUTE CONFUSION 00173, total DCV score: 0.54			obesity	0.59	0.22
impaired ability to run from side to side	0.65	0.23	<i>RiF</i> ⁶	<i>DCV</i>	<i>SD</i>	hypventilation syndrome	0.47	0.23
RF	DCV	SD	age ≥ 60 years	0.65	0.25	RISK FOR FALLS 00155 total DCV score: 0.59		
physical deconditioning	0.43	0.19	alteration in cognitive functioning	0.57	0.21	<i>RiF</i> ⁶	<i>DCV</i>	<i>SD</i>
environmental barrier	0.68	0.25	alteration in sleep-wake cycle	0.51	0.22	age ≥ 65 years	0.69	0.19
musculoskeletal impaired	0.62	0.25	dementia	0.72	0.21	history of falls	0.74	0.29
neuromuscular impaired	0.60	0.23	impaired mobility	0.46	0.18	use of assistive device	0.69	0.19
obesity	0.57	0.28	infection	0.66	0.22	unfamiliar setting	0.51	0.22
pain	0.82	0.17	pain	0.60	0.20	use of restraints	0.65	0.24
RISK FOR PERIOPERATIVE HYPOTHERMIA 00254 total DCV score: 0.38			sensory deprivation	0.63	0.23	pharmaceutical agent	0.76	0.19
<i>RiF</i>	<i>DCV</i>	<i>SD</i>	substance abuse	0.65	0.27	acute illness	0.59	0.20
combined regional and general anaesthesia	0.62	0.25				anaemia	0.47	0.21
ASA ⁷ score > 1	0.47	0.26				impaired mobility	0.66	0.26
low body weight	0.53	0.26				postoperative recovery period	0.72	0.20
diabetic neuropathy	0.50	0.22				visual impairment	0.53	0.20
surgical procedure	0.75	0.22						

¹DCV – Diagnostic Content Validation; ²DCs – defining characteristics; ³SD – standard deviation; ⁴RF – related factor; ⁵CVP – central venous pressure; ⁶RiF – risk factor; ⁷ASA – American Society of Anaesthesiologists

Table 5 Validation results – total DCV below 0.6 – excluded from the set for diagnostics in the ICU (second part)

DISTURBED SLEEP PATTERN 00198, total DCV¹ score: 0.51			NAUSEA 00134 total DCV score: 0.52			BATHING SELF-CARE DEFICIT 00108, total DCV score: 0.58		
	<i>DCV</i>	<i>SD</i> ³	<i>DCs</i>	<i>DCV</i>	<i>SD</i>	<i>DCs</i>	<i>DCV</i>	<i>SD</i>
alteration in sleep pattern	0.54	0.35	gagging sensation	0.88	0.16	impaired ability to dry	0.71	0.27
unintentional awakening	0.59	0.34	aversion toward food	0.54	0.27	body		
feeling unrested	0.43	0.32	increase in salivation	0.49	0.27	impaired ability to	0.62	0.22
RF ⁴	DCV	SD	increase in swallowing	0.47	0.17	access bathroom		
disruption caused by	0.59	0.32	RF	DCV	SD	RF	DCV	SD
sleep pattern			gastric distention	0.60	0.28	musculoskeletal	0.76	0.24
environmental barrier	0.71	0.30	pancreatic disease	0.62	0.25	impairment		
immobilization	0.59	0.22	treatment regimen	0.85	0.18	pain	0.75	0.20
insufficient privacy	0.54	0.24	exposure to toxin	0.62	0.25	weakness	0.65	0.20
IMPAIRED PHYSICAL MOBILITY 00085, total DCV score: 0.57			RISK FOR IMBALANCED BODY TEMPERATURE 00005 total DCV score: 0.59			environmental barrier	0.40	0.15
DCs	DCV	SD	RiF	DCV	SD			
decrease in range of	0.66	0.22	acute brain injury	0.74	0.30			
motion			insufficient supply of	0.37	0.20			
alteration in gait	0.47	0.21	subcutaneous fat					
difficulty turning	0.57	0.26	dehydration					
exertional dyspnoea	0.59	0.28	dehydration	0.54	0.18			
RF	DCV	SD	sepsis	0.74	0.21			
malnutrition	0.54	0.16	extremes of age	0.54	0.22			
contractures	0.60	0.25						
pain	0.79	0.24						
pharmaceutical agent	0.68	0.25						
prescribed movement	0.69	0.21						
restriction								

¹DCV – Diagnostic Content Validation; ²DCs – defining characteristics; ³SD – standard deviation; ⁴RF – related factor

Risk for disuse syndrome 00040 was not supported by any major RiFs; minor RiFs included: prescribed immobility (0.71), pain (0.71), and mechanical immobility (0.62). For Risk for pressure ulcers 00249, the following major RiFs were specified: history of pressure ulcer (0.81), and shearing forces (0.85); minor RiFs included: Norton score ≤ 25 p (0.65), decreased mobility (0.72), decrease in tissue oxygenation (0.62), dry skin (0.53), extremes of age (0.65), extremes of weight (0.69), hip fracture (0.63), inadequate nutrition (0.56), pharmaceutical agents (0.71), and physical immobilization (0.72); no RiF was diagnostically insignificant. Risk for infection 00004 can be identified by the major RiF invasive procedure (0.90); and by minor RiFs: exposure to disease outbreak (0.68), immunosuppression (0.54), and leukopenia (0.56). For confirmation of Risk for decreased cardiac output 00240 no major RiF was specified; minor RiFs were: altered stroke volume (0.63), alteration in heart rate (0.79), and alteration in heart rhythm (0.76); none of the observed RiFs was insignificant. There were no major diagnostic characteristics for Risk for bleeding 00206; minor RiFs were: gastrointestinal condition (0.69), history of falls (0.59), treatment regimen (0.75), aneurysm (0.63), impaired liver function (0.60), and trauma (0.78). A major diagnostic characteristic for Risk for aspiration 00039 was decrease in level of consciousness (0.82); minor RiFs were: decrease in

gastrointestinal motility (0.71), enteral feedings (0.78), presence of oral/nasal tube (0.69), and increase in gastric residual (0.63); there were no diagnostically insignificant characteristics.

Total DCV scores with value < 0.60 (diagnostically insignificant) were calculated for 16 NANDA International diagnoses: Impaired swallowing 00103 (total DCV score 0.41), Excess fluid volume 00026 (0.36), Impaired bed mobility 00091 (0.57), Disturbed sleep pattern 00198 (0.51), Impaired physical mobility 00085 (0.57), Ineffective breathing pattern 00032 (0.54), Nausea 00134 (0.52), Bathing self-care deficit 00108 (0.58), Toileting self-care deficit 00110 (0.48), Feeding self-care deficit 000102 (0.51), Acute pain 00132 (0.54), Anxiety 00146 (0.30), Risk for perioperative hypothermia 00254 (0.38), Risk for acute confusion 00173 (0.54), Risk for falls 00155 (0.59) and Risk for imbalanced body temperature 00005 (0.51). Specific results are shown in Table 5.

Discussion

On the basis of the search strategy presented above, we found only one study presenting validation of NANDA International diagnoses in adult intensive care patients. Therefore, the first part of the discussion is based on its results. The study by Bocková, Marečková, Zapletalová (2015), focuses on verification of the diagnostic validity of Ineffective breathing pattern 00032, and was conducted in the

same type of department featured in our validation study. In addition, both studies apply identical procedures when processing and interpreting resulting values of DCV scores (see the methods above). In Bocková et al. (hereinafter Bocková) Ineffective breathing pattern 00032 with a total DCV of 0.63 remained in the set for nursing diagnostics, but this diagnosis was excluded in the IICU study due to its DCV of 0.54. The difference between total DCV values in the studies was only ± 0.09 . Interestingly, while all the assessors (nurses) in Bocková's study held a Bachelor's degree, only 29% of assessors in the IICU study did so. Nevertheless, the difference in values for total DCVs was insignificant.

We can see a similar phenomenon in results of characteristic validation of the defining characteristics (DC) and relevant factors (RF) for Ineffective breathing pattern 00032. The values for DCV of DCs in our study ranged between 0.50 and 0.75, with RFs between 0.47 and 0.72; while Bocková's values for DCV of DCs were between 0.32 and 0.84, with RFs between 0.35 and 0.78. We are of the opinion that Bocková's set indicates greater interindividual differences between assessors using the Likert scale, and a tendency to award a lower degree of diagnostic significance to the assessed components. In Bocková's study, the category of major diagnostic components included the DC of dyspnoea with DCV of 0.84; while experts in the IICU assessed this characteristic as minor, with a DCV of 0.75; however, the difference in DCV was a mere ± 0.09 (the minimal DCV value for the category of major diagnostic characteristics is 0.80). Other DCs for Ineffective breathing pattern 00032 (IICU) validated in our study were: decrease in vital capacity (IICU DCV 0.59; Bocková DCV 0.55) and prolonged expiration phase (IICU DCV 0.53; Bocková DCV 0.53) - results without significant differences. A more distinct difference can be seen between results for the DC: use of accessory muscles to breathe, with a DCV of 0.74 in Bocková; contrasting with a DCV of 0.50 in IICU. When comparing validation results of the RF for Ineffective breathing pattern 00032 in the two studies, we note that none of the observed RFs was included in the category of major diagnostic components. This finding may point to an underestimation of the importance of relevant factors in nursing diagnostics and should be investigated further. Minor RFs in the two studies were: pain (IICU DCV 0.72, Bocková DCV 0.71), musculoskeletal impairment (IICU DCV 0.75, Bocková DCV 0.60), obesity (IICU DCV 0.59, Bocková 0.57), and neurological impairment (IICU DCV 0.72, Bocková DCV 0.49), classified by Bocková as diagnostically insignificant. In Bocková's study, validation was performed by 52 experts from

intensive care units, and anaesthesiology and resuscitation departments from five Czech hospitals that met criteria defined by Zeleníková et al. (2010) within a range of 4–8 points, all of whom had a Bachelor's degree in nursing. By contrast, the IICU study involved only 29% bachelor degree holders, and the set of assessors scored 3–7 points according to Zeleníková. Nevertheless, the differences in values for total DCVs and a number of other results were insignificant. The possible impact that nurses' education, its content and quality have on the assessment of the significance of nursing diagnostic components is an area that deserves further study.

The second part of the discussion is a commentary based on the output of validations performed at other types of department besides intensive care units. Using the scoping question: "Which studies present validation of nursing diagnoses in adults?" we obtained, after limiting search results to English and Czech texts for the publication period of 1/2000–12/2018 and after eliminating duplicate and irrelevant texts, the following eight relevant studies with content validation of NANDA International diagnoses: Oliveira, Chianca, Rassool (2008), Zeleníková et al. (2011), Vaněčková, Sollár, Vörösová (2012), Zeleníková, Žiaková (2012), Vörösová et al. (2012), Zeleníková et al. (2014), Pompeo, Rossi, Paiva (2014) and Santos, Almeida and Lucena (2016). It is worth pointing out that all the authors come from one of three countries: Brazil, the Czech Republic and Slovakia. We would like to point out that the method of expert selection (see Fehring's criteria, 1994, versus Zeleníková's modified criteria, 2010), method of calculating total DCV and minimal DCV of DC, and DCV of RF values for the purpose of classifying them as major diagnostic characteristics partially differ (see the methods of Fehring, 1986 versus Fehring, 1987).

In our study, we performed diagnostic validation of 32 NANDA International diagnoses. The eight texts mentioned above describe validation of the following six: Anxiety 00146, Acute pain 00132, Deficient fluid volume 00027, Acute confusion 00128, Nausea 00134 and Risk for pressure ulcers 00249. With respect to the limited extent of the article, we shall only discuss three of them dealing with validation of diagnoses identified by IICU experts as valid: Deficient fluid volume 00027, Acute confusion 00128, and Risk for pressure ulcers 00249. Zeleníková and Žiaková (2012) consider (as in our study) the nursing diagnosis Deficient fluid volume 00027 to belong in the group of diagnostically significant diagnoses. The total DCV of 0.71 in Zeleníková's study was higher than the DCV of 0.61 in IICU study. While the DCV values of the DCs in Zeleníková's study are 0.57 – 0.84, validation in the IICU shows a wider range of 0.44 – 0.85. The DC of

decrease in urine output was assessed by both studies as diagnostically major (Zeleníková: DCV of 0.84; IICU: DCV of 0.82). The DC of dry mucous membranes was identified by Zeleníková as major, with a DCV of 0.81; whereas the IICU study ranked it as minor with a DCV of 0.63. We notice a similar difference for the DC of decrease in venous filling, for which Zeleníková gave a DCV of 0.76; and the IICU study gave a DCV of 0.54. Decrease in blood pressure was classified by both studies as a major DC, with DCVs of 0.75 and 0.85, respectively. We should point out that Zeleníková applied Fehring's method from 1986, with the minimum DCV value for major DCs being 0.75, which Fehring raised to 0.80 in 1987. The DC of dry skin was classified by both studies as diagnostically minor (Zeleníková 0.71; and IICU 0.53), similarly to tachycardia (Zeleníková 0.57, IICU 0.78). None of the two validations resulted in any insignificant DCs. No commentary on RF validation results is available in the study by Zeleníková, Žiaková (2012). Fehring (1987) recommends including validation results of the relevant factors when interpreting the validity of a nursing diagnosis as a whole. Validation of another nursing diagnosis – Acute confusion 00128 was addressed by Vörösová et al. (2012). She presents results of DCV scores for individual DCs, but not for the total DCV score. In the IICU study, this diagnosis, with total DCV of 0.76, was classified as diagnostically significant. The DCV of DC values in the study by Vörösová et al. ranged between 0.54 – 0.76. Therefore, they were slightly lower when compared with the values in our study (DC 0.68 – 0.88). In the group of major DCs, the authors included restlessness, with a DCV of 0.76 (IICU 0.82), and hallucination, with a DCV of 0.76 (IICU 0.72). Similarly, to Zeleníková and Žiaková (2012), Vörösová et al. (2012) used the minimum DCV value of 0.75 to classify DCs in the major diagnostic category (see Fehring, 1986). They ranked the following DCs as minor: agitation - DCV of 0.68 (IICU 0.88), alteration in level of consciousness - DCV of 0.61 (IICU 0.85), and alteration in psychomotor functioning – DCV of 0.62 (IICU 0.68). The study by Vörösová et al. (2012) did not classify any validated characteristics as insignificant DCs. The RF category cannot be compared with the results of the study at the IICU, as the study did not include such information. It is interesting to note that study by the Brazilian authors Santos, Almeida and Lucena (2016) focused on validation of Risk for pressure ulcers 00249. The text does not state a value for total DCV. When assessing the diagnostic validation in the IICU, we monitored twelve selected RiFs (see Table 4), while the Brazilian study monitored nineteen RiFs. Both validations applied a minimum DCV of 0.80 for

ranking RiFs as the major characteristic (see the stricter criterion, Fehring, 1987). DCV values for RiFs for this potential nursing diagnosis ranged in the Brazilian study between 0.54 and 0.97 (IICU 0.53 – 0.85). Santos, Almeida and Lucena (2016) ranked a single characteristic in the category of major RiFs: physical immobility, with a DCV of 0.97 (IICU 0.72). The authors ranked the following RiFs as minor: decrease in tissue oxygenation – DCV of 0.74, (IICU 0.62), extremes of weight - DCV 0.70 (IICU 0.69), and extremes of age – DCV 0.67 (IICU 0.65). It is interesting to note that the team of experts led by Santos consisted of nurses specialized in the care of skin and wounds. The sample of assessors at the IICU consisted of nurses specialized in intensive care. There are numerous variables that can influence nursing diagnosis outputs, including cultural difference, healthcare system conditions, diagnostic erudition, the number of nurses with university degrees, their competences and the importance they attribute to nursing diagnostics, which is still endeavouring to establish its place in modern healthcare systems.

Limitation of study

Limitations of the study may include the relatively low number of experts, and the issue of selection criteria. The objective of the study was to create a valid diagnostic set for nursing diagnostics, subsequently applied in the participating department. Thus, the sample of assessors included all nurses from the department despite the fact that they met only 82 % of the criteria defined by Zeleníková et al. (2010). Nevertheless, as the discussion suggests, they gave very similar assessments during the validation procedure to those of experts in other validation studies.

Conclusion

To meet the major objective of the study we recommend including the following diagnoses in the set of nursing diagnostics for adults at the Interdisciplinary intensive care unit – IICU, Nový Jičín Hospital: Risk for infection 00004, Hyperthermia 00007, Constipation 00011, Diarrhoea 00013, Risk for constipation 00015, Deficient fluid volume 00027, Impaired gas exchange 00030, Ineffective airway clearance 00031, Risk for aspiration 00039, Risk for disuse syndrome 00040, Risk for peripheral neurovascular dysfunction 00086, Dressing self-care deficit 00109, Acute confusion 00128, Risk for bleeding 00206, Risk for decreased cardiac output 00240 and Risk for pressure ulcer 00249. On the basis of the results of the study, we recommend training the IICU nursing team in specific diagnostic characteristics of Ineffective breathing pattern 00032

and then repeating the content validation of the diagnosis. Following Fehring's (1994) recommendation, we propose continuous training of the relevant nursing team, including demonstration of how the characteristics of the nursing diagnoses can be identified in patients in clinical routine.

Ethical aspects and conflict of interest

When conducting the validation study, the authors adhered to ethical guidelines. The authors are not aware of any conflict of interests.

Author contribution

The authors of the study declare, upon mutual consent, that they contributed to the manuscript equally: when preparing the concept and design (DŠ, JM), data analysis and interpretation (DŠ, JM), manuscript draft (DŠ, JM), critical review of the manuscript (DŠ, JM), and final completion of the article (DŠ, JM).

References

Bocková S, Marečková J, Zapletalová J. Content validation of the diagnosis Ineffective Breathing Pattern. *Kontakt*. 2015;17(1):e24–e31.

Cabral VdeH, Andrade ÍRC, Melo EM, Cavalcante TdeMC. Prevalence of nursing diagnoses in an intensive care unit. *Revista Rene*. 2017;18(1):84–90.

Castellan C, Sluga S, Spina E, Sanson G. Nursing diagnoses, outcomes and interventions as measures of patient complexity and nursing care requirement in intensive care unit. *Journal of Advanced Nursing*. 2016;72(6):1273–1286.

de Carvalho EC, Martins FT, Dalri MC, Canini SR, Laus AM, Bachion MM, Rossi LA. Relations between nursing data collection, diagnoses and prescriptions for adult patients at an intensive care unit. *Revista Latino-Americana de Enfermagem*. 2008;16(4):700–706.

Fehring JR. Validation diagnostic labels: standardized methodology. In: *Classification of nursing diagnoses: Proceedings of the sixth conference*. St. Louis: Mosby; 1986.

Fehring JR. Methods to validate nursing diagnoses. *Heart and Lung*. 1987;16(6 Pt 1):625–629.

Fehring JR. The Fehring Model. In: *Classification of nursing diagnoses: Proceedings of the tenth conference*. 1st. ed. Philadelphia: Lipincot; 1994.

Ferreira AM, da Rocha EdoN, Lopes CT, Bachion MM, Lopes JdeL, de Barros ALBL. Nursing diagnoses in intensive care: cross-mapping and NANDA-I taxonomy. *Revista Brasileira de Enfermagem*. 2016;69(2):285–293.

Gordon M. *Nursing diagnoses: process and application*. 2nd ed. St. Luis: McGraw-Hill Inc.; 1987.

Herdman TH, Kamitsuru S. Eds. *NANDA International nursing diagnoses: definitions and classification, 2015-2017*. Oxford: Wiley Blackwell; 2014.

Klugarová J, Klugar M, Marečková J, Hájek M. Methodology of systematic review development I: the effectiveness of hyperbaric oxygen therapy on mortality in adults with craniotrauma. *Czech and Slovak Neurology and Neurosurgery*. 2015;78(5):555–561.

Lucena AdeF, de Barros AL. Nursing diagnoses in a Brazilian intensive care unit. *International Journal of Nursing Terminologies and Classifications*. 2006;17(3):139–146.

Oliveira N, Chianca T, Rassool GH. A Validation study of the nursing diagnosis Anxiety in Brazil. *International Journal of Nursing Terminologies and Classifications*. 2008;19(3):102–110.

Pompeo DA, Rossi LA, Paiva L. Content validation of the nursing diagnosis Nausea. *Revista da Escola Enfermagem da USP*. 2014;48(1):48–56.

Salgado PO, Chianca TCM. Identification and mapping of the nursing diagnoses and actions in an Intensive Care Unit. *Revista Latino-Americana de Enfermagem*. 2011;19(4):928–935.

Santos CT, Almeida MdeA, Lucena AdeF. The nursing diagnosis of Risk for pressure ulcer: content validation. *Revista Latino-Americana de Enfermagem*. 2016;24:e2693.

Vaněčková J, Sollár T, Vörösová G. Defining characteristics of the Nursing Diagnosis Anxiety: A Validation study. In: *Present and the future of nursing and midwifery; proceedings for international conference*. České Budějovice: Jihočeská univerzita; 2012. p. 294–299.

Vörösová G, Semanišiová M, Sollár T, Solgajová A. Validation of nursing diagnosis Acute confusion in selected settings. In: *Present and the future of nursing and midwifery; proceedings for international conference*. České Budějovice: Jihočeská univerzita; 2012. p. 314–318.

Zeleníková R, Žiaková K, Čáp J, Jarošová D, Vrublová Y. Návrh kritérií výberu expertov pre validizáciu ošetrovateľských diagnóz v ČR a SR. *Kontakt*. 2010;12(4):407–413. (in Slovak)

Zeleníková R, Žiaková K, Vrublová Y, Jarošová D. Porovnanie výsledkov validizácie ošetrovateľskej diagnózy Akútna bolesť v ČR a SR. *Ošetrovateľstvo: teória, výskum, vzdelávanie*. 2011;1(1):12–19. (in Slovak)

Zeleníková R, Žiaková K. Obsahová validácia ošetrovateľskej diagnózy Deficit objemu telových tekutín. *Ošetrovateľství a porodní asistence*. 2012;3(4):475–483. (in Slovak)

Zeleníková R, Žiaková K, Čáp J, Jarošová D. Content validation of the nursing diagnosis Acute pain in the Czech Republic and Slovakia. *International Journal of Nursing Knowledge*. 2014;25(3):139–146.