Validation of NANDA international nursing diagnoses at postoperative intensive care unit: quasi-experimental study

Walidacja diagnoz pielęgniarskich NANDA na pooperacyjnym oddziale intensywnej terapii: badanie quasi-eksperymentalne

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STRESZCZENIE

WALIDACJA DIAGNOZ PIELĘGNIARSKICH NANDA NA POOPERACYJNYM ODDZIALE INTENSYWNEJ TERAPII: BADANIE QUASI-EKSPERYMENTALNE

Cel. 1. Realizacja powtarzalnej walidacji trzech diagnoz Międzynarodowego Towarzystwa Diagnoz Pielęgniarskich NANDA przed i po ich eksperymentalnym zaszeregowaniu do codziennej praktyki pielęgniarskiej w jednostce intensywnej terapii dla dorosłych, w szpitalu średniej wielkości. 2. Identyfikacja statystycznie istotnych różnic w treściach diagnostycznych (Diagnostic Content Validation – DCV) pomiędzy obydwoma walidacjami.

Materiał i metody. Do walidacji diagnoz NANDA wykorzystana została metodyka DCV modelu Fehringa. Do zespołu oceniających w pierwszym etapie włączono 33 specjalistów, w etapie drugim 31, w obydwu przypadkach chodziło o pielęgniarki z OIT. Eksperymentalne zastosowanie diagnoz pielęgniarskich w praktyce trwało przez 3 miesiące. Dane opracowywano z wykorzystaniem statystyki opisowej, testu Wilcoxona dla par obserwacji oraz t-test dla par obserwacji.

Wyniki. Całkowity wynik DCV diagnoz pierwszej walidacji: Zaburzenie wymiany gazów 00030 z DCV 0,67; Ryzyko syndromu immobilizacyjnego 00040 z DCV 0,69 oraz Ryzyko aspiracji 00039 z DCV 0,73. Wartości DCV po drugiej walidacji były odpowiednio równe 0,63; 0,64 i 0,78.

Wnioski. Diagnozy pielęgniarskie: Zaburzenia wymiany gazów 00030, Ryzyko syndromu immobilizacyjnego 00040 oraz Ryzyko aspiracji 00039 w przypadku diagnostyki pielęgniarskiej przytomnych dorosłych pacjentów w ramach pooperacyjnej jednostki intensywnej opieki medycznej szpitala średniej wielkości są ważne.

Słowa kluczowe: NANDA International, DCV model, walidacja, intensywna opieka, dorosły

ABSTRACT

VALIDATION OF NANDA INTERNATIONAL NURSING DIAGNOSES AT POSTOPERATIVE INTENSIVE CARE UNIT: QUASI-EXPERIMENTAL STUDY

Aim. 1. Implement repeated validation of three NANDA International nursing diagnoses before and after their experimental classification in daily nursing practice at an intensive care unit for adults, at a medium-sized hospital. 2. Identify statistically significant differences in Diagnostic Content Validation (DCV) values between the two validations.

Material and methods. Fehring's DCV model was used for validation of NANDA International diagnoses. The sample of assessors consisted of 33 experts in the first stage and of 31 experts in the second stage, the experts were in both cases ICU nurses. Nursing diagnoses were experimentally applied in practice for 3 months. The data were processed using descriptive statistics, Wilcoxon matched pairs test and paired t-test.

Results. Total DCV scores of diagnoses after the first validation: Impaired gas exchange 00030 with DCV 0.67; Risk for disuse syndrome 00040 with DCV 0.69 and Risk for aspiration 00039 with DCV 0.73. The DCV values after the second validation were as follows: 0.63; 0.64 and 0.78 respectively.

Conclusions. Nursing diagnoses: Impaired gas exchange 00030, Risk for disuse syndrome 00040 and Risk for aspiration 00039 are valid for nursing diagnostics of adult lucid postoperative intensive care unit patients at a medium-sized hospital.

Key words: NANDA International, DCV model, validation, intensive care, adult

INTRODUCTION

As a result of various diseases, patients experience dysfunctional and potentially dysfunctional fulfilment of human needs that are referred to as nursing issues – nursing diagnoses [1]. NANDA International Nursing Diagnoses: Definition and Classification 2018-2020 [2], a classification system that has been developed for more than 30 years, is a suitable tool for identification and designation of patients' nursing diagnoses. The diagnostic classification NANDA International is amended and innovated biannually and according to, e.g. Thoroddsen et al., it is the most frequently used classification [3] in nursing. As this classification is an extensive and comprehensive system applicable in patients with various health conditions, from birth until death, it is advisable to select relevant nursing diagnoses and validate them subsequently for different expert fields. It is also advisable to verify diagnostic significance of the nursing diagnoses and their characteristic features for specific workplaces by the means of Diagnostic Content Validation – DCV, published by Fehring [4]. Application of the aforementioned process when validating nursing diagnoses in diverse context of patients was published by many teams of authors, e.g. by expert groups from Brazil, Spain and the Czech Republic. In the case of intense care it was Ineffective breathing pattern 00032 [5].

This study is a follow up to the needs of nursing practice at an intensive care unit (hereinafter ICU) for adult patients and the hospital management as well as the ICU management expressed consent with it. The given ward previously made records of nursing diagnostics with no documentation of characteristic features of nursing diagnoses and the terminology of the diagnoses did not correspond with NANDA International. Therefore, NANDA International nursing diagnoses were selected for innovation of processes of nursing diagnostics at the word; their diagnostic validity was verified by content validation before they were implemented in practice.

AIM

1. To implement repeated validation of three NANDA International diagnoses before and after their experimental classification in daily nursing practice at an intensive care unit (ICU) for adults, in a medium-sized hospital.
2. To identify statistically significant differences in DCV values between the two validations.

METHODS

Design: quasi-experimental with pre-test and post-test study.

Set of diagnoses to be validated

The following nursing diagnosis NANDA International Nursing Diagnoses: Definition and Classification 2015-2017 [6] were selected for verification of their diagnostic significance for nursing practice at an adult intensive care unit: Impaired gas exchange 00030, Risk for disuse syndrome 00040 and Risk for aspiration 00039 and their relevant characteristic features. The study mentions the nursing diagnoses together with their numeric codes [6] in order to prevent their confusion. The monitored set was prepared for validation on the basis of: 1. content analysis of the form for nursing documentation at the ICU, 2. content of relevant studies found in literature search and 3. consensual agreement of the authors – face validation.

Sample of experts/assessors

The sample of experts for content validation included nurses working at the given ICU who agreed to participate in the study and complied with modified criteria for classifying the experts as defined by Zeleníková et al. [7]. The assessors in both validations complied with the criteria scoring 4-7 points. In the first validation (pre-test data) the sample consisted of 30 women (90.91%) and 3 men (9.09%) with mean age of 37.03 (youngest 24 – oldest – 54 years), with average length of experience at ICU of 11.27 years. The sample for the second validation (post-test data) consisted of 31 experts, 28 women (90.32%) and 3 men (9.68%) with mean age of 37.03 (youngest 24 – oldest 54) and with average length of experience at ICU of 10.79.

Applied method

Both validations were conducted using Fehring's DCV model [4]. It is a model of content validation of nursing diagnoses in which experts use five-point Likert scale for ranking the significance of characteristic features of nursing diagnoses. Value 1 means zero diagnostic significance, 2 small, 3 medium, 4 significant and 5 the highest. The output of processing the obtained data is weighted DCV scores of characteristic features and total DCV scores of nursing diagnoses. The validity of the phenomena assessed is interpreted in a way where DCV score ≥ 0.80 points to the main diagnostic significance of characteristic features of a nursing diagnoses as such, while DCV score 0.79 – 0.50 points to secondary diagnostic significance. Phenomena with DCV in the defined ranges are considered valid for practice. Phenomena with DCV score ≤ 0.50 are not valid and they should be eliminated from the diagnostic process.

When including experimentally the monitored NANDA International diagnoses in everyday nursing practice at the postoperative ICU for adults, printed forms for nursing documentation of the involved ward were used. The forms were extended for purpose of the experiment with an offer of defining characteristics (hereinafter DCs), related factors (hereinafter RF) and risk factors (hereinafter RiF) of the three nursing diagnoses monitored. Records in the documentation were made by hand.

Data collection

During the first validation, a protocol for collection of validation data was made for the purpose of experts' observations. It was conceived with respect to the methods of the DCV model for content validation of nursing diagnoses, see above. The monitored characteristic features included also Likert scales with instruction how to proceed during assessment. Printed versions of the protocols were

distributed to experts who were duly trained on how to fill in the protocols and filled them in anonymously. Data collection in the second validation was conducted using an identical protocol and process as in the first stage.

Hypotheses

When analysing the differences and agreement of the results of both validations, two broadly focused hypotheses were formulated and their wording were adjusted when the parameters were tested.

1. There is/is not a statistically significant difference between values of DCV scores of a nursing diagnosis before and after implementation in practice.
2. There is/is not a statistically significant difference between values of DCV scores of DC, RF, RiF before and after their implementation in practice.

Data processing and analysis

Content validation data were processed using contingency tables, methods of descriptive statistics (minimum and maximum values, mean, standard deviation, 25th and 75th percentile). Significance of differences between DCVs of nursing diagnoses was identified by pair t-test with a significance level of $\alpha = 0.05$ and significant differences between DCV values of DC, RF, RiF were identified by non-parametric Wilcoxon matched pairs, also with a significance level of $\alpha = 0.05$. The data were processed using STATA v 13 software.

■ RESULTS

Before experimental inclusion of NANDA International diagnoses in daily nursing practice at the postoperative ICU for adult patients, the following outputs of content validation of diagnoses seen as a whole were identified: Impaired gas exchange 00030 with DCV score of 0.67; Risk for disuse syndrome 00040 with DCV score of 0.69 and Risk for aspiration 00039 with DCV of 0.73. The output of the second validation of nursing diagnoses were the following DCV scores: 0.63; 0.64 and 0.78 respectively (the values are in the same order of diagnoses). Outputs of both validations of nursing diagnoses as a whole are presented in Figure 1.
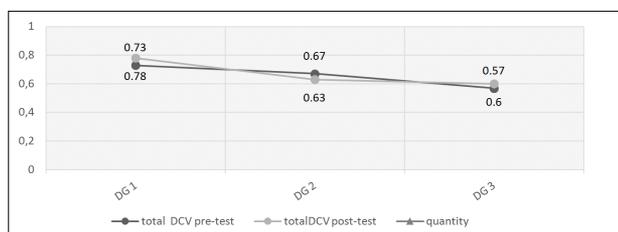
DG1 – Impaired gas exchange 00030; DG2 – Risk for aspiration 00039; DG3 – Risk for disuse syndrome 00040

■ Fig. 1. Comparison of validation of nursing diagnoses results in total

Out of all results of content validation of characteristic features of nursing diagnoses we now mention those whose DCV score exceeded or was near to, the value of diagnostically significant phenomena. The DCs are as follows: abnormal arterial blood gases with DCV 0.75, dyspnoea with DCV 0.75 and RF: alveolar-capillary

membrane changes with DCV 0.78 and ventilation-perfusion imbalance with DCV 0.87 (see diagnosis Impaired gas exchange 00030). From potential diagnoses, the RiF decrease in level of consciousness was evaluated in such a way for Risk for aspiration 00039 with DCV 0.77. The second validation saw a slight decrease in the DCV score, however, the results were not significant. Complete results of the first and second validation of characteristic features (DCs, RFs, RiFs) of nursing diagnoses are shown in Tables 1, 2 and 3.

■ Tab. 1. Impaired gas exchange 00030 – outputs of DCV score and statistical analysis

Impaired gas exchange 00030		test	DCV	SD	Me	0.25 p.	0.75 p.	p-value
DCs	abnormal arterial blood gases	pre	0.75	0.31	1.00	0.50	1.00	0.9730
		post	0.67	0.31	0.75	0.50	1.00	
	abnormal breathing pattern	pre	0.69	0.30	0.75	0.50	1.00	0.7868
		post	0.65	0.32	0.75	0.50	0.75	
	abnormal skin color	pre	0.69	0.33	0.75	0.50	1.00	0.8092
		post	0.68	0.23	0.75	0.50	0.75	
	cyanosis	pre	0.64	0.30	0.75	0.50	1.00	0.8201
		post	0.67	0.20	0.75	0.50	0.75	
	somnolence	pre	0.67	0.29	0.75	0.50	1.00	0.8490
		post	0.65	0.24	0.75	0.50	1.00	
	dyspnea	pre	0.75	0.26	0.75	0.50	1.00	0.9504
		post	0.74	0.24	0.75	0.50	1.00	
RF	alevolar-capilary membrane changes	pre	0.78	0.27	0.75	0.625	1.00	0.8376
		post	0.70	0.28	0.75	0.50	1.00	
	ventilation-perfusion imbalance	pre	0.87	0.22	1.00	0.75	1.00	0.9425
		post	0.70	0.23	0.75	0.50	0.75	

DCs – defining characteristics; RF – related factor; DCV – diagnostic content validation; SD – standard deviation; Me – median; 0.25 p. – 0.25 percentile; 0.75 p – 0.75 percentile

■ Tab. 2. Risk for aspiration 00039 – outputs of DCV score and statistical analysis

Risk for aspiration 00039		test	DCV	SD	Me	0.25 p.	0.75 p.	p-value
RiF	decrease in GIT motility	pre	0.64	0.31	0.75	0.50	1.00	0.9974
		post	0.65	0.28	0.75	0.50	0.75	
	decrease in level consciousness	pre	0.77	0.23	0.75	0.50	1.00	0.9166
		post	0.69	0.24	0.75	0.50	0.75	
	enteral feedings	pre	0.67	0.20	0.75	0.50	0.75	0.9307
		post	0.60	0.24	0.50	0.50	0.75	
	presence oral/nasal tube	pre	0.67	0.23	0.75	0.50	0.75	0.8104
		post	0.67	0.26	0.75	0.50	1.00	
	increase in gastric residual	pre	0.61	0.28	0.50	0.50	0.75	0.8064
		post	0.56	0.27	0.50	0.50	0.75	

RiF – risk factor; DCV – diagnostic content validation; SD – standard deviation; Me – median; 0.25 p. – 0.25 percentile; 0.75 p. – 0.75 percentile

■ Tab. 3. Risk for disuse syndrome 00040 – outputs of DCV score and statistical analysis

Risk for disuse syndrome 00040		test	DCV	SD	Me	0.25 p.	0.75 p.	p-value
RiF	prescribed immobility	pre	0.58	0.34	0.50	0.50	0.86	0.6678
		post	0.60	0.33	0.75	0.25	1.00	
	pain	pre	0.61	0.30	0.50	0.50	0.86	0.5926
		post	0.61	0.24	0.75	0.50	0.75	
	mechanical immobility	pre	0.52	0.30	0.50	0.38	0.75	0.5160
		post	0.57	0.27	0.50	0.50	0.75	

RiF – risk factor; DCV – diagnostic content validation; SD – standard deviation; Me – median; 0.25 p. – 0.25 percentile; 0.75 p. – 0.75 percentile

Results of statistical analysis – total DCV score of nursing diagnoses

By applying pair t-test (p <0.001), no significant result was confirmed between values of total DCV score for any of the diagnoses before and after the experiment, see Table 4. The following null hypothesis was assumed for all the three nursing diagnoses monitored: "There is no statistically significant difference between the values of total DCV score of a nursing diagnoses before and after its implementation in practice."

■ Tab. 4. Paired t-test of total DCV values

Variable	Observation	Mean	Standard Error	Standard Deviation	95 % Confidence Interval	
pre-test	3	0.66	0.046667	0.08	0.45587	0.85746
post-test	3	0.67	0.055678	0.10	0.43044	0.90956
diameter difference = average (pre-test – post-test)					t=8.344262	
degree of freedom = 2						
p = >0.0001						
No statistically significant difference was found						

Results of the statistical analysis – DCV score of characteristic features of the diagnoses

All characteristic features of the included nursing diagnoses were assessed as valid before and after their implementation in nursing practice with DCV scores of the DCs, RFs and RiFs within the range of 0.87 – 0.52.

Using non-parametric Wilcoxon matched pairs test with assessment at the significance level of α = 0.05, no significant results were confirmed between values of DCV scores of characteristic features before and after the experiment, see Tables 1, 2 and 3. For all sixteen DCs, RFs and RiFs, the following null hypothesis was assumed: "There is no statistically significant difference between the values of DCV scores of characteristic features of a diagnosis before and after implementation in practice."

■ DISCUSSION

In order to obtain sources for discussion, we ran a search limited the publication period since 2000 until present and with no limitation concerning the language of studies. We used seven e-sources: MEDLINE, CINAHL Plus with Full text, Wiley

Online Library, search engines MedNar, Google Scholar, Bibliographia Medica Čechoslovaca and OpenGray. However, the search did not find any study with a DCV method of content validation that would concern our nursing diagnoses, so it was not possible to compare our results with other authors' findings. The intent of our study was to get outputs of validation of three selected NANDA International diagnoses with selected characteristic features before and after their experimental implementation in practice of a postoperative ICU for adult patients. We were interested in how the experts participating in the validations assess diagnostic significance of the phenomena monitored after they had the chance to work with them in their daily nursing routine. The presumption that DCV scores of the diagnoses would be higher in the second validation stemmed from expectation of positive experience of the involved nurses with an extended form/documentation for nursing diagnostics, see the description of the method applied. However, the results of the study show that the total DCV score was higher in experts' assessment of Impaired gas exchange 00030 and Risk for disuse syndrome 00040, while with Risk for aspiration 00039 it was quite the contrary, although the statistic processing of data did not identify any significant differences. Taking into consideration the fact that we often hear in nursing arguments that intensive care nurses do not have the time for thorough diagnostics using NANDA International terminology due to the demanding nature of their work and many other activities required, we consider the results rather encouraging. They are actually in accord with opinions held by Herdman and Kamitsuru [6], editors of NANDA International classification who respond to the question: "Why should nurses at ICU bother with nursing diagnostics?" with the following answer: "What an interesting question! Should nurses practice nursing? Yes, of course! There is no question that critical care nurses have a high focus on interventions as a result of medical conditions, and often intervene Nursing Diagnosis with patients using "standing protocols" (standing medical orders) that require critical thinking to implement correctly." This study also points to the meaningfulness of the recommendation to select relevant diagnoses before they are implemented in practice and it accentuates their validation by experts who know very well the problems of a given workplace and patients.

Above the scope of the objectives of the study, a set of 108 anonymized nursing documentations that were kept at the ICU during the experimental period was analysed. Risk for disuse syndrome 00040 was identified on the basis of the RiFs included in the study, in 55.56% patients, Risk for aspiration 00039 in 15.74% patients and Impaired gas exchange 00030 was identified in 5.56% patients on the basis of the DCs and RFs. It is interesting to compare the results with the data stated by authors of published studies. The occurrence of Risk for disuse syndrome in ICU patients was identified by Marečková and Tománková [8] and Castellan et al. [9], with values of 100% and 86% respectively. Their observations concerned ICU inpatients with a longer stay at hospital, which is why we believe that the lower frequency of records at our

participating postoperative ICU is adequate. Results for Risk for aspiration 00039 were presented by three studies: Salgado et al. [10] with analogical results of 16.00%, whereas Carvalho et al. identified 65.30% [11] and Cabral et al. with 60.90% of records in the set of patients' documentation [12]. The occurrence of Impaired gas exchange 00030 in ICU documentations was observed by five studies. In two of them, Salgado et al. 5.00% [10] and Carvalho et al. 7.60% [11], the interpreted data were similar, while other authors present much higher results, namely Ferreira et al. 40.23% [13], Castellan et al. 47.00% [9] and Marečková with Tománková 58.57 [8].

CONCLUSIONS

On the basis of outputs of quasi-experimental validation of monitored NANDA International diagnoses we conclude that Impaired gas exchange 00030, Risk for disuse syndrome 00040 and Risk for aspiration 00039 are valid for nursing diagnostics in adult lucid patients at an postoperative intensive care unit at a medium-sized hospital and that after their three-month inclusion in daily nursing practice, the DCV scores of the monitored diagnoses were not significantly different. The presented findings evidence the fact that nursing diagnostics has its justified position at ICUs.

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