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ORIGINAL PAPER

CLINICAL VALIDATION OF NURSING DIAGNOSIS OF ACUTE PAIN

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Abstract

Aim: To verify, based on clinical validation whether NANDA-I identified defining characteristics of the nursing diagnosis Acute Pain (00132) actually occurred in patients hospitalised in Intensive Care Units in Slovakia and the Czech Republic by means of the Clinical Diagnostic Validity Model. *Design:* Clinical validation of the nursing diagnosis can be verified if defining characteristics created on the basis of conceptual analysis and validation by experts are confirmed by clinical data. *Methods:* We selected Fehring's Clinical Diagnostic Validity Model as the method of clinical validation. *Results:* According to the values attained for Cohen's kappa coefficient for 18 defining characteristics of the nursing diagnosis Acute Pain (00132) for both Slovakia and the Czech Republic, we can state that the experts agreed relatively fully only on one defining characteristic: Changes in Appetite. The attained coefficient value expresses absolute agreement among Slovak experts (1.00) and good agreement among Czech experts (0.86). *Conclusion:* Analysis and interpretation of the data obtained provides: information on clinically valid defining characteristics of the nursing diagnosis Acute Pain (00132) for Slovakia and the Czech Republic, information on the agreement between clinical conclusions of nurse-experts from Slovakia and the Czech Republic, and a comparison of the results between Slovakia and the Czech Republic. The study also contributes to the development of nursing terminology.

Keywords: acute pain, clinical validation, experts, nursing.

Introduction

The process of validation of nursing diagnoses involves several methodological approaches, such as conceptual analysis (conceptualisation and operationalisation of diagnoses), and content and clinical validation. Single methodological approaches are used for the creation and modification of nursing diagnoses, including their cultural adaptation in specific social-cultural contexts. The validation process thus contributes to the support and improvement of the NANDA International classification system, in accordance with requests for evidence-based diagnostics (Zeleníková, Žiaková, 2010).

In the Slovak and Czech social-cultural contexts, validation studies based on Fehring's Diagnostic Content Validity Model (DCV) prevail (Fehring, 1986). In the last decade, several content validation studies based on this model have been published in Slovak and Czech contexts. The DCV model has been used for content validation of the nursing diagnosis of *Hopelessness* (Žiaková, Čáp, Holmanová, 2006; Gurková, Žiaková, Čáp, 2011); *Acute Pain* (Zeleníková, Kozáková, Jarošová, 2014; Zeleníková, Maniaková, 2015); *Chronic Confusion* (Tomagová, Bóriková, 2011a; Tomagová, Bóriková, 2012; Vörösová, Zrubcová, Solgajová, 2013); *Impaired Memory* (Tomagová, Bóriková, 2011b); *Fear* (Zeleníková et al., 2012); *Acute Confusion* (Vörösová et al., 2012); *Caregiver Role Strain* (Tabaková, Zeleníková, Kolegarová, 2011); *Deficient Knowledge* (Zeleníková, Plevová, Žiaková, 2012); *Deficient Fluid Volume* (Zeleníková, Žiaková, Sikorová, 2011), *Spiritual Distress* (Žiaková et al., 2011); *Anxiety* (Solgajová, Vörösová, Semanišinová, 2012; Bubeníková, Vránová, 2013).

Compared to the wide implementation of the DCV, the Clinical Diagnostic Validity Model is applied to a lesser extent in both Slovakia and the Czech Republic. Clinical validation has been used in four studies regarding validation of nursing diagnosis *Fear* (aimed at the paediatric population, Mazalová, Mikšová, Kameníčková, 2013); *Caregiver Role Strain* (Kolegarová, Zeleníková, 2011; Zeleníková,

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Kozáková, Jarošová, 2014); and *Impaired Comfort* (Slamková et al., 2015). In our work, we focused on clinical validation of the nursing diagnosis *Acute Pain* in Slovak and Czech cultural contexts for the following reasons: the frequency of its usage in clinical practice and in previous studies of content validation. The nursing diagnosis of *Acute Pain* can be considered one of the best established nursing diagnoses, especially for the post-operative period (Junttila, Hupli, Salanterä, 2010; Herdman, Kamitsuru, 2014). Therefore, in our study, we performed clinical validation of this diagnosis in the conditions of intensive care nursing. None of the known Slovak and Czech clinical validation studies focus on the intensive care environment. Content validation of *Acute Pain* has been published in two works (Zeleníková, Kozáková, Jarošová, 2014; Zeleníková, Maniaková, 2015). Regarding the aspect of continuity of validation methods, we focused on using the same method of clinical validation in both countries.

According to Carlson-Catalano and Lunney (1995), clinical validation can be defined as establishing whether defining characteristics of a researched nursing diagnosis actually occur in a clinical situation. In contrast with studies using content validity, clinical validation research studies verify validity of single diagnostic elements in real clinical situations. Clinical validation studies also contribute to the development and testing of a unified nursing terminology. By increasing its representativeness and capability of generalisation for various patient groups in different environments, they simultaneously forge its external validity (Mazalová, Mikšová, Kameníčková, 2013). Clinical validation has only been performed in 12 validation studies (Kelly, 1991; Carlson-Catalano et al., 1998; Corrêa, da Cruz, 2000; Young et al., 2002; Giménez, Serano, Marín, 2003; Chaves et al., 2010; Martins, Aliti, Rabelo, 2010; Martins et al., 2011; Rodrigues et al., 2011; Kolegárová, Zeleníková, 2011; Paganin, Rabelo, 2012; Mazalová, Mikšová, Kameníčková, 2013; Zeleníková, Kozáková, Jarošová, 2014; Slamková et al., 2015), of which only one concerned the diagnosis of *Pain* (Corrêa, da Cruz, 2000). The objective of the study was to characterise pain among adult patients after cardiac surgery (quality, location and intensity of pain) and to verify defining characteristics of patients with pain. The study used methodological procedures by three authors (Gordon, Sweeney, 1979; Fehring, 1987; Carlson-Catalano, Lunney, 1995). The patient sample involved 80 patients after cardiac surgery. They were divided into two groups: Group A and Group B. Group A patients experienced pain within the 24 hours before validation or at the time of validation. Group B patients did not experience pain within the 24 hours preceding validation. Group A was further divided into two subgroups, validated by objective and subjective data: A1 – objective data validated at the onset of pain and subjective data within the following 24 hours; and A2 – both objective and subjective data were validated for patients up to 24 hours after pain manifestation. Patients validated presence/absence of single defining characteristics through either a verbal statement, or by an objective measurement of behaviour. Three tools were used for measurement: the McGill Pain Questionnaire (MPQ), the Spielberger Anxiety State/Trait Inventory, and the Beck Depression Scale (BDI) (Corrêa, da Cruz, 2000). Overall, 19 defining characteristics were identified in this study, 16 of which are described in NANDA-I Taxonomy II, although definitions did not match completely. Two characteristics related to chronic pain. Agreement between NANDA-I and the study was found in the following four defining characteristics: the wording of pain, disturbed sleep, protective gestures and facial expression (Corrêa, da Cruz, 2000).

Aim

The main objective of our research study was to verify, according to clinical validation, whether identified defining characteristics of the nursing diagnosis of Acute Pain (00132) (from the NANDA-I classification system) could be observed in patients hospitalised in intensive care units in both Slovakia and the Czech Republic, by means of CDV model implementation.

Methods

Design

The design of this study is a clinical validation of the nursing diagnosis of *Acute Pain*. Clinical validation of nursing diagnoses can be verified if defining characteristics created on the basis of conceptual analysis and validation by experts are confirmed by clinical data. Are defining characteristics actually present when a diagnosis is documented in clinical practice? For this phase of validation, it is typical to use direct interaction or observation of patient behaviour by at least two nursing experts. Each expert obtains data and formulates conclusions independently. Two types of data are monitored: agreement percentage (presence or absence of defining characteristics), and frequency of characteristic occurrence in the sample of patients (Hoskins, 1989; Whitley, 1999; Creason, 2004).

Sample

The sample of the research study involved nursing experts and selected patients. To determine the number of clinical experts and patients we applied Fehring's recommendations (1987).

Sample of experts

The sample included two nurses from Slovakia and two nurses from the Czech Republic. The experts were chosen by modified criteria proposed for conditions in Slovakia and the Czech Republic by Zeleníková et al. (2010). The main criteria for inclusion were: education in nursing and clinical practice, with at least one year's practice in an area relevant to the NANDA nursing diagnosis of Acute Pain. Additional criteria were: specialisation/certification in a clinical practice field relevant to the area of diagnosis, a diploma/rigorous thesis or dissertation in the area of nursing diagnostics, and a published article in the field of nursing diagnostics in a journal (of a research or theoretical content). According to Zeleníková et al. (2010), a nurse can be considered an expert if they fulfil four of the criteria.

Sample of patients

The sample included 50 patients from the University Hospital, Martin, and 50 patients from the University Hospital, Brno. The average age of reviewed patients from Slovakia was 59.92 ± 11.84. The youngest reviewed patient was 31, and the oldest was 83-years-old. The average age of reviewed patients in the Czech Republic was 65.02 ± 13.81. The youngest reviewed patient was 23, and the oldest was 92-years-old.

The sample of patients included 24 women (48%) and 26 men (52%) from the University Hospital, Martin. The sample of patients from the University Hospital, Brno included 18 women (36%) and 32 men (64%).

The VAS (Visual Analog Scale) evaluation scale was used to assess pain. The analysis of the results shows that the mean VAS value in Slovak patients was 4.52 ± 1.90. The lowest value in the sample considered was VAS 1, and occurred in two patients, representing 4%. In contrast, the highest value in the sample was VAS 9 and occurred in one patient (2%). The most common occurrence was VAS 5 (occurrence in 10 patients, representing 20%) and VAS 6 (occurrence in 10 patients, representing 20%). Analysis of the results shows that the mean VAS value in Czech patients was 2.82 ± 1.33. The lowest value in the sample considered was VAS 0 and VAS 1, and occurred in three patients, representing 6%. The highest value in the sample was VAS 6, and occurred in one patient (2%). The most common occurrence was VAS 2 (occurrence in 15 patients, representing 30%), and VAS 3 (occurrence in 14 patients, representing 28%).

We also divided the sample of the study according to type of postoperative analgesic management. In Slovakia, the most commonly used type was continuous analgesia, which was administered to 34 patients. The second most frequently used method was administration of analgesia every six to eight hours (11 patients). The least used method was epidural analgesia (five patients). In the Czech Republic, the most commonly used analgesic method was administration every six to eight hours, (26 patients). The second most frequent method was continuous analgesia (14 patients). The least used method was epidural analgesia (10 patients).

In Slovakia, classic abdominal surgery was the most common type of surgery, performed on 47 patients (94%). In terms of urgency of surgery, planned operations were most common (94%). In the Czech Republic, classic abdominal surgery was also the most common type of surgery, performed on 45 patients (90%). Likewise, in terms of urgency of surgery, planned operations were most common (74%).

The research sample involved patients that met criteria set in advance: hospitalisation in the Intensive Care Unit (ICU), nursing diagnosis of acute pain made beforehand, stomach surgery, aged over 18 years, absence of a cognitive disorder, and the ability to communicate. Exclusion criteria were: impaired consciousness, unwillingness to cooperate.

Data collection

Administration of CDV validation tools was completed from July 2015 to January 2016. For selection of both samples (patients and nursing experts) criteria were set in advance, i.e., the sample selection was deliberate. Data were collected in interviews with patients conducted by nurse-experts in the Department of Surgery and Transplantation Centre of ICU in Martin University Hospital, and in the Department of Surgery of the ICU in Brno University Hospital.

Two CDV validation tools were created for data collection, in Slovak and Czech. CDV validation tools serve to establish whether defining characteristics of the nursing diagnosis *Acute Pain (00132*) are present or absent, and also to match characteristics of the nursing diagnosis *Acute Pain (00132*) with the characteristics that appear in each patient reviewed. The validation tools consisted of two parts. The first part of the tool involved data

on experts and data on patients; demographic data on reviewed patients; medical diagnosis; presence of chronic pain in their medical history; polymorbidity; VAS result; type of surgery (classic stomach surgery, laparoscopic stomach surgery); level of surgical urgency (planned surgery or acute surgery); and method of analgesia (continual, epidural, every six – eight hours). The second part of the tool involved a list of 18 defining characteristics of the nursing diagnosis *Acute Pain (00132*) from NANDA-I Taxonomy II. The experts validated the presence or absence of each of the 18 defining characteristics for all patients in the sample.

Data analysis

Empirical data from single CDV validation tools were coded and then converted into electronic format in a version of Microsoft Office Excel 2013. For statistical processing and validation of data, statistical functions of Microsoft Office 2013 and the SPSS – PASW Statistic program were used. Descriptive statistics were used to analyse patient data (n = 50). For items of age and VAS (finding), mean score, standard deviation, minimum and maximum scale value of replies were calculated. For statistical statement of clinical validity ratio, we calculated absolute and relative multitude of agreement of nurse-experts. For agreement ratio of both the experts, interrater reliability R score by Fehring, AC1 coefficient, and Cohen's kappa coefficient were used. Defining characteristics that attained a weighted score of interrater reliability $R \geq 0.80$ (differing from the 0.75 suggested by Fehring, 1986) were classified as main characteristics, and Cohen's kappa coefficient was used to determine the agreement ratio between nurse-experts, and for defining characteristics that did not occur in patients in the sample (Paganin, Rabelo, 2012). One limitation of this procedure is that in cases of a large disproportion between current agreement and disagreement of nurse-experts it is more appropriate to use the AC1 coefficient designed by Gwet (Langová, Zapletalová, Ličman, 2012). For large data disproportions, the AC1 coefficient is a more precise indicator of agreement between nurse-experts than the weighted score of interrater reliability by Fehring. The same applies to defining characteristics that do not occur in a given clinical situation (Mazalová, Mikšová, Kameníčková, 2013). Interpretation of single values for AC1 and Cohen's kappa coefficients can be found in Table 1 (Mazalová, Mikšová, Kameníčková, 2013). According to Paganin and Rabelo (2012), a suggested boundary value for interrater agreement of nurse-experts in the process of validation in nursing is Cohen's kappa = 0.65. According to Chráska (2007), a minimum Cohen's kappa coefficient of 0.80 is required for categorical observation techniques.

Table 1 AC1 coefficient and Cohen's kappa coefficient for the nursing diagnosis Acute Pain, in Slovakia

No.	Defining characteristics NANDA-I	AC1	Cohen kappa
1.	changes in appetite	1.00	1.00
2.	changes in blood pressure	1.00	1.00
3.	changes in heart rate	0.96	0.96
4.	changes in respiratory frequency	0.98	0.88
5.	VAS (using a pain scale)	-	-
6.	excessive sweating	0.98	0.90
7.	inattentive (absent-minded) behavior (e.g. walking back and forth, searching for other persons or activities	-	-
8.	expressive behavior (e.g. agitation, moaning, crying, vigilance, sighs, irritability)	0.81	0.80
9.	facial expression (e.g. loss of luster in the eyes, exhausted look, fixed or diffuse movement, grimace)	0.87	0.62
10.	protective behaviors (e.g. the protection of the painful area)	0.76	0.76
11.	reduced alertness (altered time perception, impaired thought processes, reduced interaction with people and the environment)	0.96	0.49
12.	visible signs of pain	0.92	0.92
13.	search reliever position	0.96	0.96
14.	protective gestures (the patient does not allow the painful parts of the body to be touched)	0.85	0.70
15.	dilated pupils	1.00	1.00
16.	verbal expression of pain	**1.00**	**1.00**
17.	focus on self	-	-
18.	disturbed sleep	0.80	0.70

F1 – frequency of characteristics observed by the first expert; F2 – frequency of characteristics observed by the second expert

Results

Results of clinical validation in Slovakia

In this part we introduce the findings of clinical validation of the nursing diagnosis *Acute Pain (00132*) in the environment of the ICU (Intensive Care Units) of the Department of Surgery and Transplantation Centre in Martin University Hospital.The weighted score R of interrater reliability was calculated for each of 18 defining characteristics, which determined their clinical relevance related to the nursing diagnosis *Acute Pain (00132)*. According to this, it was possible to divide defining characteristics into three groups: *main, secondary* and *insignificant*. Besides the weighted score R of interrater reliability, we also established the agreement ratio for clinical conclusions between nurse-experts according to Cohen's kappa coefficient and AC1 coefficient.

Two defining characteristics with weighted score ≥ 0.80 were included in the group of main clinically valid defining characteristics. The highest weighted score R = 1 of interrater reliability was scored by defining characteristic No. 5 [VAS/Numerical Record (using a pain scale)]. The second characteristic in the main group of clinically valid characteristics is defining characteristic No. 16 (Verbal Expression of Pain), with a weighted score of R = 0.94 for interrater reliability.

14 of the remaining 16 defining characteristics scored a low weighted score of interrater reliability (≤ 0.50). This suggests that these should be included in the group of *insignificant* characteristics.

In table 1, we present a summary of values for the AC1 coefficient and Cohen's kappa coefficient for the 18 defining characteristics of the nursing diagnosis *Acute Pain (00132)*. Coefficient values mostly point to good or absolute agreement of experts when judging the sample of 50 patients. For three of the defining characteristics it was not possible to express the aforementioned coefficients, although it is nevertheless possible to say that there was a 100% agreement between experts. For defining characteristic No.11 (Reduced Alertness) there is a fairly large difference between the scores, perhaps due to the disproportion between agreement and disagreement of nurse-experts.

Results of clinical validation in the Czech Republic

In this part, we introduce the findings of clinical validation of the nursing diagnosis *Acute Pain (00132*) in the Czech Republic. The weighted score R of interrater reliability was calculated for each of 18 defining characteristics, which suggests their clinical relevance in relation to the nursing diagnosis *Acute Pain (00132)*. Using these scores, it was possible to divide the defining characteristics into three groups: *main, secondary* and *insignificant*. The interrater agreement ratio between the independent conclusions of both nurse-experts on the presence or absence of defining characteristics was presented in terms of absolute multiplicity (n) of congruent opinions of experts and by relative multiplicity in %. Besides the weighted score R of interrater reliability, we also calculated the agreement ratio of clinical conclusions between nurse experts according to Cohen's kappa coefficient and AC1 coefficient.

In the ICU of the Department of Surgery at Brno University Hospital, two defining characteristics with the score of ≥ 0.80 can be considered as *main clinically valid* characteristics. The highest weighted score R = 0.90 of interrater reliability was for defining characteristic No. 5 [VAS/Numerical Record (using a pain scale)]. The second characteristic that can be considered as clinically valid is defining characteristic No. 16 (Verbal Expression of Pain) with weighted score R = 0.846 of interrater reliability. In contrast to Slovakia, in the Czech Republic two observed defining characteristics with a score of < 0.80 and > 0.50 were included in the group of *secondary defining characteristics*: No. 1 (Changes in Appetite) with weighted score R = 0.67 of interrater reliability, and No. 12 (Visible Signs of Pain) with weighted score R = 0.52 of interrater reliability. The remainder of the 14 defining characteristics had a low weighted score of interrater reliability. These were included in the group of *insignificant* characteristics.

In table 2 we present a summary of the achieved values for the AC1 coefficient and Cohen's kappa coefficient for the 18 defining characteristics of the nursing diagnosis *Acute Pain (00132)* valid for the ICU of Department of Surgery at Brno University Hospital. The values of the coefficients point to the variable degree of compliance of the nurse-experts in the assessment of the patient sample. The coefficients range from negative values (indicating the match is less than random) up to 0.96 (indicating good agreement between nurse-experts). However, it was not possible to express any of the above-mentioned coefficients for defining characteristic No. 15 (dilated pupils), although 100% of nurses agreed with this characteristic.

Clinical validation results – comparison between Slovakia and the Czech Republic

According to the findings, we can state that the same defining characteristics attained the highest interrater reliability score in both countries. They were

Table 2 AC1 coefficient and Cohen's kappa coefficient for nursing diagnosis Acute Pain, in the Czech Republic

No.	Defining characteristics NANDA-I	AC1	Cohen kappa
1.	changes in appetite	0.90	0.86
2.	changes in blood pressure	0.52	0.52
3.	changes in heart rate	0.53	0.41
4.	changes in respiratory frequency	0.46	0.32
5.	VAS (using a pain scale)	**0.96**	**0.65**
6.	excessive sweating	0.67	0.60
7.	inattentive (absent-minded) behavior (e.g. walking back and forth, searching for other persons or activities)	0.88	0.39
8.	expressive behavior (e.g. agitation, moaning, crying, vigilance, sighs, irritability)	0.52	0.20
9.	facial expression (e.g. loss of luster in the eyes, exhausted look, fixed or diffuse movement, grimace)	0.66	0.50
10.	protective behaviors (e.g. the protection of the painful area)	0.32	0.22
11.	reduced alertness (altered time perception, impaired thought processes, reduced interaction with people and the environment)	0.84	0.56
12.	visible signs of pain	0.50	0.36
13.	search reliever position	0.23	0.12
14.	protective gestures (the patient does not allow the painful parts of the body to be touched)	0.88	0.40
15.	dilated pupils	-	-
16.	verbal expression of pain	**0.85**	**0.33**
17.	focus on self	0.90	0.70
18.	disturbed sleep	-0.01	-0.06

F1 – frequency of characteristics observed by the first expert; F2 – frequency of characteristics observed by the second expert

included in the group of *main defining characteristics*, and can be considered as clinically valid for the Department of Surgery and Transplantation Centre of the ICU at Martin University Hospital and the Department of Surgery of the Intensive Care Unit at Brno University Hospital. These are characteristics No. 5 [VAS/ Numerical Record (using of pain scale)] and No. 16 (The Verbal Expression of Pain). Table 3 shows the comparison of values of the total CDV score for Slovakia and the Czech Republic.

Table 3 Comparison of the CDV score for the nursing diagnosis Acute Pain, for Slovakia and the Czech Republic

CDV score	defining characteristics NANDA-I	defining characteristics score > 0.50
Slovak Republic	0.29	0.97
Czech Republic	0.30	0.74

The total CDV score for the 18 defining characteristics for Slovakia is 0.29 and for the Czech Republic 0.30. The total CDV score for two defining characteristics (score > 0.50) for Slovakia is 0.97, and for four defining characteristics for the Czech Republic it is 0.73. There are significant differences in attained scores for all defining characteristics with a score > 0.50. By Fehring's recommendation (1986), nursing diagnoses with overall CDV score > 0.60 should be changed or excluded from NANDA-I Taxonomy II. In the first case, it would be necessary to change the nursing diagnosis, whereas in the second it would not. In our view it would be useful to repeat the clinical validation study to reconfirm our findings.

After comparison of single AC1 coefficient values it can be stated that Experts from both Slovakia and the Czech Republic agreed on five defining characteristics. They are characteristics No. 1 (Changed Appetite); No. 6 (Excessive Sweating); No. 9 [Facial Expression (e.g. loss of luster in the eyes, exhausted look, fixed or diffuse movement, grimace)]; No. 11 [Reduced Alertness (altered time perception, impaired thought processes, reduced interaction with people and the environment)]; No. 10 [Protective Gestures (the patient does not allow painful parts of the body to be touched)]. The attained values confirm good agreement of nurse-experts regarding these five characteristics.

According to the attained values for Cohen's kappa coefficient for the 18 defining characteristics of the nursing diagnosis *Acute Pain (00132)* for Slovakia and the Czech Republic, it can be stated that experts agreed relatively fully only on one defining characteristic, namely characteristic No. 1 (Changed Appetite). The coefficient value implies absolute agreement between experts from Slovakia (1.00), and good agreement between experts from the Czech Republic (0.86). However, it cannot be stated that it is clearly an absolute or good agreement, since each of the attained values is included in a different group.

This can be explained by a disproportion in agreement and disagreement of nurse-experts.

Discussion

Clinical validation contributes to the critical thinking of nurses, helps them set up priority nursing diagnoses, and plan effective intervention to attain the best nursing results.

The aim of this study was to verify, based on clinical validation, whether NANDA-I identified defining characteristics of the nursing diagnosis *Acute Pain (00132)* actually occurred in patients hospitalised in ICU in Slovakia and the Czech Republic, using the Clinical Diagnostic Validity Model.

Slovakian experts agreed unanimously on defining characteristic No. 5 [VAS/Numerical Record (using a pain scale)] in their ratings of 50 reviewed patients. However, it was not possible to calculate AC1 and Cohen's kappa coefficients for this characteristic. The fact that both groups of experts expressed agreement for all 50 of the reviewed patients could suggest no data were measured or that data were distributed absolutely proportionally (Langová, Zapletalová, Ličman, 2012). Nevertheless, a finding of 100% agreement between experts is clinically relevant. The same level of agreement was found for defining characteristic No. 16 (verbal expression of pain). The AC1 coefficient score for this defining characteristic was 1.00, and the Cohen's kappa coefficient value was 1.00. The findings for this defining characteristic express the absolute agreement of nurse-experts when reviewing the patients. 100% agreement was also found for five other defining characteristics: No. 1 (Changes in Appetite); No. 2 (Changes in Blood Pressure); No. 15 (Dilated Pupils); No. 7 [Inattentive/Absent-minded Behavior (e.g. walking back and forth, searching for other persons or activities)]; and No. 17 (Focus on self). Characteristics No. 1, 2, and 15 scored 1 for both AC1 and Cohen's kappa coefficients, indicating absolute agreement of experts. For characteristics No. 7 and 17, for which the interrater reliability score was 0, the frequency of expert agreement on the absence of the characteristic was 50 (100% agreement). AC1 and Cohen's kappa coefficients could not be calculated. The explanation is that these characteristics genuinely did not occur in the reviewed sample (Langová, Zapletalová, Ličman, 2012).

Experts from the Czech Republic agreed in their scoring of defining characteristic No. 5 [VAS/Numerical Record (using a pain scale)] on 48 reviewed patients (96% agreement). The AC1 coefficient was 0.96, and Cohen's kappa coefficient for this defining characteristic was 0.65. Both values indicate good agreement between nurse-experts. For defining characteristic No. 16 (Verbal Expression of Pain), experts agreed on 47 reviewed patients (94% agreement). The AC1 coefficient for this characteristic was 0.85, and Cohen's kappa coefficient was 0.33. This indicates a large discrepancy between agreement and disagreement of nurse-experts (Langová, Zapletalová, Ličman, 2012).

This characteristic is, however, also included under a different name: Presence of Pain Indirectly Indicated by Patient. The characteristic Presence of Pain Indirectly Indicated by Patient was included in the group of secondary defining characteristics by Slovak and Czech nurses (Zeleníková et al., 2011), which differs from the classification used by Siegreen et al. (1995, in Zeleníková, Žiaková, Jarošová, 2011), who include this characteristic in the group of main defining characteristics.

According to the findings, we can state that the same defining characteristics attained the highest interrater reliability score in both countries. Characteristic No. 5 (VAS/ Numerical Record) was included in the group of main defining characteristics in both countries. This finding can be explained by the fact that the subjective one-dimensional scale of the VAS is most commonly used for pain validation in clinical practice in both countries. For example, in the study by Lamplotová and Lamková (2013), focusing on *Validation and record of post-surgical pain from the point of view of surgical nurses*, up to 70% of nurses reported using the aforementioned visual analogue scale for validation of patient pain. The defining characteristic VAS/ Numerical Record (using of pain scale) was included in the list of validated defining characteristics in two research studies focusing on content and clinical validation, which also validated the nursing diagnosis *Acute Pain* or *Pain*. This characteristic is, however, reported under a different name: Presence of Pain Indirectly Indicated by Patient. The characteristic Presence of Pain Indirectly Indicated by Patient was included in the group of secondary defining characteristics by Slovak and Czech nurses (Zeleníková et al., 2011). However, Siegreen et al. (1995, in Zeleníková, Žiaková, Jarošová, 2011) include this characteristic in the group of main defining characteristics.

Another characteristic that can be considered clinically valid for Slovakia and the Czech Republic is defining characteristic No. 16 (Verbal Expression of Pain). In three foreign content validation studies (Metzger, Hiltunen, 1987; Levin et al., 1989; Simon et al., 1995, in Zeleníková, Žiaková, Jarošová, 2011)

and in one clinical validation (Correa, da Cruz, 2000) of the nursing diagnosis Pain, the characteristic The Wording of the Pain was validated as one of the main defining characteristics (Žiaková et al., 2012). This characteristic is based on verbal statements of patients about the presence of pain. It is also the only subjective sign (Zeleníková et al., 2011). This fact confirms that pain is an individual and subjective experience. Therefore we should believe patients if they say that they feel pain (Kulichová, 2009; Málek, Ševčík et al., 2009; Opavský, 2012). Some authors claim that patients' verbal expression of pain is the most reliable indicator, and the gold standard for validation of pain (Arbour, Gélinas, 2011; Souza et al., 2010 in Lucena et al., 2013). Nurses who, in clinical practice, deal with validation of pain by patients often rely on the verbal statements of individuals (Zeleníková et al., 2011). The Institute for Clinical Systems Improvement (ICSI) also states that the most reliable indicator on the presence of pain is the patients themselves (Assessment and Management of Acute Pain, 2008). That could also explain why nurse-experts in our research study included defining characteristic No. 16 (Verbal Expression of Pain) in the group of main characteristics.

Clinical validation contributes to the critical thinking of nurses, helps them set up priority nursing diagnoses, and plan effective intervention to attain the best nursing results. For further research in the area of clinical validation, development and testing of standard terminology in conditions of Slovak and Czech nursing theory and clinical practice, we recommend the replication of the clinical validation of the nursing diagnosis *Acute Pain (00132*) using the same methodology to verify our findings, to attempt to validate nursing interventions and nursing findings in Slovakia and the Czech Republic, to perform clinical validation studies focusing on a variety of clinical environments (internal medicine, surgery, cardiology, haemato-oncology and others, in which there are Intensive Care Units), to focus on preparation of validation tools for objectification of nursing diagnoses and testing of their psychometric characteristics (scales used for patients requiring intensive care), and to perform clinical validation of adopted validation tools (e.g. a scale for pain validation for patients hospitalised in ICU and Departments of Anesthesiology and Resuscitation, requiring intensive care and not capable of verbal communication).

Conclusion

The findings of clinical validation in the Czech-Slovak social-cultural context indicate that, for nurses in clinical practice, the main role is played by defining characteristics related to verbal statements from patients about the presence of pain. It is therefore important to include patients in the validation. Nurses should also be educated about pain indicators, and should: develop skills for recognizing, observing and validating pain; learn to use validation tools; and find adequate and effective solutions for pain. As this is the first clinical validation of the nursing diagnosis *Acute Pain (00132)* in Slovakia and the Czech Republic, it is not possible to generalise from the results. Although we attempted to keep to Fehring's recommendations (regarding the sample of patients), we think it would be appropriate to perform the same study in several medical centres in Slovakia and the Czech Republic, with the same group of patients, or to focus on other specific groups of patients.

An asset to our research study was the active participation of nurse-experts from clinical practice in the implementation of the study. In return, by participating in the research study, experts were able to obtain new skills or strengthen existing ones, and helped us to connect nursing theory with clinical practice.

Ethical aspects and conflict of interest

The survey was carried out with the consent from the deputy director of selected hospitals and hospitalized patients. All participants were informed about the purpose of the study and were assured of anonymity. The survey was a part of a diploma thesis at the University of Brno.

The authors are not aware of any conflict of interest.

Author contribution

Concept and design (MH, KŽ), data collection (MH), data analysis and interpretation (MH, IF, KŽ, RK, EG), manuscript draft (RK), critical revisions of the manuscript (KŽ, EG, RK), final approval of the manuscript (RK).

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