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ORIGINAL PAPER

THE FACTORS AFFECTING PATIENT AGGRESSION SCALE: PSYCHOMETRIC TESTING OF A NEW TOOL

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Abstract

Aim: To report the development and psychometric testing of the Factors Affecting Patient Aggression Scale (the FAPAS), a new attitude scale constructed to measure nurses' perception of miscellaneous factors in terms of their potential to increase the risk of patient aggression against nurses. *Design:* A cross-sectional study. *Methods:* The study was conducted according to the STROBE checklist. Data were collected using the FAPAS between November 2014 and May 2015. Registered nurses (n = 1,220) from nine teaching hospitals across Slovakia were included in the study. Construct validity and reliability of the instrument were tested using SPSS 18.0. *Results:* Resulting from the factor analysis, a six-factor structure was revealed. Six subscales representing specific groups of factors affecting patient aggression against nurses can be conditioned by Gender aspects, Situations of physical and emotional distress of a patient, Nurse-related factors, Factors of nursing shift organization, Patient-related factors, Factors of the nursing workplace environment. The Cronbach's alpha of the instrument was 0.91, ranging from 0.63 to 0.88 for subscales. *Conclusion:* Based on psychometric testing in the Slovak sociocultural context, the FAPAS showed acceptable reliability and construct validity and thus is considered a promising instrument for measuring nurses' perception of miscellaneous factors of patient aggression.

Keywords: acute care, contributing factors, nurses, nurses' perception, patient aggression, psychometric properties.

Introduction

Internationally, patient aggression has been recognized to be one of the most significant and risky issues in the performance of the nursing profession (Pich et al., 2017) as it becomes an integral and permanent part of nurses' professional lives. Nurses are more frequently confronted with aggressive behaviour from patients or their relatives in various clinical settings than other healthcare professionals (Shi et al., 2017) mainly because of their frequent direct contact with the patients (Madani & Hashemi, 2015). However, aggressive incidents are not limited only to specific care areas. The highest risk is reported in an emergency, and mental health areas (e.g., Pich et al., 2017), but nurses are commonly exposed to patient aggression in medical-surgical areas and community settings as well (e.g., Shi et al., 2017; Williamson et al., 2014). In recent decades, the issue of patient aggression has attracted more attention internationally (Cheung et al., 2018) due to an emerging need to understand this phenomenon comprehensively and due to the escalation of violence in society. The impact of this risky issue is widespread, thus necessitating research focused on severe, undesirable consequences on patients, the organization, and nurses. Patient aggression threatens patients' safety, as they become ultimate victims whether or not the aggression is directed at them (Shi et al., 2017; Williamson et al., 2014). Besides, the phenomenon has a negative impact on the organization, as it affects its normal functioning and reputation and contributes to the escalation of healthcare costs and economic consequences due to absenteeism or the loss of capable staff (Roche et al., 2010; Shi et al., 2017). Besides, patient aggression directly affects nurses' health and mental wellbeing, causing instant injuries, such as bruises, lacerations, head injuries, or dislocations, as well as long-term physical and psychological consequences, including post-traumatic stress disorder (e.g., Madani & Hashemi, 2015). Decreased job satisfaction as a result of facing such incidents may result in nurses' feelings of powerlessness, loss of self-confidence, reduction of working spirit, and professional burnout, often leading to a high turnover of nurses, who change workplaces or quit the profession. Also, the quality of provided care is decreased, including

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nurses' lower interactions with patients, reducing contact to an absolute minimum, manifesting less empathy, communicating negatively, and having difficulty understanding the patients' viewpoint as a result of previous experience, which might create an atmosphere of social distance and lead to the onset of new patient aggression (Pich et al., 2017). Nurses' feelings of being angry with patients, together with the stress and anxiety about patient aggression, can also be coped by "going in strong", resulting in overusing control techniques, such as restraints. Because nurses are constantly confronted with difficult and challenging working situations and often with patients' illogical behaviours and expectations, then expressing their experiences and feelings in terms of violence in the wards seems necessary (Madani & Hashemi, 2015). To understand this phenomenon in its complexity, it is crucial to explore factors affecting it. However, patient aggression against nurses is a multifactorial phenomenon resulting from an accumulation of variously related influences affecting the actor of aggression (e.g., inner dispositions, experience gained, and current incentives). Factors affecting patient aggression are variously categorized, reflected and interpreted – for example organic, psychosocial, and environmental factors (Ryan & Maguire, 2006); patient and nurse-related factors; contextual factors, such as environmental and situational factors (Duxbury, 1999); and factors stimulating patient frustration, with its consequent manifestation in aggressive behaviour: environmental stress, cognitive stress, and communication stress, which further specify three levels of aggression-eliciting factors, namely patient, ward, and staff variables (Nijman, 2002). Duxbury and Whittington (2005) formulated three explanatory models that reflect the previously mentioned factors and components of aggression (internal, external, and situational-interactional models). However, aggression against nurses is a complex problem, thus the risk of potential factors is uncertain (Madani & Hashemi, 2015). While some risk factors predispose the nurse or the patient in a certain situation for patient aggression, the research attempts to examine which of them are viewed to be the key determinants of this phenomenon (Child & Mentes, 2010). In this respect, it is beneficial to gain nurses' understanding of various factors' contributions to incidents of patient aggression against them, with the use of attitude scales. There are different types of instruments measuring patient aggression. Most of them are focused on the perception of patient aggression by nurses (e.g., *Perception of Aggression Scale* [Jansen et al., 1997] or *Attitude Towards Aggression Scale* [Jansen et al., 2006]), perceptions of the prevalence of aggression (e.g., *Violence Scale* [Morrison, 1993], *Violence and Aggression of Patient Scale* [Lepiešová et al., 2012], *Survey of Violence Experienced by Staff German Version-Revised* [Hahn et al., 2012], *Perceptions of Prevalence of Aggression Scale* [Nijman et al., 2005], or *Overt Aggression Scale* [Vanderslott, 1998]), attitudes towards aggressive behaviour or aggression (e.g., *Attitudes Toward Patient Physical Assault Questionnaire* [Poster & Ryan, 1989], *Attitudes Toward Aggressive Behaviour Questionnaire* [Collins, 1994], or the strategies of the management of aggression), how they are experienced or perceived (e.g., *The Management of Aggression and Violence Attitude Scale* [Duxbury, 2002]), and modified *MAVAS-L* (Duxbury et al., 2008). Most of these instruments concerning the identification of the frequency of nurses' exposure to patient aggression, nurses' experiences, or perceptions of such a behaviour marginally focus on related factors that may contribute to patients' aggressive incidents. Many instruments also map the relationship between the occurrence of patient aggression against nurses and selected sociodemographic characteristics of respondents, which might be considered as antecedents or contributing factors of patient aggression. However, these instruments are more or less general. They do not explicitly measure the factors affecting patient aggression against nurses nor the meaning assigned to them by nurses in terms of their potential to increase the risk of patient aggression against nurses. Furthermore, most of these instruments are suitable for specific care areas (e.g., psychiatric wards) and internationally, there are a lack of comprehensive tools designed for all types of care units (Cheung et al., 2018). Identifying this gap, we decided to construct a new scale to map these factors from the nurses' perspective – the Factors Affecting Patient Aggression Scale (the FAPAS).

Aim

The study aimed to report the development and psychometric testing of the FAPAS, a new self-report scale constructed to measure nurses' perception of miscellaneous factors of patient aggression against nurses.

Methods

Design

The cross-sectional study design was used to investigate the nurses' perception of patient aggression against nurses. The study was conducted according to the STROBE checklist.

Sample

The study was performed in nine teaching acute care hospitals, with equal representation in all regions of Slovakia. Respondents were selected purposively if they: a) worked as a registered nurse (RN); b) provided direct nursing care to adult patients for at least one year; c) provided the consent to participate. Respondents were excluded if they held a managerial position. The sample size was calculated using the online sample size calculator (Qualtrics®). Until February 2018, the actual number of RNs was 40,885. The confidence interval of 95% and the margin of error of ± 5% was applied. The sample size was set to be at a minimum of 381 respondents.

Data collection

The study was conducted between November 2014 and May 2015. Data were collected using the newly developed *"Factors Affecting Patient Aggression Scale (the FAPAS)"*. The items in the FAPAS were developed based on a review of the literature on patient aggression against nurses and related factors, affecting the occurrence of incidents (Duxbury & Whittington, 2005; Edward et al., 2014; Ferns, 2007; Jansen et al., 2005). The first step in reviewing the literature was the adoption of the explanatory models of the factors (causes) affecting patient aggression from Duxbury & Whittington (2005). Authors classified these factors as follows: internal, external, and situational-interactional factors affecting patient aggression. The second step was focused on analysing the list of miscellaneous factors presented in the systematic review of Edward et al. (2014) and literature reviews of Ferns (2007) and Jansen et al. (2005). Concerning the sociocultural context and current nursing practice in Slovakia, 70 factors affecting patient aggression against nurses were selected, which resulted in the development of the item pool consisting of 70 items and representing miscellaneous risk factors, causes, precipitants, antecedents, and determinants (i.e., the underlying, conditioning, and contributing factors of patient aggression against nurses). The identification of key themes, as well as the critical appraisal of each item formulation, was carried out by the expert panel (four experts from the fields of nursing, psychology, and ethics) using the Delphi technique. The number of rounds for reviewing the instrument and reaching the agreement between experts in the panel was three. The result of the agreement was the 35-item instrument. To assure face-validity, five independent nursing experts assessed the clarity, wording, and understanding of these items and the rating scale as well. The first draft of the instrument was piloted on a sample of 15 hospital nurses who reviewed the tool for its content. Based on comments of hospital nurses, three items were modified. Subsequently, the first version of the tool, initially named F-scale, was used within an empirical study performed in one of the regions of Slovakia, on the sample of 270 nurses (Lepiešová et al., 2014). Due to research limitations, particularly the purposive selection of respondents, limited sample size, and selection of just one geographical region of Slovakia, this study could be considered only a partial one. On the sample of 270 nurses, a preliminary testing of the psychometric properties was performed. The seven-factor structure was revealed in F-scale by exploratory factor analysis, and its reliability and construct validity were concluded to be acceptable in this study. The name of the tool was changed to the FAPAS, to cover the concept it attempts to measure in both, its Slovak as well as English names, and to make their abbreviations identical. The original FAPAS consists of 35 items representing various factors including internal, external, and situational-interactional ones that could contribute to patient aggression against nurses. In the tool, respondents are asked to specify the risk level of these factors by evaluating them on a 5-point rating scale from 1 – the least impact on the risk of aggression, to 5 – the greatest impact on the risk of aggression. A higher score indicates rating the factor as riskier for patient aggression against nurses.

Data analysis

Statistical analysis was performed using the statistical software SPSS version 18. Sample characteristics were analysed by descriptive statistics (frequencies, mean, SD). Psychometric analysis of the FAPAS was analysed through construct validity and reliability analysis. Construct validity was tested with exploratory factor analysis, more specifically with Principal Component Analysis (PCA). PCA is presented as a standard statistical test when exploring the factor structure of the instrument, mainly in newly developed instruments. Also, PCA is focused on the structure; more specifically, it explores how the items form the structure of the instrument and its parts. This method may suggest dimensions "inside the concept" structure as inspected from the factorial validity point of view. Therefore, Varimax was also selected as the rotation method of choice, as we assumed the existence of correlations between items (measuring the topic) (Abdi & Williams, 2010). In order to indicate the suitability of our data for structure detection by factor analysis, factorability of the data was calculated by Kaiser-Meyer-Olkin Measure of Sampling Adequacy

(KMO test) and Bartlett's test of Sphericity. Also, PCA with Varimax rotation and Kaiser Normalization was applied. For variable factor loadings, an absolute value of ≥ 0.5 was set down as the cut-off value. Reliability was examined by determination of Cronbach's alpha coefficient (α_c).

Results

In total, 1,783 questionnaires were distributed in hospitals by head nurses acting as contact persons; 1,251 returned (the return rate was 70.16%), of which 31 were incomplete or failed to meet inclusion criteria and were discarded. The sample consisted of 1,220 RNs. Sample characteristics are fully reported in Table 1.

Construct validity of the FAPAS

The development process of the new instrument is illustrated in Figure 1. The results of KMO test (0.913; considered very acceptable) and Bartlett's test of Sphericity ($p < 0.000$; significant) together with the sample size ($n = 1,220$; subject to item ratio of almost 35:1) proved our data are suitable for factor analysis. In the context of the problem studied, the seven common factors were extracted out of 35 FAPAS items by PCA. While extracting the factors we respected the Kaiser's eigenvalue ≥ 1 principle (Lu, 2007). The cumulative eigenvalue of the factors extracted was 20.47. This set of seven factors explained 58.49% of the total variance in the initial variables (the FAPAS items) in the sample examined. The variance extracted by factor 1 was the highest (eigenvalue 9.53) as this factor explained the most substantial part out of the total variable variance (27.24%). The contribution of factor 2 to the explanation of the total variable variance was 9.71%, for factor 3 it was 6.81%, for factor 4 it was 4.57%. Factor 5 captured 3.81% of the overall variance of the initial variables, factor 6 explained 3.42%, and factor 7 accounted for 2.94% of the total variance. Criteria agreed by the research group conditioned inclusion of the FAPAS items into extracted factors: factor loadings of 0.50 or higher were assumed as significant, having an association with an underlying construct; in the case of cross-loadings, when an item loaded over cut-off value on two or more factors at the same time, the item was retained and allocated to the factor on which loading was higher; one of the conditions was that variable inclusion to the factor made sense from a conceptual and content perspective, as the variable meaningfully and usefully contributed to the underlying nature of a particular factor, its interpretation and identification, and the naming of the concept. Except for two of them, all the FAPAS items loaded only to one of the factors extracted. Item F24 (*personality of a nurse*) loaded over the cut-off on two factors, while both loadings were of almost the same value (loadings 0.505 and 0.506). Item F20 (*equipment hazards in the healthcare environment: furniture or objects that can be used as a "weapon"*) loaded highly on two factors as well. Item F5 (*different ethnicity of a patient*) had no loading over the cut-off value on any of the factors, thus should be excluded from the FAPAS factor structure. In the case of item F16 (*use of restrictive strategies to manage aggression: restraints, medications*), the highest loading was on factor 6 and almost reached the cut-off value (loading = 0.443). For interpretation purposes and to help name the factor it is recommended to use loadings which are about 0.40 or greater (Lu, 2007), thus in this one exception we decided to retain this item and considered its loading value significant. Factor 7 was associated with only one variable with significant factor loading (item F25: *age of a nurse*). According to Raubenheimer (2004), the number of items per factor is crucial and in scales with more than one factor should be as little as two items per factor, although these should be seen as the exception. We decided to exclude factor 7 as well as item F25 from the FAPAS factor structure. Finally, the factor structure of the FAPAS is represented by six factors well loaded by 33 items. Table 2 presents the final factor structure of the FAPAS. The number of items in each factor varies between three (lowest) and nine (highest). The names of factors were derived from the content of items that loaded highly on each factor.

Items in factor 1 are related to gender issues in the nursing profession in general (prevalence of female or male nurses in the profession) as well as in situations of direct interaction with patients while providing nursing care. In this respect, factor 1 was named *Gender aspects* (subscale FAP1). The variables strongly associated with factor 2 can be treated as situations increasing patients' distress, thus potentially contributing to the risk of patient aggression. Factor 2 implies situational causes of aggression with the potential to boost the physical or emotional distress of a patient as the potential actor of aggression towards healthcare professionals; in this respect, this factor was named *Situations of physical and emotional distress of a patient* (subscale FAP2). Seven variables that loaded highly on factor 3 describe the characteristics of a nurse with whom the patient interacts as a potential trigger for patient aggression. In this factor, one general formulation is included (*personality of a nurse*) together with specifically formulated behaviour

of a nurse reflected in nurse-patient interaction in terms of communication, engagement in decision-making, clinical skills, time management skills, and ability to identify patients' needs and solve their problems. Factor 3 variables represent the concept of a nurse possibly contributing to the risk of patient aggression; thus, we decided to name it *Nurse-related factors* (subscale FAP3). Variables in factor 4 imply influences contributing to overloading the nurses such as multiple work shifts, a large number of shifts in a row, and isolated work, as well as workplace safety aspects for nurses. These items are connected with the organization of nursing work and possibly raising the risk of patient aggression by means of increasing the nurse burden or threatening nurse safety, thus factor 4 was named *Factors of nursing shift organization* (subscale FAP4). Variables belonging to factor 5 specify possible causes of patient aggression in terms of sociocultural patterns influencing a patient during formative years (aggression as learned behaviour to solve the problems), patient's abuses (alcoholism, drug addiction) or patient's primary health problems, conditions, or diseases, including mental disorders. In summary, we may conclude these are the selected characteristics of a patient as an actor of aggression, so factor 5 was named *Patient-related factors* (subscale FAP5). Some of the variables in factor 6 describe the healthcare environment from the perspective of selected physical characteristics with potential impact on the safety of nurses making them more vulnerable ("blind" areas, equipment hazards, open or closed nurse stations); others indicate the possible risks of nursing workplaces conditioned by the nature of work in a particular clinical nursing discipline (use of restraints, availability of drugs, etc.). Items F16 and F17 describe nursing workplace characteristics that may contribute to the emotional distress of a patient as a potential actor of aggression. In this respect, the concept represented by factor 6 can be named *Factors of nursing workplace environment* (subscale FAP6). Complex variables of the FAPAS are items F20 and F24, with factor loadings over the cut-off value on two extracted factors. Complex variables were allocated to the factor on which higher loadings were reached, while from a conceptual and content perspective they corresponded with other variables assigned to the particular factor.

Table 1 Sample characteristics

Variable	**n = 1,220**		
Nurse age	**mean ± SD (range)** 40.1 ± 10.1 (19–66) **median** – 40.0		
Nurse experience in nursing (years)	**mean ± SD (range)** 19.5 ± 10.9 (1–49) **median** – 20.0		
		n = 1,220	**%**
Gender	male	1,132	92.8
	female	88	7.2
Nurse education level	secondary vocational education	367	30.1
	higher education in nursing	299	24.5
	university education (bachelor, master degree, phd)	554	45.4
Unit type	surgical care unit	290	23.8
	medical care unit	233	19.1
	psychiatric care unit	381	31.2
	intensive care unit	223	18.3
	oncology care unit	93	7.6

SD – standard deviation

Reliability of the FAPAS

Reliability of the FAPAS was examined in terms of its internal consistency by determination of Cronbach's alpha coefficient. In this study, the Cronbach's alpha value for original 35-item FAPAS was 0.92; after exclusion of F5 and F25 items, it changed to 0.91. Both values are considered "excellent", confirming the instrument is a strongly consistent measure of a concept.

In six subscales of the FAPAS, the Cronbach's alpha ranged from 0.63 to 0.88 (Table 2). This is commonly interpreted as acceptable internal consistency of all subscales apart from the one with the lowest value.

Table 2 Final version of the Factors Affecting Patient Aggression Scale (the FAPAS)*

Factor / *Subscale*	Item	Item content	Loading	Cronbach's alpha
FAP1	F32	Predominance of female nurses in nursing profession	0.692	
	F33	Nursing profession performed by a male nurse	0.764	0.88
Gender Aspects	F34	Gender differences (a nurse and a patient are of the opposite sex)	0.830	4 items
	F35	Gender equality (a nurse and a patient are of the same sex)	0.834	
FAP2	F6	Pain experienced by a patient	0.624	
	F7	Unmet patient needs (frustration)	0.641	0.86
Situations of physical and emotional distress of a patient	F8	Intervention / treatment possibly causing metabolic changes (e.g. Surgery, anaesthesia)	0.577	9 items
	F9	Loss experienced by a patient (e.g. Loss of positive future prospects, body image disturbance, body function changes)	0.682	
	F10	Fear, concerns or psychological strain experienced by a patient (e.g. The fear of diagnostic tests results, the fear of surgery; the need to participate in treatment decision-making)	0.684	
	F11	Nursing interventions requiring intimate proximity to a patient (care involving physical closeness)	0.638	
	F12	Lack of privacy (in terms of physical environment, personal and territorial space)	0.620	
	F13	Long waits (waiting too long for an examination / intervention, in waiting room or at the emergency)	0.648	
	F14	Long-term hospital stay	0.682	
FAP3	F24	Personality of a nurse	0.506	
	F26	Confrontational behaviour / statements of a nurse	0.708	0.84
Nurse-related factors	F27	Failure of a nurse in dealing with conflict	0.790	
	F28	Paternalistic nurse – patient relationship (taking decisions instead of a patient; "dictatorial behaviour of a nurse")	0.764	7 items
	F29	Autonomous nurse – patient relationship (decision-making is shifted to a patient; "dictation of a patient")	0.599	
	F30	Clinical incompetence of a nurse (lack of clinical skills, failure to recognize the needs and solve the problems of a patient)	0.656	
	F31	"Too busy" nurse	0.503	
FAP4	F21	Isolated work of a nurse (only one nurse on a shift)	0.758	
	F22	Multiple shifts job of a nurse	0.668	0.77
Factors of nursing shift organization	F23	Large number of shifts for a nurse (in a row, without free time)	0.692	3 items
FAP5	F1	Aggression and violence as social learned behaviour of a patient (i.e. The established way of solving problems)	0.660	0.63
Patient-related factors	F2	A patient's alcohol and drug abuse	0.706	
	F3	Primary medical diagnosis of a patient	0.545	4 items
	F4	Mental health problems / mental disorder of a patient	0.663	
FAP6	F15	Availability of drugs / addictive substances in nursing workplaces (as cause of aggression, making them targets)	0.607	0.79
Factors of nursing workplace environment	F16	Use of restrictive strategies to manage aggression (restraints, medications)	0.443	6 items
	F17	Closed nurse stations (barrier-based nurse rooms with glass window / wall and a door – usually with just one exit)	0.635	
	F18	Open access nurse stations (reception-type stations with a counter, designed as open-spaced and semi-private)	0.595	
	F19	"Blind" spaces in healthcare environment (e.g. Poorly lighted, dark narrow corridors or lifts)	0.554	
	F20	Equipment hazards in healthcare environment (furniture or objects that can be used as a "weapon", e.g. Vases, paintings, thermos)	0.564	

**The instrument cannot be used or reproduced without the written permission of the authors.*

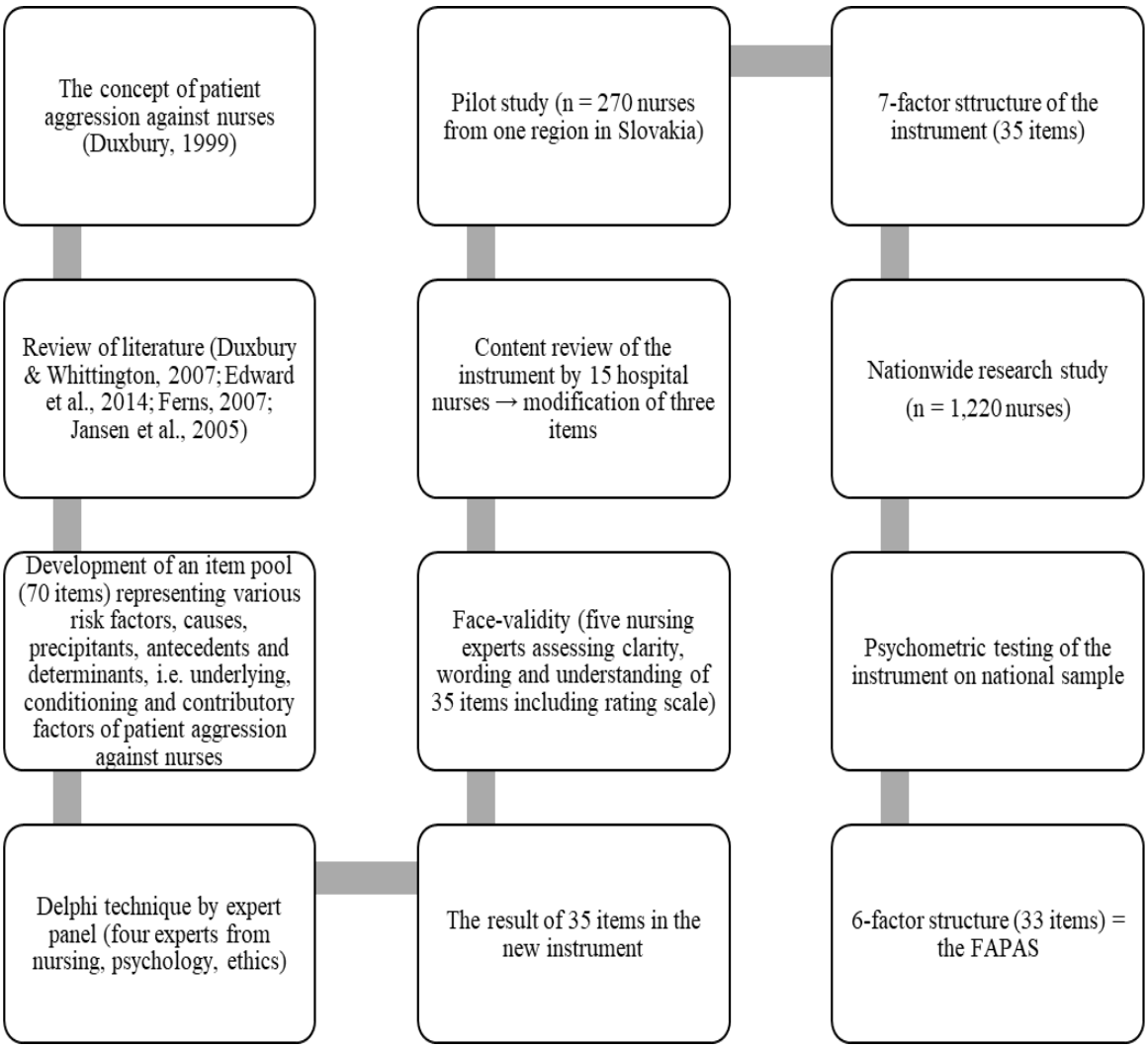

Figure 1 Development process of the new instrument*

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Discussion

The factorability of our data proved to be good, and sampling adequacy was considered very acceptable based on the KMO test and Bartlett's test of Sphericity. Exploratory factor analysis was used to test the construct validity of the FAPAS. This method supported to the use of 33 items retained out of the original 35 ones, as all loaded highly and thus could be placed into one of six factors extracted. Two items (F5: *different ethnicity of a patient*; F25: *age of a nurse*) were excluded from the final factor structure because of poor or problematic loadings. This could have been contributed by respondents' unclear understanding these items due to their general, unspecific wording or unclear formulations. In the case of item F5, respondents' responses could have also been limited by social desirability so that their views are not interpreted in terms of discrimination or the victimization of individuals from ethnic minority groups. By factor analysis, a six-factor structure was revealed as opposed to the original seven-factor one detected in the previous partial study. Six subscales of the FAPAS represent underlying dimensions (constructs) that summarize the original set of variables (i.e., structure the factors affecting patient aggression). As previously stated, the tool was developed intentionally to address nurses' views of miscellaneous risk factors of patient aggression against nurses. The intention was to capture the complexity of factors possibly conditioning patient aggression and contributing to increased risk of this phenomenon in clinical practice; therefore, items of the tool reflect all relevant groups of the causes of aggression covered

by internal, external, and situational-interactional models of aggression, as they are categorized by Duxbury and Whittington (2005).

Items reflected in subscale *Gender aspects* are related to gender issues in the nursing profession in general and in situations of direct interaction with patients while providing nursing care. Hesketh et al. (2003) speak literally about the pervasive influence of gender in nurses' relationships with patients, which can, together with the intimate nature of their work, add to the likelihood of experiencing some form of aggression, including sexual intimidation, gestures, and degrading communication. In most countries, nursing is a predominantly female profession, and in some of them, aggression and violence against women are tolerated. This fact can put nurses and other female healthcare providers at greater risk (International Council of Nurses, 2001). Such statements may indicate that the problem of aggression and violence needs to be studied at the sociostructural level, too, the level of professions and their gender connotations.

Items included in subscale *Situations of physical and emotional distress of a patient* have the potential to boost the physical or emotional distress of a patient as a possible actor of aggression towards healthcare professionals. The patient's actual situation (e.g., fear, lack of privacy) together with the nature of nurses' work (e.g., nursing interventions involving physical closeness) may act as a trigger for patient aggression. Other triggers might be situational and environmental factors, such as the difference between the amount of nursing care required by patients and the amount of care available, or increasing proportion of patients on the wards waiting for care (Roche et al., 2010) but also patients' physical pain and distress (Badger & Mullan, 2004), long waiting times or delays in care (Pich et al., 2017), staff-patient interaction in general (Bowers et al., 2011), and the misinterpretation of intrusion into private space or non-respecting privacy when providing nursing care (Åström et al., 2004). Items reflected in the subscale *Nurse-related factors* describe the characteristics of a nurse with whom the patient interacts as a potential trigger for patient aggression. Situations in which patients are deprived of individuality, dignity, choice, or independence may lead to the tendency to express themselves through aggressive behaviour (Badger & Mullan, 2004). These situations can be directly provoked by the nurse's inappropriate interaction with the patient, reflecting the influence of situational-interactional factors accounting for a large proportion of aggressive incidents (Spencer et al., 2010). Except for item F24 (*personality of a nurse*), all items in this subscale accurately describe the behaviour of a nurse that can be considered unprofessional, possibly resulting in patient aversion stimulation. The subscale *Factors of nursing shift organization* contains factors contributing to the nurse burden as well as factors potentially threatening workplace safety for nurses. Unit-based processes including unit routine, structure, and regime issues do influence adequate staff rostering and staffing levels. All can impact nurses' workload and impact the patients, thus at times they may be the root cause of an aggressive outburst (Bowers et al., 2011; Spencer et al., 2010). Patient factors that play a role in aggression risk in the clinical settings are included in the subscale *Patient-related factors*. Nurses mostly attribute patient aggression against nurses to internal risk factors that are directly linked to the patient and include medical co-morbidities, psychopathology, impaired cognition, thought disorders, substance use, substance intoxication or withdrawal, and patient conflict behaviour (Bowers et al., 2011; Dickens et al., 2013; Duxbury & Whittington, 2005; Spencer et al., 2010). This is conditioned by predominant and traditional biomedical ways of understanding patient aggression, which, in terms of causative and underlying factors of aggression, mainly emphasizes internal characteristics and individual patient variables (Duxbury & Whittington, 2005). The subscale *Factors of nursing workplace environment* reflects external influences representing another significant group of causes of inpatient aggression (Dickens et al., 2013; Duxbury & Whittington, 2005; Spencer et al., 2010). These factors are related to environmental issues – the patients' environment as well as the environment of the whole healthcare facility or the specific workplace. Some of them may be interpreted as stimuli of patient aggression, and others facilitate the manifestation of aggressive behaviour (Dickens et al., 2013).

The topic of patient aggression against nurses seems to be timeless, real, and severe, as evidenced by the results of recent studies carried out in our sociocultural context (e.g., Dimunová & Žemličková, 2020; Magurová et al., 2018) as well as international studies (e.g., Schablon et al., 2018; Yagil & Dayan, 2020). Hence, there is a call for studying the phenomena of patient aggression against nurses even more deeply, also concerning its underlying, conditioning, and contributing factors. Likewise, the topic does not seem to be limited to a certain environment, either sociocultural or clinical, as evidenced by multiple international and comparative studies (e.g., Babiarczyk et al., 2019, 2020; Tomagová et al., 2020).

For an exploration of the factors affecting patient aggression against nurses, the FAPAS seems to be an appropriate instrument for measuring the concept. During the development process of the instrument, items were formulated with the aim to be applicable in various clinical settings, as well as sociocultural contexts. The instrument was developed with the purpose of its use in national studies to explore the phenomena but also in international comparative studies to identify the most contributing factors affecting patient aggression with the aim of its further management. Resulting from the psychometric testing, the instrument is valid and reliable and we recommend using it in further studies.

The findings of our study are limited by the purposive selection of respondents; due to this, our conclusions should be interpreted with caution. On the other hand, psychometric testing of the tool was performed on a more than acceptable sample size and a broad national level, thus the generalizability of the study in the Slovak context may be taken into consideration. Another limitation was that the FAPAS represented one of four instruments distributed in this national study. By such a length, the overall return rate and the response rate for each item may have been lowered, and the reliability of received responses could have been influenced in terms of the response bias, particularly habituation bias. Another possible response bias of social desirability could influence the validity of respondents' responses, particularly those to quite sensitive questions concerning patient-related and nurse-related factors or gender aspects affecting patient aggression. The last possible limitation of the study is the period during which the study was conducted (2014–2015), given that data not older than five years should be used. The time factor may affect the relevance of the data, but in Slovakia, there were no significant changes (e.g., legislative, sociocultural, organisational, and administrative) in the conditions of the Slovak nursing practice, which could influence the relevance of obtained data in our study.

Conclusion

The FAPAS is both a reliable and valid instrument, as presented in our study. Based on the results of psychometric testing performed in the Slovak sociocultural context, the FAPAS is a promising instrument to measure nurses' perceptions of relevant factors as risky (i.e., to have the potential to increase the risk and contribute to patient aggression against nurses in their professional practice). These factors represent miscellaneous causes, precipitants, antecedents and determinants; whereas some of them directly evoke patients' aggression, others increase the risk or facilitate the manifestation of aggressive behaviour. Some of them are unavoidable, but most of them can be controlled or prevented by architectonical and spatial adaptations, organizational and technical measures, or staff educational training. Data obtained by the use of FAPAS may be helpful for managing healthcare facilities to initiate specific measures of further evaluation and improving manageable and controllable factors contributing to patient aggression. In the future, determining which workplaces are at the greatest risk of patient aggression could serve as a starting point for paying more attention to the exploration of this phenomenon. The FAPAS can also be used within comparative studies to compare nurses' views of factors affecting patient aggression in various contexts, including the international one.

Ethical aspects and conflict of interest

The authors haven't found any conflict of interest that would threaten the fundamental publication principles. Psychometric testing of the FAPAS was performed as a part of a nationwide research study approved by the institutional board committee (EC 1118 / 2012). In all selected hospitals, permission to carry out the research study was obtained by the hospital management, the chief nurses, or vice presidents of nursing. Respondents were fully informed about the study, its purpose, and anonymity and agreed to participate in the study by completing and returning the questionnaire.

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Author contributions

Conception and design (ML, JC, KŽ), data analysis, and interpretation (ML, IF, MZ, DK), manuscript draft (ML, IF, MZ, DK), critical revision of the manuscript (ML, DK), final approval of the manuscript (ML, IF, MZ, JC, KŽ, DK).

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