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Attitudes to Patients' Safety Questionnaire in The Arabic Context: Psychometric Properties

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Abstract

Patient safety education is often implicit in undergraduate nursing curricula, making it harder to meet competency standards. The Attitudes to Patient Safety Questionnaire (APSQ-III), which was developed in 2009 by Carruthers and collaborators in the United Kingdom, examines patient safety on a more sophisticated system level and has the potential to lead productive, nonhierarchical collaboration in educational settings. This study's goal was to use rigorous psychometric testing to validate the Arabic version of the Attitudes to Patient Safety Questionnaire (APSQ-III) for nursing students in an Arabic context. The majority of the 217 students recruited for this study through a convenience sampling technique were in their fourth year of college. There were two phases of APSQ-III validation investigations. Initially, three nurses were hired. The team documented their ideas and selected the best one. The Arabic version of the APSQ-III was translated using World Health Organization (WHO) principles. A number of models were developed and evaluated. On the APSQ-III, which had a total of 25 questions, a principal components analysis with equamax rotation was carried out. The analysis revealed that the six higher-order factors with respective eigenvalues of (5.9, 3.1, 2.0, 1.3, 1.2, and 1.1) account for 58.4% of the total variance. All resulting factors contained at least three variables with clean loadings. The APSQ-III, which has been modified for use with nursing students in Jordan and other Arab countries has achieved construct validity and a Cronbach's alpha reliability of 0.80 for measuring attitudes regarding patient safety.

Keywords: Arab, attitudes, patients, safety, validation

Abstrak

Kuesioner Sikap terhadap Keselamatan Pasien dalam Konteks Arab: **Psychometric Properties.** *Pendidikan keselamatan pasien sering kali tidak tersirat dalam kurikulum sarjana keperawatan, sehingga lebih sulit untuk memenuhi standar kompetensi.* Attitudes to Patient Safety Questionnaire (APSQ-III), *yang dikembangkan oleh Carruthers dan kolaboratornya pada tahun 2009 di Inggris, meneliti keselamatan pasien pada tingkat sistem yang lebih canggih dan memiliki potensi untuk menghasilkan kolaborasi yang produktif dan tidak hirarkis dalam lingkungan pendidikan. Tujuan dari penelitian ini adalah untuk memvalidasi versi bahasa Arab dari APSQ-III untuk mahasiswa keperawatan dalam konteks bahasa Arab, dengan menggunakan pengujian psikometrik yang ketat. Mayoritas dari 217 mahasiswa yang direkrut melalui* convenience sampling technique, *berada di tahun keempat kuliah. Ada dua tahap investigasi validasi APSQ-III. Awalnya, tiga orang perawat direkrut. Tim mendokumentasikan ide-ide mereka dan memilih yang terbaik. Versi bahasa Arab dari APSQ-III diterjemahkan dengan menggunakan prinsip-prinsip WHO. Sejumlah model dikembangkan dan dievaluasi. Pada APSQ-III, yang memiliki total 25 pertanyaan, dilakukan analisis komponen utama dengan rotasi equamax. Analisis tersebut menunjukkan bahwa enam faktor tingkat tinggi dengan nilai eigen masing-masing (5.9, 3.1, 2.0, 1.3, 1.2, dan 1.1), menyumbang 58.4% dari total varian. Semua faktor yang dihasilkan mengandung setidaknya tiga variabel dengan* clean loadings. *APSQ-III, yang telah dimodifikasi untuk digunakan mahasiswa keperawatan di Yordania dan negara-negara Arab lainnya, telah mencapai validitas konstruk dan reliabilitas Cronbach's alpha sebesar 0,80 untuk mengukur sikap terkait keselamatan pasien.*

Kata Kunci: *Arab, keselamatan, pasien, sikap, validasi*

Introduction

Educating the healthcare workforce about patient safety has emerged and is widely recognized as an effective tool for safeguarding patients' health (Paul et al., 2023; WHO, 2011).

Since the publication of To Err is Human by the Institute of Medicine (IOM) in 2000, there has been a noticeable push to develop strategies and solutions to reduce patient safety risk (IOM Committee, 2011). As part of their traditional role, nurses, who make up the majority of the health workforce, have been viewed as crucial to protecting patients' health (IOM Committee, 2011). Individually and organizationally, nurses must be equipped with the essential knowledge and skills regarding patient safety issues in order to play a leading role. According to the available research, the early introduction of undergraduate nursing students to patient safety principles has a significant effect on the latter group's long-term patient safety knowledge, abilities, and behaviors (Al Tamimi & Ahmad, 2022; Patient Safety & European Commission, 2014). Undergraduate nursing programs often contain implicit patient safety education, making competency criteria harder to meet. Through thorough psychometric testing, this study verified that the Arabic version of the Attitudes to Patient Safety Questionnaire (APSQ-III), which has been adopted for use with nursing students in Jordan and other Arab nations, is valid and reliable for measuring patient safety attitudes.

Education on patient safety is usually taught in a manner that is more implicit than explicit in undergraduate nursing courses, which may make it more difficult to achieve safety competency standards (Tella et al., 2014). In general, patient safety-related nursing curriculum stress individual safe clinical practices (e.g., Medication security and infection control) (Lee et al., 2020; Usher et al., 2018) and technical skills related to patient safety (e.g., the five medicine safety rights). Non-technical abilities, such as communication and teamwork, appear to be underrepresented in nursing school, despite the fact that these skills are extremely important (Ricciardi & Cascini, 2020).

The challenges associated with incorporating patient safety education into the nursing curriculum are not only related to the content, but also to the evaluation of students' educational needs. A recent systematic review conducted with the intention of evaluating patient safety educational interventions for undergraduate nursing students found heterogeneity in the number and type of targeted samples, educational interventions utilized, assessment instruments utilized, and outcomes measured (Ahmad et al., 2018; Lee et al., 2020). Therefore, it is necessary to have a valid instrument for evaluating the current perceptions and educational needs of students in order to determine the most suitable curricular strategies and educational interventions. In order to do this, it is necessary to have a valid instrument for evaluating the current perceptions and educational needs of students.

Mortensen et al. (2022) carried out a scoping review in order to locate methods for assessing the nursing staff's capacity for ensuring patient safety. All nine instruments identified by the authors for measuring patient safety competencies are self-administered Likert-type scales. The APSQ-III, which was developed by Carruthers and colleagues in the United Kingdom in 2009, is one of the included instruments that assess patient safety on a more complex system level and can be used to guide efficient and non-hierarchical collaboration in education.

Although the APSQ-III is a useful instrument for evaluating attitudes toward patient safety, valid instruments are still required to meet the evolving, diverse, and particular requirements of patient safety research and practice. The ongoing refinement and verification of instruments guarantee their continued efficacy as guiding mechanisms for enhancing patient safety in diverse settings (Shin & Lee, 2024). Other instruments that assess patient safety on a more basic system level include the Patient Safety Culture Questionnaire (PSQ-III), which was developed by Carruthers and colleagues in the United States in 2005 (Cuffee, 2012).

The decision to use the APSQ-III instead of an alternative instrument was based on its reputation for rigor, its psychometric qualities, and its close applicability to nursing students in an

Arabic environment. The original APSQ-III was designed specifically for medical students; it evaluates attitudes toward patient safety across multiple domains. APSQ-III consists of 26 items evaluated on a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree). Additionally, it encompasses nine essential patient safety categories (Patient safety training received, Error reporting confidence, Working hours as an error cause, Error inevitability, Professional incompetence as an error cause, Disclosure responsibility, Team functioning, Patient involvement in reducing error, and Importance of patient safety in the curriculum) (Garcìa et al., 2023).

The first iteration of the APSQ-III exhibited satisfactory consistency across its factorial structure (reliability coefficients ranging from 0.71 to 0.82), and its content validity was found to be adequate (Elorrio et al., 2016). The developers of the original instrument hypothesized that the APSQ-III may be utilized to evaluate attitudes toward patient safety in a variety of other health-related fields and settings (Atwa et al., 2023).

In the nursing literature, Abu-El-Noor et al. (2019) utilized the APSQ-III to measure attitudes of nurses working in government hospitals in the Gaza Strip toward patient safety and to examine factors influencing attitudes. This was done to determine how nurses felt about patient safety. The instrument was translated into Arabic, its face validity was examined, and its Cronbach's reliability was determined to be acceptable at .718% (Abu-El-Noor et al., 2019). To evaluate the effectiveness of an educational intervention on a sample of sixty master's level nursing students, Raines et al. (2016) employed a modified version of the APSQ questionnaire that they had previously developed. Nevertheless, neither the questions nor the psychometric features of the questionnaire were covered in this article.

The instrument was adapted and translated into Spanish (Cervera-Gasch et al., 2021). The author has used 29 items on a 5-point Likert scale (where 1 = strongly disagree; 5 = strongly agree). Their sample size was approximately six participants per item (a total of 177 nursing students), the majority of whom were female (77.4%; n = 137) and proportional to their academic year. It was cut down to 22 components and structured into six dimensions (Responsibility, Organization and communication, Teamwork, Training, Notification, and Consciousness), and the newly developed structure indicated a satisfactory overall internal consistency (= .81), with values ranging from 0.66 to 0.91. Cervera-Gasch et al. (2021) concluded that the APSQ-III has adequate psychometric properties, including good construct validity, internal consistency, and temporal stability.

Due to the paucity of evidence regarding the psychometric properties of nursing education assessments in general, and Arabic contexts in particular, further research is required. The vast majority (95-97%) of Jordan's population consists of Arabs. Jordan is an Arab country located in the northern Arabian Peninsula and West Asia (Dabash, 2023).

Using exploratory factor analysis, the construct validity of a previously validated questionnaire was then evaluated. Factor analysis is a statistical tool for analyzing scores on a large number of variables to determine if there are additional dimensions that describe these variables (Ahmad et al., 2023; Rayan & Ahmad, 2018). Exploratory factor analysis aims to summarize or reduce data by grouping variables that are intercorrelated. The most common method for validating a tool is the principal components (PC) method, which aims to select a set of variables that account for as much of the total variance as possible (Warner, 2013). They arrived at the conclusion that the APSQ-III possesses appropriate psychometric qualities, which include good concept validity, internal consistency, and temporal stability.

On the other hand, to evaluate its psychometric qualities, additional testing with a bigger sample size in a variety of scenarios is necessary.

Thus, a valid instrument that reflects the context and cultural relevance is required. The APSQ-III, which was established in 2009 in the United Kingdom, is indicative of the dominant patient safety attitudes and educational paradigms of that era. The exhaustive description of certain patient safety aspects that are unique to specific educational environments, healthcare systems, and cultures may not be possible in the APSQ-III. Sustaining relevance and applicability across various contexts such as the Arab culture is ensured by the validity of an instrument within this context.

Methods

Design and Setting. Two stages of research were carried out in order to validate the APSQ-III for use with nursing students in the Jordanian environment. Initially, a nominal group of three nurses was formed (two of them are registered nurses who work as quality control staff in governmental hospitals in Jordan, and the third nurse has a master's degree in quality and safety in healthcare management who works as faculty member at one of the Schools of Nursing in Jordan). The term "nominal group technique" (NGT) refers to an organized strategy for group brainstorming that encourages everyone to participate and allows speedy consensus on the relative importance of issues, problems, or solutions. NGT is described as an acronym for "nominal group technique."

The members of the team start by writing down their concepts, and then they vote on which one they think will be the most successful. They did this in order to accomplish their major goal, which was to execute adaptation and translation between cultures. Specifically, they adapted the language to the subject of nursing studies (for example, the term doctor was changed to nurse). Then, the APSQ-III was translated by two professional bilingual speakers into Arabic using WHO guidelines for instrument translation and back translation (Butcher et al., 2019). Then, two expert nurses with a master's degree in quality and safety in healthcare management and who work as quality improvement staff at a private hospital in Jordan evaluated the translation's face validity and provided suggestions for improving its quality.

The Arabic APSQ-III for nursing students has 25 items in six dimensions (Confidence, Causes of errors, Prevention of errors, Professional responsibility, Disclosure responsibility, and Error inevitability). The original version, produced with English medical students, had 26 items on a 7-point Likert scale in nine categories. After implementing the suggested modification, a pilot study with 10 undergraduate nursing students was conducted to assess general comprehension and clarity. These students were conveniently recruited from the School of Nursing at the University of Jordan; the majority (70%) were female, and 50% were in their fourth academic year, while the remaining (10%), (20%), and (20%) were in their first, second, and third academic years, respectively. The results of the pilot study indicated that the final version was comprehensible and that no changes were necessary. In the second part of the research, a cross-sectional study was carried out on nursing students to evaluate the questionnaire's psychometric qualities.

Sample and Sampling. The intended audience was comprised of nursing students from public and private nursing schools in Jordan. It was determined that sample sizes between 5 and 10 subjects per item were adequate (Warner, 2013); On the basis of the number of items on the original scale (26 items), sample sizes between 130 and 260 students were deemed sufficient. Using convenience sampling, 217 students were recruited, the majority of whom were in their fourth year of study.

Ethical Consideration and Data Collection. Prior to data collection, ethical approval was obtained from the ethical committee at the School of Nursing University of Jordan. An online announcement was used to invite participants to participate. The questionnaire description included a comprehensive description of

the study and its purpose. Both privacy and anonymity were ensured. Permission to validate the APSQ-III was obtained from the original author.

No exclusion criteria were used in the collection of data using an online questionnaire sent to nursing students currently enrolled in a bachelor's degree program at one of the nursing schools in Jordan. The questionnaire includes a sociodemographic data sheet compiled by the researchers as well as a translated version of the APSQ-III. The sociodemographic sheet includes information about age, gender, academic year, management, and leadership in nursing courses studied or currently being studied, and patient safety training courses.

Data Analysis. The computer program, SPSS Windows (version 25) was used. The Cronbach's alpha coefficient was used to evaluate reliability, while factor analysis was used to evaluate construct validity.

In this study, a number of models were developed and evaluated based on the following criteria: the correlations between variables, also known as the loading factor, must be greater than 0.40. The eigenvalue, which refers to the weight of each factor, must have a minimum acceptable score of 1, and the clean loading, which refers to the absolute difference between variable loading, must >.20; final, the overall significance of variables within each dimension (Al-Dweik & Ahmad, 2019; Lloret-Segura et al., 2014). Measuring the sample adequacy, the applicability of the factor analysis was validated by the findings of the Kaiser-Meyer-Olkin (KMO) test (KMO = 0.789), as well as the results of the Bartlett's test of sphericity (p .001).

Results

Among the 217 students 67.3% (n = 146) were female and 32.7% (n = 71) were male. The average age of the people in the sample was 21.95 ± 2.6 years that ranged from 18 to 38 years. The majority (70%) were female, and 50% were in their fourth academic year, while the remaining were in their first (10%), second (20%), and third (20%) year. Lastly, the majority of students, 79.3% (n = 172), had never participated in workshops or extracurricular courses related to patient safety. However, 65.9% (n = 143) of the students had completed or were currently enrolled in a management and leadership in nursing course in which they become acquainted with patient safety issues. Regarding nursing experience, only 26.3% (n = 57) had it, with the majority of those working in government hospitals at 16.6% (n = 36) (Table 1). Cronbach's alpha for the translated instrument was .75 which is acceptable for the number of items and the sample size which suggests that the items may not be measuring a single construct.

To determine the stability of the original instrument structure, a factor analysis of the APSQ-III was conducted by forcing a nine-factor structure. The result revealed that the nine-factor model explains 67.7% of the total variance, but five of the nine factors do not meet the requirements to remain within the final structure; one of the nine factors had no retained variables with factor loading >.4, and the other four factors had only two retained variables with impure loading, indicating that the original structure must be modified (Han & Zhang, 2023).

On the APSQ-III, which had a total of 25 questions, a principal components analysis with equamax rotation was carried out (Item 12 "Human error is inevitable" was removed because its loading across factors was low, <.20). The analysis revealed that the six higher-order factors with respective eigenvalues of (5.9, 3.1, 2.0, 1.3, 1.2, and 1.1) account for 58.4% of the total variance. All resulting factors contained at least three variables with clean loadings (Table 2).

Discussion

The goal of factor analysis is to reduce a large

number of variables to a smaller number of factors (Rayan & Ahmad, 2018). This method takes the largest common variance from all the variables and awards each variable a single score. The current study evaluated the construct validity of the APSQ-III for nursing students in an Arabic context using factor analysis. In this study, the number of extracted factors depends on the strength and cleanliness of the variable's loading on the factors; if factor loading is greater than .4 and the absolute difference between loadings is greater than .20, the variable was deemed strong and clean (Ahmad et al., 2018; Nunnally & Bernstein, 1994).

The Arabic version of the APSQ-III for nursing students possesses appropriate psychometric features, such as adequate construct validity, adequate internal consistency, and adequate temporal stability. These psychometric properties are necessary for accurate assessment. However, one aspect of the questionnaire showed low internal consistency (α = .394), consequently, additional testing with alternative samples is required.

Factors affecting the reliability include sources of random errors, which may be attributable to the presence of atypical students who had never received training on patient safety concerns (Alammar et al., 2020; Ayasrah et al., 2024). In the APSQ-III validation in nursing students within a Spanish context, Cervera-Gasch et al. (2021) also reported low reliability in some dimensions. They hypothesized that the dependability results may have been improved with a transcultural adaptation, a more stringent content validity examination, and a bigger sample size.

A typical objective of Principal Components or factor analysis is to determine how few components or factors can be retained while still retaining sufficient information (Ahmad et al., 2024; Tailakh & Ahmad, 2023; Warner, 2013).

Table 1. Demographic Characteristics of the Participants

Variable	n (%)
Age	
Range: 18-38	
Mean (SD)	21.95 (2.6)
Sex	
Male	146 (67.3)
Female	71 (32.7)
Academic Year	
First	15 (6.9)
Second	18 (8.3)
Third	32 (14.7)
Fourth	152 (70)
Management and leadership course	
Yes	143 (65.9)
No	74 (34.1)
Working experience in nursing	
Yes	57 (26.3)
No	160 (73.7)
Working place (n = 57)	
Governmental hospital	36 (16.6)
Primary health care center	4 (1.8)
Nursing Home	9 (4.1)
Private hospital	8 (3.7)
Received training related to safety culture (n = 152)	
Yes	45 (20.7)
No	172 (79.3)

Table 2. Exploratory Factor Analysis as well as Maintaining Internal Consistency for the Selected Model

Item Number and Items	Confidence	Causes of Errors	Prevention of Errors	Professional Responsibility	Disclosure responsibility	Error inevitability
3- My training is preparing me to prevent medical errors	**.755**		.195			
1- My training is preparing me to understand the causes of medical errors	**.711**					
2- I have a good understanding of patient safety issues as a result of my undergraduate medical training	**.685**					
5- I would feel comfortable reporting any errors other people had made, no matter how serious the outcome had been for the patient	**.563**	.283	.202	-.434		
4- I would feel comfortable reporting any errors I had made, no matter how serious the outcome had been for the patient	**.546**		.290	-.459		
6- I am confident I could talk openly to my supervisor about an error I had made if it had resulted in potential or actual harm to my patient	**.457**	.221		-.324	.244	.318
19- All medical errors should be reported	**.433**		.344	-.196		
7- Shorter shifts for nurses will reduce medical errors		**.800**				
9- The number of hours nurses work increases the likelihood of making medical errors		**.782**				
8- By not taking regular breaks during shifts, nurses are at an increased risk of making errors		**.562**				.258
23- Encouraging patients to be more involved in their care can help to reduce the risk of medical errors occurring			**.772**			
22- Patients have an important role in preventing medical errors			**.761**			
21- Teaching teamwork skills will reduce medical errors		.487	**.588**			
24- Teaching students about patient safety should be an important priority in undergraduate training		.451	**.489**			.304
20- Better multi-disciplinary teamwork will reduce medical errors	.204	.443	**.444**			.293
26- Learning about patient safety issues before I qualify will enable me to become a more effective nurse		.356	**.409**			.367
16- Medical errors are a sign of incompetence				**.781**		

Table 2. Exploratory Factor Analysis as well as Maintaining Internal Consistency for the Selected Model

Item Number and Items	Confidence	Causes of Errors	Prevention of Errors	Professional Responsibility	Disclosure responsibility	Error inevitability
15- Most medical errors result from careless nurses				**.666**	.361	
13- Most medical errors result from careless doctors				**.622**	.368	
25- Patient safety issues cannot be taught and can only be learned by clinical experience when qualified					**.730**	
18- Nurses have a responsibility to disclose errors to patients only if they result in patient harm				.217	**.681**	
17- It is not necessary to report errors which do not result in adverse outcomes for the patient				.378	**.622**	
10- Even the most experienced and competent nurses make errors						**.765**
11- A true professional does not make mistakes or errors. (item reversed)			.221	.356	.343	**-.565**
14- If people paid more attention at work, medical errors would be avoided.		.387	.236			**.496**
Cronbach's alpha	**.799**	**.697**	**.787**	**.718**	**.742**	**.394**

In this study, substantial changes were made to the APSQ-structure III's relative to its original form (Carruthers et al., 2009) and the validated version in the Spanish context (Cervera-Gasch et al., 2021). The Arabic version of the APSQ-III for nursing students was reduced to 25 items organized into six dimensions (Confidence, Causes of errors, Prevention of errors, Professional responsibility, Disclosure responsibility, and Error inevitability). The original version, which was developed with medical students in England, consists of 26 items organized into nine dimensions using a 7-point Likert scale, and it was used in this study. Whereas the Spanish version, which was validated using exploratory factor analysis with nursing students, is comprised of 22 items organized into six dimensions using a 5-point Likert scale.

Comparing the APSQ-III structure obtained with that of Carruthers et al. (2009) and Cervera-Gasch et al. (2021) versions, it revealed a nearly identical structure, although it is closer to that of Carruthers and colleagues (the original version). As an illustration, items in this study's confidence dimension are generated from the "patient safety training received" and "error reporting confidence" dimensions included in the original version.

In addition, the "Source of errors" dimension in this study is comparable to the "Working hours as the source of errors" dimension in the original instrument. The "Prevention of errors" dimension includes items pertaining to "Team functioning," "Patient involvement in reducing errors," and "Importance of patient safety in the curriculum." All these factors pertaining to the attitude of students constitute potential methods for preventing medical errors. The items comprising the "Professional responsibility," "Disclosure responsibility," and "Error inevitability" dimensions in the current version and the original version are nearly identical. However, the low reliability score for the factor "Error inevitability" is considered a limitation for this study.

The achievement of adapting and validating the

APSQ-III for nursing students who speak Arabic signifies a substantial advancement in the integration of explicit patient safety instruction into the Arabic nursing curriculum. This research highlights the criticality of incurporating advanced, systemic patient safety principles into nursing education, surpassing implicit curriculum elements to properly fulfill competency standards. Through the implementation of meticulous psychometric evaluations, the research not only validates the APSQ-III practicality in gauging nursing students' attitudes towards patient safety, but also underscores the tool's capacity to facilitate constructive, decentralized collaborations in academic environments. The thorough examination of patient safety attitudes is evidenced by the identification of six higher-order components that account for a significant amount of variance; this reflects the multifaceted character of the patient safety competences that prospective nurses must possess. Consequently, this study enhances comprehension regarding the distinct educational requirements of nursing students in Jordan and potentially other Arabic-speaking areas; it highlights the influence of the APSQ-III in fostering a safety-oriented environment in the healthcare sector via instructional means.

Implications. The adaptation of APSQ-III for Arabic-speaking nursing students underscores the importance of explicit patient safety education. It suggests a shift towards incorporating patient safety as a distinct and measurable component of nursing curricula, potentially leading to better-prepared graduates who can contribute effectively to patient safety in healthcare settings. Furthermore, the translated tool highlights the significance of culturally and linguistically appropriate educational tools. This ensures that patient safety concepts are accurately understood and applied by nursing students, thereby improving the quality of care in diverse patient populations.

Conclusion

The framework of the APSQ-III has been simplified in this study's adapted form for Arabic nursing students. As a result, with one less dimension, the structure has become more coherent and succinct. The APSQ-III that has been developed for Jordanian and Arab nursing students is a valid and reliable instrument for measuring attitudes toward patient safety. Patient safety education is frequently included in undergraduate nursing programs as an implicit component, which may make it more difficult to meet competency requirements. For the purpose of testing attitudes toward patient safety in other Arab nations, the Arabic version of the APSQ—which was modified for use with nursing students in Jordan—is recommended.

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