ORIGINAL RESEARCH

Preliminary psychometric properties of the Arabic version of Sheu and colleagues Perceived Stress Scale among nursing students at Jordanian universities

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Purpose: Nursing is known to be a stressful profession, as it necessitates constant interaction with different individuals in an environment that is described as highly stressed. The stress phenomenon mainly affects the students of nursing more than other health-related students. The Perceived Stress Scale (PSS), which is developed by Sheu and colleagues represents the most implemented instrument to examine stress among nursing students that belong to different cultures in different countries. Previous studies have not fully examined the psychometric properties of the PSS, especially in the Arab World. Therefore, this study aims to assess the psychometric properties of the Arabic version of Sheu and colleagues Perceived Stress Scale (PSS), which is used to measure the clinical stress among nursing students.

Patients and methods: This methodological study utilized a cross-sectional design to test the PSS preliminary psychometric properties among 320 nursing students at 5 Jordanian universities.

Results: The Arabic version of the PSS showed high internal consistency reliability (Cronbach's α was 0.90 in addition to an excellent content validity (CVI was 0.94). The exploratory factor analysis indicated that 54.54% of the total variance was accounted for by the five factors model, which confirmed the construct validity of the Arabic version of PSS. The findings of this study revealed that the Arabic version of PSS can be appropriately implemented among nursing students.

Conclusion: This study supports and recommends the use of the Arabic version of PSS to measure clinical stress among nursing students at Jordanian Universities.

Keywords: validity, reliability, exploratory factor analysis, clinical training, stress

Introduction

Stress has become a commonly used word and concept in both everyday language,[1] and is also a medical concern, for example, the world health organization (who) has described stress as the "21st century epidemic".[2] Many definitions have been given to this phenomenon; and the emphasis depends on the approach or framework being posited.[3] Linguistically speaking, stress is defined as "uncountable or countable pressure or worry caused by the problems in someone's life".[4] Similarly, Lazarus and Folkman (1984) and based on the transactional model of stress, defined psychological stress as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being".[5]

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Nursing is a demanding profession requiring constant interaction with different individuals within a complex clinical environment. Stress has many effects on nurses, such as alteration in their professional skills, absenteeism, somatic illnesses, coronary artery diseases, and alcoholism.[6–9] Nursing students have been reported as more affected by stress than other health-related students.[10] Stress can build the student's knowledge background and enhance performance when it remains at tolerable levels. However, if stress escalates, students will be more prone to make mistakes, lose confidence in their ability to perform their assigned tasks, and potentially fail.[11] In addition, stress can result in health problems such as hypertension, heart diseases, immune deficiency, and depression.[12]

According to Alzayyat and Al-Gamal (2014), nursing students usually encounter stress that is generated from three key sources including academic sources, clinical sources, and personal or social sources of stress. The academic sources of stress comprise assessments and examinations, assignment workload, and the fear of failure. The clinical sources of stress comprise clinical settings, initial clinical experience, the fear of conducting mistakes, the death of patients, and relations with other health team members including superiors' attitudes that are negative and hostile. The personal/social sources involve finance, as well as issues concerning the home-college interface, e.g., lack of free time.[13] Clinical sources of stress are the most stressful stressors for nursing students.[14–16]

To measure stress among nursing students, scholars of nursing used several tools. For example, the Student Stress Survey (SSS) was used to identify the source of stress among Iranian nursing students.[17] The stress in nurse education questionnaire (SNEQ) was used to investigate nursing students' experiences of stress in the United Kingdom.[18] The SNEQ was also used to detect sources of stress among nursing students across five different countries: Albania, Brunei, the Czech Republic, Malta, and Wales.[19] The General Health Questionnaire (GHQ) was used to identify the source of stress among nursing students in Australia[20] and Japan.[21] The Perceived Stress Questionnaire (PSQ) was used to describe stressors among nursing students in the USA.[22] However, several systematic reviews reported that the Perceived Stress Scale (PSS), developed by Sheu and colleagues in 1997, has been the most utilized tool for assessing stress in nursing.[13–15] The PSS was used to assess stressors among nursing students in different countries including Taiwan,[23–25] Hong Kong,[26] China,[27] Philippines,

Greece, and Nigeria,[28] Spain,[29] Turkey,[12] Jordan,[30,32–34] and Saudi Arabia.[35–40] Based on the previous literature, nursing students, including Jordanian nursing students, suffer from several clinical stressors that can inflict a negative effect on their psychological well-being and deter their ability to provide optimal nursing care for their patients.

In summary and based on the existing literature, the PSS tool was utilized among nursing students from different cultures in different countries. However, despite extensive use among nursing students from different cultures in different countries, the PSS psychometric properties of the PSS have not been previously investigated thoroughly. Previous studies investigated mainly the consistency reliability but did not mention other details such as construct validity and content validity or the detailed translation process except for a previous study in Spain.[29] The PSS tool was used in 11 studies in two Arab countries (Jordan[30–34] and Saudi Arabia.[35–40]) However, a validation of the Arabic language version of the PSS has not been investigated so far. The absence of a validated Arabic instrument to assess the clinical stress in the Arab World, where Arabic is the first language, is a real concern. Therefore, investigating a validated tool, which measures clinical stress among the nursing students, contributes to the body of literature as it provides insights into the clinical stress among nursing students. Moreover, this is essential for assessing the impact of interventions, which aim at decreasing the levels of stress among Arabic speaking nursing students in different countries.

This study aims to evaluate the psychometric properties of the Arabic version of the PSS tool among nursing students at Jordanian universities. This study also aims at achieving the following objectives: (i) to translate the PSS from English into Arabic, (ii) to determine whether the PSS is appropriate for the Jordanian nursing students, and (iii) to examine the reliability and validity of the translated Arabic version of the PSS tool.

Materials and methods
Perceived Stress Scale (PSS): development, reliability and validity

The Perceived Stress Scale (PSS) tool was originally developed by Sheu et al (1997) to assess the extent and type of stress as perceived by nursing students at Taiwanese universities. The PSS consists of 29 items rated on a 5-point Likert scale, where (0= never, 1= almost never, 2= sometimes, 3= fairly often, and 4= very often).

The total score ranges from 0 to 116. Higher score indicates a higher degree of stress. The items were clustered into six factors or subscales that related to the source of stress as follows: 1) the first factor consists of 3 items, and it measures "stress from lack of professional knowledge and skills", 2) the second factor consists of 8 items that measure "stress from taking care of patients", 3) the third factor comprises 5 items; this factor measures "stress from assignments and workload", 4) the fourth factor consists of 6 items that measure "stress from teachers and nursing staff", 5) the fifth factor comprises 3 items that measure "stress from the clinical environment", and 6) the sixth factor, which consists of 4 items, measures "stress from peers and daily life". The exploratory factor analysis (EFA) indicated that 50.7% of the total variance was accounted for by the six factors. Sheu et al (2002) reported good internal consistency reliability of 0.89, whereas the one-week test-retest stability reliability coefficient was r=0.60. The content validity index (CVI) was 0.94, which showed excellent levels.[23,41]

Design, setting and participants

This methodological study utilized a cross-sectional design to test the preliminary psychometric properties of the pss among nursing students at five Jordanian universities, including four public universities and one private university in the central province of Jordan. Based on the type and location of the university, a stratified random sampling technique was used to select the five universities from a total of 15 universities offering an undergraduate nursing program in Jordan. The nursing students in the selected universities come from diverse socioeconomic and cultural backgrounds. The classes were randomly selected from each of the five selected universities. The sample size for exploratory factor analysis (EFA) is usually determined based on the number of variables (items) on the scale. As a general rule, the minimum ratio is 10–15 participants for each item.[42] Based on the total number of items in the PSS, which is 29 items, a minimum of 290 participants is required in the study.

Data collection procedures

The data collection procedure was carried out during the academic years from 2015 to 2016. Based on certain arrangements with the administrators of the nursing schools at each of the participating universities, only one elective theoretical class of the second, third, and fourth-year nursing students were randomly selected from each university.

The first-year nursing students do not have clinical courses at hospitals and, therefore, they were not included in the study. Accordingly, the researchers contacted the instructors of those selected classes; they explained the objectives of the study and arranged for the data collection procedure during class sessions. The students' registration list at each class was used to select students randomly. The students, who agreed to participate in the survey, completed two types of self-report questionnaires in 15 mins. The first questionnaire was about the students' demographic data that was designed for this study, whereas the second questionnaire was about the PSS tool.

Ethical considerations

An official permit was obtained to use the PSS English version in this study from the original author. The current study was approved by the Research Ethics Committee at Mutah University (reference number: REC-25/2015).

Scale translation

In this study, the PSS was translated from English into Arabic in accordance with Brislin's model. A well-known method, for constructing reliable and valid instruments for cross-cultural investigations.[43–46] The English-Arabic translation process involved three steps: 1) the translation was conducted from English (the source Language) into Arabic (the target language) by a bilingual expert, 2) back-translation from Arabic into English was conducted by another bilingual expert, and 3) a comparison between the back-translated versions with the original translated version was carried out. The first two steps were carried out by two (different) clinical nurse specialists. These translators were fluent in English and Arabic, and they were familiar with the nature of this study as they worked as clinical instructors for the nursing students. The third step was undertaken by a bilingual expert (an Assistant Professor in clinical nursing), who compared the PSS back-translated version with the originally translated version item-by-item to transfer the semantic equivalence of the translated items. The translator is fluent in English and knowledgeable in instrument development. Moreover, an English native speaker double checked the PSS back-translated version with the originally translated version to achieve an adequate translation.

Pilot study

To assess the PSS, readability, clarity and reliability of the PSS, and to determine if modifications were required

before conducting the main study, a pilot study was conducted on a sample of 30 nursing students, who were enrolled in a clinical nursing course at one of the selected universities. Before embarking on filling out the questionnaires, the researcher directed the nursing students to add their own comments on whether the items are clear or difficult to grasp. Moreover, the students were given the opportunity to suggest new items for the study questionnaires. Therefore, spaces were provided for the qualitative comments after each questionnaire.

The pilot study revealed a few minor issues. First, regarding the addition of new items of the study tools, most of the students' suggestions were implicitly included in the existing items. For instance, it was commented by several students that excessive assignments constitute a stressor. Item No. 15 in PSS, i.e., (requirements of clinical practice exceed my physical and emotional endurance) implies the students' suggestions. Therefore, no new items were identified. Second, regarding the clarity of the tools, the students reported that PSS items were clear and easy to comprehend. Third, regarding the reliability of the pilot Arabic language PSS, Cronbach's alpha was 0.89 indicating good internal consistency reliability. The technique of "Alpha if item deleted" was used to examine the items separately to establish how every item affected the reliability of the scale.[47] However, none of the item's deletion resulted in improving the Cronbach's alpha of the total PSS. Therefore, all PSS items were used in this study.

Data analysis

SPSS Statistics 17.0 was used for data analysis. Descriptive statistics were used to describe the participants' demographics. The psychometric properties of the Arabic version of PSS (content validity, construct validity, internal consistency reliability) were measured using several statistical tests, described in detail in the following section.

Content validity

Content validity can be defined as "the degree to which an instrument has an appropriate sample of items for the construct being measured and adequately covers the construct domain".[48] (p 336) There exist possible differences in the parameters of clinical stress between Taiwanese and Jordanian nursing students. Therefore, the CVI of the PSS Arabic version was evaluated to ensure that the items were familiar to the Jordanian students and their clinical training environment. Therefore, five nursing experts were invited to assess the content validity. All the invited experts had

an adequate background about tools' and they had extensive experience in clinical nursing education. The experts were asked to rate each item of the PSS based on a four-point scale labeled as: "1: not relevant, 2: somewhat relevant, 3: quite relevant, or 4: highly relevant".

Moreover, the panel of experts was asked to evaluate each item separately in the Arabic version of PSS in addition to the overall PSS. The CVI of the total PSS is the proportion of the items that are rated 3 or 4. A CVI score of 0.80 or better indicates good content validity.[49]

Factorial construct validity

The construct validity of the instrument is the degree to which it measures the construct under investigation.[48] The construct validity of the PSS was assessed through Exploratory Principal Component Factor Analysis (PCA) with the varimax rotation method.[50] To determine the number of factors to be retained for interpretation, the criterion of eigenvalues greater than 1.0 was adopted.[50,51] The selection of items for a given factor was based on their factor loadings; items with a minimum factor loading of 0.40 were selected.[48] Assumptions for PCA (Kaiser–Meyer–Olkin (KMO) and Barlett's Test of Sphericity (BTS) were checked.[48]

Internal consistency reliability

The reliability of an instrument is the consistency with which it measures the target attribute. Reliability can be equated with a measure's stability, consistency, or dependability. The internal consistency reliability is the most widely used reliability approach.[48] The internal consistency reliability of the total PSS and the identified subscales from EFA were determined by Cronbach's alpha coefficient. Cronbach's alpha is calculated based on the pairwise correlations between items. The normal range of values is in between.00 and 1.00 and higher values reflect higher internal consistency. The "alpha if item deleted" technique was used to identify whether an item's deletion enhanced the Cronbach's alpha coefficient of the total PSS or subscales substantially.[47]

Results
Demographics of the sample

A total of 350 questionnaires were distributed to nursing students. Thirty questionnaires were excluded because of missing data. Table 1 illustrates the demographics of the 320 participants. The nursing students' age ranged from 20 to 25 years (M=21.15; SD =1.42). The students' academic

Table 1 Demographics characteristics of nursing students (N=320)

Variable	M (SD)	SD	Minimum	Maximum
Age (years)	21.15	1.42	20	25
Academic cumulative score average	2.97	0.33	2.26	3.65
Academic credit hours	16	1.2	12	20
Variable	**n**	**Frequency**		
Gender 　Female 　Male	 272 48	 85.0% 15.0%		
Marital status 　Single 　Married 　Divorced	 276 36 8	 86.25% 11.25% 2.50%		
Employment status 　Full time 　Part Time 　Unemployed	 44 33 243	 13.75% 10.31% 75.93%		
Current university year 　2nd year 　3rd year 　4th year	 48 218 54	 15.0% 68.13% 16.88%		

score ranged from 2.26 to 3.65 out of 4; academic score under 2 is considered weak while 3.65 and above is considered excellent (*M*=2.97; *SD* =0.33). Most of the participants were females (n=272; 85.0%), single (n=276; 86.25%), unemployed (n=243; 75.93%), and third-year students (n=218; 68.13%). The students registered between 12 and 20 academic credit hours during the semesters of data collection (*M* =16; *SD* =1.2).

PSS validity
Translation process
Translation of the PSS from English into Arabic was straightforward due to the simplicity and non-technical language of the original PSS. However, the English native speaker, who checked the back-translated version with the original one suggested that item 8, that is, (feeling anxious when trust and acceptance of patients and their families are lacking) and item 13 (fear of having bad grades) in the back-translated version was rewritten. The English native speaker believed that these items should measure the students' fear of having future stressors as reported in the original version. Accordingly, these items were reworded to reflect future stressors in the Arabic version. In the back-translated version, item 8 was reworded to become

(feeling anxious that I will not be gaining the trust and acceptance of patients and their families), and item 13 was reworded to become (fear of receiving future bad grades).

Content validity
Content validity: the findings of the content validity measurements were mainly positive. The computed item-CVI was 1.00 (the maximum) for 20 from a total of the total 29 items. The remaining nine items had an item-cvi of 0.80. According to the Polit and Beck's (2012) criteria, all the 29 items in the Arabic version of PSS were acceptable. With an overall scale-level CVI for the PSS of 0.94, content validity can be considered excellent.[48]

Construct validity
The KOM test result was 0.88, which indicates sampling adequacy for the factor analysis. BTS findings were statistically significant (X^2=1947.26; DF=406; *P*<0.0001),

Indicating that the correlation matrix is suitable for EFA. Results of the PCA are shown in Table 2. There were 5 factors accounting for 54.54% of the variance. Factor 1 consists of seven items measuring "stress from teachers and nursing staff". Factor 2 consists of six items measuring "stress from taking care of patients". Factor 3 consists of five items measuring "stress from lack of

Table 2 Factor loadings of the Arabic version of PSS items after varimax rotation (N=320)

	Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
25	Lack of care and guidance from teachers	**0.75**	0.11	0.23	0.15	0.20
14	Teachers do not give fair evaluation on students	**0.71**	0.13	-0.15	0.27	-0.22
20	Type and content of teacher's instruction do not meet my expectation	**0.67**	0.03	0.09	-0.16	0.29
21	Pressure from teachers who evaluate students' performance	**0.61**	0.09	0.17	0.11	0.18
1	Experience discrepancy between theory and practice	**0.61**	0.07	0.13	0.15	0.25
17	Medical personnel lack empathy and are not willing to help	**0.59**	0.15	-0.20	0.12	0.06
22	My performances do not meet teacher's expectation	**0.54**	-0.03	0.05	0.09	0.10
3	Unable to provide patients with good nursing care	0.03	**0.77**	0.04	0.01	0.02
2	Lack of experience and ability in providing nursing care and in making judgment	0.11	**0.66**	0.27	-0.05	0.08
11	Unable to reach one's expectation	0.15	**0.65**	0.13	0.27	0.01
10	Unable to provide appropriate responses to doctor's, teacher's and patients' questions	0.02	**0.65**	0.23	-0.06	0.15
4	Do not know how to communicate with patients	0.12	**0.61**	0.09	0.15	0.17
12	Do not know how to help patients with physio- psycho-social problems	0.05	**0.61**	0.11	-0.12	0.18
6	Unfamiliar with patients' diagnosis and treatments	0.04	-0.23	**0.80**	0.30	0.18
7	Unfamiliar with medical history and terms	0.11	0.03	**0.79**	0.05	0.20
28	Unfamiliar with ward's facilities	0.09	0.17	**0.59**	0.21	-0.28
26	Unfamiliar with professional nursing skills when dealing with patients	0.16	0.04	**0.56**	-0.15	0.21
18	Do not know how to discuss patients' illness with teachers, and medical and nursing personnel	0.09	0.12	**0.57**	0.27	0.13
19	Feel that dull and inflexible clinical practice affects one's family and social life	0.12	0.17	0.24	**0.73**	-0.03
15	Feel that the requirements of clinical practice exceed one's physical and emotional endurance	0.11	0.08	0.31	**0.72**	0.05
5	Feel that clinical practice affects one's involvement in extracurricular activities	0.01	0.03	0.50	**0.64**	0.12
27	Feel stressed from the rapid change in patient's condition	0.23	0.01	0.20	**0.55**	-012
29	Feel stressed in the hospital environment where clinical practice takes place	-0.14	0.07	0.22	**0.54**	0.15
16	Experience pressure from the nature and quality of clinical practice	0.03	0.14	0.17	**0.47**	-0.01
24	Experience competition from peers in school and clinical practice	0.10	0.21	0.08	0.28	**0.61**
8	Feeling anxious that I will not be gaining the trust and acceptance of patients and their families	0.40	0.30	0.01	0.02	**0.55**
9	Experience difficulties in changing from the role of a student to that of a nurse.	0.00	-0.21	0.08	0.11	**0.53**
13	Fear of receiving future bad grades	0.12	0.05	0.42	0.15	**0.52**
	Initial eigenvalues	8.80	2.52	1.68	1.56	1.26
	Percentages of variance explained	30.34	8.68	5.79	5.38	4.35
	Cumulative variance	30.34	39.02	44.81	50.19	54.54

Notes: Item 23 has been excluded since it did not have any significant load (≥0.4) in any of the five identified factors. Factor loadings in bold mean the items were assigned to the designated factor.

professional knowledge and skills". Factor 4 consists of six items measuring "stress from the nature of clinical practice". Factor 5 consists of four items measuring "stress from the student's role demands". From the original 29-item set, item 23 was removed since the factor loading of this item was lower than 0.40, and this item did not fit well into one of the five identified factors. Three items with substantial loadings on more than one factor (items 5, 8, and 13) were assigned to the factor with the highest loading. Table 3 illustrates a comparison between the English and Arabic versions of the PSS. The table showed that factors 1, 2 & 3 in the Arabic version correspond to factors 4, 2 and 1 in the English version respectively.

Internal consistency reliability

The total PSS scale alpha coefficient was 0.90, which indicates an excellent internal consistency. The Cronbach's alphas of the five subscales ranged from 0.65 to 0.83. All items were retained as "alpha if item deleted" showed that deletion of any item did not lead to an improvement in the Cronbach's alpha of the total PSS or its subscales. The reliability tests of the total PSS and the five factors in this study are summarized in Table 4.

Discussion

Clinical stress was frequently has been frequently evaluated using the PSS, which was designed for nursing students with adequate English language skills. However,

applying the original, English language PSS in the Jordanian context potentially has limitations due to language and cultural variations. This study aimed to translate and evaluate the psychometric properties of the PSS among Jordanian nursing students. It was concluded that the translation process was successfully conducted and that the PSS Arabic version is suitable to be utilized for nursing students that are native speakers of Arabic. This result was further supported by the panel of experts, who examined the CVI of the Arabic version of PSS and reported that the items adequately measured all the dimensions of the clinical stress construct. The CVI of the Arabic version PSS was 0.94, which is similar to the original scale.[23] This reflects an excellent level.[48]

The Arabic language PSS resolved in to a five-factors model reflecting different sources of stress perceived by students during clinical practice. Accounting for 54.54% of the total variance, in comparison with the six-factor model, which explained 50.7% and 56.11% of the total variance of the original version[23] and the Spanish version[29] respectively.

While the factors total number and order differed somewhat, similar factors emerged across the two versions and for three of the factors in the Arabic version, the names of the factors were retained, because the items' grouping of the factors in the Arabic version is somewhat like those of the English version. The fourth factor in the Arabic PSS "stress from the nature of clinical practice"

Table 3 Comparison between the English and Arabic versions of the PSS of 28 Items loaded on five factors

Factor rank	English PSS Subscales	Factor rank	Arabic PSS Subscales
	# of items, items loaded		# of items, items loaded
4	Stress from teachers and nursing staff (6 items), **1, 14,17**, 18, **20, 25**	1	Stress from teachers and nursing staff (7 items) **1, 14, 17, 20**, 21, 22, **25**.
2	Stress from taking care of patients (8 items), **2, 3, 4**, 8, 9, **10, 11, 12**	2	Stress from taking care of patients (8 items) (6 items) **2, 3, 4, 10, 11, 12**
1	Stress from lack of professional knowledge and skills (3 items), **6, 7, 26**	3	Stress from lack of professional knowledge and skills (5 items) **6, 7**, 18, **26**, 28
3	Stress from assignments and workload (5 items), 11, 13, **15, 16, 19**	4	Stress from the nature of clinical practice (6 items) 5, **15, 16, 19**, 27, 29,
6	Stress from peers and daily life (4 items), **24**, 21, 5, 23(omitted from new scale)	5	Stress from student's role demands (4 items) 8, 9, 13, **24**
5	Stress from clinical environment (3 items) 29, 28, 27		

Notes: Items in bold were matched in the subscales between the English and Arabic versions of the PSS.

Table 4 The factors structure of the Arabic PSS scales and its Cronbach's alpha (α)

Item number	28 Items/5 PSS Subscales	α
	Total perceived stress scale	0.90
Factor 1	**Stress from teachers and nursing staff**	0.83
25	Lack of care and guidance from teachers	
1	Experience discrepancy between theory and practice	
22	My performances do not meet teacher's expectation	
20	Type and content of teacher's instruction do not meet my expectations	
14	Teachers do not give fair evaluation on students	
21	Pressure from teachers who evaluate students' performance	
17	Medical personnel lack empathy and are not willing to help	
Factor 2	**Stress from taking care of patients**	0.78
11	Unable to reach one's expectation	
4	Do not know how to communicate with patients	
10	Unable to provide appropriate responses to doctor's, teacher's and patients' questions	
3	Unable to provide patients with good nursing care	
12	Do not know how to help patients with physio- psycho-social problems	
2	Lack of experience and ability in providing nursing care and in making judgment	
Factor 3	**Stress from lack of professional knowledge and skills**	0.83
28	Unfamiliar with ward's facilities	
18	Do not know how to discuss patients' illness with teachers, and medical and nursing personnel	
7	Unfamiliar with medical history and terms	
6	Unfamiliar with patients' diagnosis and treatment	
26	Unfamiliar with professional nursing skills when dealing with patients	
Factor 4	**Stress from the nature of clinical practice**	0.78
19	Feel that dull and inflexible clinical practice affects one's family and social life	
27	Feel stressed from the rapid change in patient's condition	
29	Feel stressed in the hospital environment where clinical practice takes place	
16	Experience pressure from the nature and quality of clinical practice	
15	Feel that the requirements of clinical practice exceed one's physical and emotional endurance.	
5	Feel that clinical practice affects one's involvement in extracurricular activities	
Factor 5	**Stress from student's role demands**	0.65
8	Feeling anxious that I will not be gaining the trust and acceptance of patients and their families	
9	Experience difficulties in changing from the role of a student to that of a nurse.	
13	Fear of receiving future bad grades	
24	Experience competition from peers in school and clinical practice	

comprises items from the third factor "stress from assignments and workload", as well as the fifth factor of the English PSS. The remaining items were included under the fifth factor, which was labeled as "stress from the student's role demands. Fourteen from a total of 28 items in the Arabic version of the PSS were distributed across 3 similar factors to the original English version. These 3 factors in the Arabic version are therefore conceptually equivalent with the original instrument. Another Fourteen items were loaded onto factors that were different from those of the original English version. Such inconsistencies are most likely to happen because of dissimilarities that are inherent

to the samples utilized for analysis (such as sample size and sample recruitment method) or differences in the composition of the clinical educational programs rather than because of contradictory representations of the clinical stress construct.

The results of this study, however, indicated that the proposed PSS model needs some modifications, especially in terms of the included items. Given the obviously inappropriate loadings of item 23 remarked in EFA, it was determined to eliminate this item from the proposed PSS model as it should not be incorporated in the computation of the PSS scores. Item 23, that is, (cannot get along with

other peers in the group) may represent a significant stressor in the earlier context of the PSS development. In the Jordanian context, the cultural factors may normalize this stress in the perceptions of nursing students as there are strong and positive affiliations between students' classmates in Jordan. Furthermore, these affiliations are usually used by the students to buffer stress instead of being a source of stress.[52] Therefore, a critical evaluation of item 23 wording, as well as replication of the study findings in different contexts (e.g., in another Arab world country) are recommended in future studies. Moreover, further research should aim to confirm the status of item 23 in the PSS model by confirmatory factor analysis procedures.

Regarding the PSS reliability, the Cronbach's alpha coefficient of the total PSS scale was 0.90 in this study compared with 0.89 of the original scale. This is in accordance with results reported in previous studies from Jordan[33] and Saudi Arabia,[38] but less than those reported by studies from Spain[29] and Turkey.[12] In general, The results indicated that PSS has excellent internal consistency reliability. According to Polit and Beck (2012), the first four identified factors of the PSS achieved reasonable internal consistency reliability ($\alpha \geq 0.7$). However, the last identified factor (i.e., student's role demands subscale) achieved relatively inadequate internal consistency reliability ($\alpha < 0.7$). This is partly because of the minimal number of items loading on the fifth factor.[48]

In summary, the five-factor model of PSS was found to be valid, reliable, and empirically supported. The results of this study showed that the 28-item PSS and the five-factor solution achieved the necessary validity of the scale among the nursing students at Jordanian universities.

Limitations

The findings of this study are promising, and they contribute to the development and validation of the PSS model. However, a few limitations should be acknowledged. First, the utilized sample is comparatively homogenous (female nursing students in the third year of their study). Therefore, generalizing the study results can be limited. Second, the current study has only examined the content and constructs validity in addition to consistency reliability. Therefore, the authors recommended further studies to explore other dimensions of psychometric properties such as the stability reliability, the criterion-related validity, and predictive validity of the PSS model. However, the confirmatory analysis of the five-factor model of the PSS is a necessary second step, which is

highly recommended before the validation of this tool to measure clinical education stress among Arab-native nursing students.[42] These studies would be useful in evaluating stress resources during clinical training. At the same time, they would provide opportunities to compare the differences in the perceived level of stress between Eastern and Western nursing students.

Conclusion

This study has offered initial evidences for the validity and reliability of the Arabic version of the PSS. The Arabic version of the PSS appears to be an appropriate tool to measure nursing students' clinical stress. It showed high internal consistency reliability (Cronbach's alpha was 0.90), and excellent content validity (CVI 0.94). The exploratory factor analysis indicated that 54.54% of the total variance was accounted for by the five factors model and supported the construct validity of the Arabic version of PSS. Future work should validate the hypothesized PSS model in this study in a more diverse and larger sample of nursing students, using more advanced confirmatory analyses that boost the obtained results of this exploratory study. Moreover, the impact of deleting or re-development of the low-loading items on the whole PSS performance should be verified. To conclude, this study supports and recommends the use of the Arabic version of PSS to measure clinical stress among nursing students at Jordanian Universities.

Disclosure

The researchers declare that there are no conflicts of interest to disclose.

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