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Psychometric assessment of the learning needs for disaster nursing scale Arabic version among baccalaureate nursing students in Saudi Arabia

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ABSTRACT

This study assessed the psychometric properties of the "Learning Needs for Disaster Nursing Scale-Arabic version" (LNDNS-A) among baccalaureate nursing students in Saudi Arabia. A quantitative, methodological approach was performed to establish the psychometric properties of the LNDNS-A. The investigation was conducted in one university situated in the central region of Saudi Arabia. A sample of 204 student nurses was surveyed in this study with an average age of 21.30 (standard deviation = 2.35). The "Learning Needs for Disaster Nursing Scale" was culturally and linguistically adapted to LNDNS-A. Validity and reliability tests were performed to support the psychometric properties of the LNDNS-A. For validity, content validity was established and "principal components analysis" (PCA) with varimax rotation was used for construct validity of the tool. Cronbach's alpha was computed to establish the internal consistency reliability. The demographic characteristics were treated using descriptive statistics. The findings showed that the content validity of the LNDNS-A was acceptable. The PCA supported the three-factor scale: "Skills and knowledge in disaster relief," "Discipline introduction," and "Disaster management," with a cumulative explained variance of 63.7%. The entire scale computed Cronbach was 0.943, and 0.927, 0.806, and 0.987 for the three subscales, respectively. LNDNS-A is valid and reliable when used among Arabic-speaking baccalaureate nursing students. LNDNS-A can be used to accurately assess the learning needs of disaster nursing of Saudi student nurses and possibly other Arabic nursing students, expanding the scientific research on this area in the Arabic peninsula.

1. Introduction

The ongoing threat of disasters intensifies the recognition of nurses' roles in disaster response to handle critical situations [1]. Hung et al. [2] argued that it is not only nurses who need to respond to disasters but also nursing students. To respond competently to public health emergencies, nursing students should have basic knowledge and skills in disaster response. Several nursing institutions developed programs to increase their students' learning in disaster response. For example, disaster drills have been conducted to build

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competence in disaster management skills during a situation that arises [3]. Also, participation in disaster nursing training and educational programs prepares nursing students for disasters [4]. Brinjee et al. reported that disaster nursing preparedness, response, and management processes begin with identifying the student's learning needs in a disaster [5]. Awareness of disaster learning needs may prompt them to develop new skills to respond competently during disasters. Exploring their disaster learning needs will enable future nurses to improve their disaster awareness and help the educational system create new policies during catastrophic events. This endeavor, however, needs a valid and reliable instrument that can accurately assess the learning needs for disaster nursing among students.

2. Background

In today's time, disasters are becoming more prevalent, and Saudi Arabia is considered a hazard-prone country [6]. The increasing frequency of disasters in the country is widely attributed to several factors, such as climate change, increasing population growth, rapid urbanization, and geographical location [6]. Disasters place individuals into emergencies, which can be devastating as they result in various losses and impacts, including those affecting human life, property, the economy, and the environment [3]. Disasters result from a combination of "hazardous events" exposure, the presence of situations of vulnerability, and inadequate capacity to reduce or cope with possible adverse effects [7]. The different impacts of disasters could be prevented or mitigated with an organized, scalable disaster response system management [8]. A crucial step in developing disaster preparedness is assessing healthcare professionals' learning needs [3].

Nursing education is critical in preparing nursing students for disaster management by educating nursing students with the necessary knowledge and skills in disaster response [4]. Hindriyastuti et al. argued that nursing students are key players in disaster response [9]. Nursing students must acquire adequate knowledge, training, experience, and psychological readiness to act during disasters. Assessing nursing students' disaster nursing learning needs is an essential part of their disaster preparedness education [10,11].

A literature review of disaster education from 1990 to 2017 stated that "disaster education is a functional, operational, and cost-effective tool for risk management" [10]. The review further argued that disaster education is most impactful in the preparation stage [10]. The benefits of disaster education can be amplified when individuals know their disaster learning needs to become more ready and resilient to disaster effects [12]. Individual learning needs assessment could provide critical information for forming disaster training, learning, and improving disaster response needs. Thus, assessing nursing students' disaster learning needs is necessary for planning and providing competency-based disaster education and training programs [5].

Different educational institutions in many countries have started offering disaster nursing education or training programs. The disaster nursing concept has been integrated into the nursing curricula as a standalone course or incorporated into other nursing courses [5]. In Saudi Arabia, disaster education programs typically focus on healthcare professionals' education in various healthcare institutions [13]. In some universities in the country, disaster nursing is integrated into nursing courses, such as Community and Family Health Nursing. Standard needs assessment strategy of disaster is considered the priority in developing continuing education courses; however, to the authors' knowledge, this had yet to be thoroughly examined in the country.

Although numerous disaster-related research among nursing students have been conducted, there is insufficient research on examining a valid and reliable tool to assess learning needs for disaster nursing in Saudi Arabia. Developing an Arabic version of a tool assessing the learning needs for disaster nursing, specifically for nursing students, could help to bridge this gap. One of the validated scales that can be used to assess the learning needs for disaster nursing is the "Learning Needs for Disaster Nursing Scale" (LNDNS) [11]. According to Wang et al. [11], the tool has strong psychometric properties and can accurately assess baccalaureate nursing students' disaster nursing learning needs. Thus, this tool could also be adapted to Saudi Arabia to benefit nursing education and policymakers.

2.1. Aim

This research assessed the psychometric properties of the LNDNS Arabic version (LNDNS-A) among Bachelor of Science in Nursing (BSN) students in Saudi Arabia.

3. Methods

3.1. Design

This research was a quantitative investigation with a methodological approach. In this study, the psychometric properties of the LNDNS-A were supported by "content validity," "construct validity," and "internal consistency reliability."

3.2. Setting and samples

The investigation was carried out on one of the campuses of a university situated in the central region of Saudi Arabia. The BSN program of the university comprises four years of study. The first year is the preparatory year, where students take courses in basic sciences and Arabic courses. Nursing courses are taken from the 2nd to 4th year of the program. After completing the four-year BSN program, the students will undergo a 48-week hospital-based internship in university-recognized hospitals. The topic of "disaster nursing" is embedded in the "Community and Family Health Nursing" course of the program.

The study included students enrolled in the second, third, and fourth years of the BSN program. First-year students were not considered in the study because they are in the preparatory program of the university and are not yet taking nursing courses. During the data collection period, 239 students were qualified to participate in the investigation. Convenience sampling was utilized in the

study. All students were invited, and data from 204 BSN students (response rate = 85.4%), who agreed to participate, were included in the analysis. This sample size is enough to conduct the statistical analysis to establish the psychometric properties of the tool (10 samples for each scale item) [14].

3.3. Measures

The data collection tool used in the study was an online survey comprising the demographic characteristics section and the LNDNS-A. The demographic characteristics collected in this study include age, gender, year level, place of residence, having learned disaster nursing in any nursing course, and if the student attended seminars/training on disaster nursing in the last 12 months.

The LNDNS was developed by Wang et al. [11] to evaluate the nursing students' disaster nursing learning needs. This 19-item, 5-point Likert scale (1 = "strongly dis-agree," 2 = "disagree," 3 = "partly agree," 4 = "agree," 5 = "strongly agree") questionnaire has three factors, namely "discipline introduction" (5 items), "skills and knowledge in disaster relief" (9 items), and disaster management (5 items). The following lead sentences were used before the scale items: "The following items assess your learning needs for disaster nursing. Please read each item carefully and let us know how much you agree about the need to learn these topics in nursing education." Scores from all the items are added to create the overall and subscales score. A high score implies a more significant need for disaster nursing. The EFA and CFA provided evidence on the three dimensions that constitute the scale. The computed Cronbach's alpha of LNDNS was 0.89, and the "intraclass correlation coefficient" (ICC) was 0.87, respectively [11].

3.4. Translation of the LNDNS to LNDNS-A

The LNDNS was translated into Arabic utilizing the "forward-backward translation method." Two Arab language translations were accomplished independently by 2 Saudi assistant professors in nursing. A certified translator created a single Arabic version (LNDNS-A) based on the two separate translations. The LNDNS-A was translated back to English separately by two translators. The outcomes of the back translation and the LNDNS-A were examined by a panel comprising five members for "semantic, idiomatic, experiential, and conceptual equivalence." After finalizing the Arabic version, the LNDNS-A was pre-tested among 30 Saudi baccalaureate nursing students. They were asked to answer the survey and comment on the tool's clarity and ease of use. The panel then rated the LNDNS-A for its content validity [15].

3.5. Ethical considerations and data collection procedure

This report is part of a protocol approved by the university's ethics committee (BLINDED). Participation in the study was voluntary. The recruitment message containing the Survey Monkey link was forwarded to the 239 students through social media. The beginning of the online survey contained the study's information and respondents' rights. The lead researcher's contact detail was indicated in the same part of the online survey to allow any questions or clarifications about the study. The student nurses who wanted to volunteer were asked to click "yes, I agree" in the electronic informed consent. Those who decided not to participate exited the survey, and no information was collected. The researchers sent reminders every week to ensure an adequate sample. The data collection was performed in May 2021.

3.6. Data analysis

The data analysis for this study was conducted using the SPSS version 22.0. To establish the psychometric properties of the LNDNS-A, the validity (content and construct) and reliability (internal consistency) were examined.

3.6.1. Validity tests for the LNDNS-A

The content validity was analyzed by computing the "item-level content validity index" (I-CVI) and "scale-level content validity index averaging method" (S-CVI/Ave) using the data from the ratings of the five experts [16]. "I-CVI" tests the content validity at the individual item level, while "S-CVI/Ave" tests for the overall content validity of the entire scale. The researchers asked five experts in "disaster nursing" to evaluate the relevance of each item of the LNDNS-A to "learning needs in disaster nursing" among Saudi nursing students using a four-point scale (1 = "not relevant," 2 = "somewhat relevant," 3 = "quite relevant," and 4 = "highly relevant" [5]. Following the recommendation of Polit and Yang, responses that were "not relevant" and "somewhat relevant" were coded as zero (0). In contrast, responses that were "quite relevant" and "highly relevant" were coded as 1 [16]. Polit and Yang [15] suggest that the accepted values for I-CVI and S-CVI/Ave are one due to the number of experts who provided their ratings (5 experts). The construct validity of the tool was examined using "PCA with varimax rotation." Before conducting the PCA, descriptive analysis, such as the computation of "item-total correlations" (ITC) and Cronbach's alpha of the tool if the item is deleted, were performed. An ITC between 0.30 and 0.80 were deemed acceptable and indicated retention of the item. For components extraction, Eigenvalues of more than one and factor loadings of more than 0.40 were used as parameters [17]. In addition, the different subscales were correlated with each other to support its construct validity using "Pearson's product-moment correlation."

3.6.2. Reliability test for the LNDNS-A

Cronbach's alpha was computed for the whole scale and its subscales to support the internal consistency of the LNDNS-A, with values of 0.70 and above indicating good reliability [18].

4. Results

Table 1 reflects the demographic characteristics of the 204 student nurses surveyed in this study. The students had an average age of 21.30 (standard deviation = 2.35). Most students are male (52.0%) and live in urban communities (64.2%). The fourth-year nurs-

Table 1
Demographic variables of the respondents (n = 204).

Variable	Mean (SD)	n	%
Age[a]	21.30 (2.35)		
Gender			
Male		106	52.0
Female		98	48.0
Year level			
2nd year		68	33.3
3rd year		54	26.5
4th year		82	40.2
Place of residence			
Rural		73	35.8
Urban		131	64.2
Learned about disaster nursing in any nursing courses			
No		153	75.0
Yes		51	25.0
Attended seminars/training on disaster nursing that are not part of the nursing curriculum of the university in the last year			
No		24	11.8
Yes		180	88.2

Note. [a]Range = 18-35.

ing students constituted the most significant number of respondents (40.2%), followed by 2nd-year students (33.3%) and 3rd-year students (26.5%). Most student nurses did not learn disaster nursing in any nursing courses (75.0%), while most attended seminars/training on disaster nursing in the last year (88.2%).

Item Mean, Item-Total Correlation, and Cronbach's Alpha if Item is Deleted.

In Table 2, the item with the highest mean was item 6, "Common knowledge and skills of disaster rescue" (mean = 4.36, standard deviation = 0.83). In contrast, the item with the lowest mean was item 1, "Related concepts and characteristics" (mean = 3.79, standard deviation = 0.96). The average of the scale was 4.14 (standard deviation = 0.67). The subscale "Skills and knowledge in disaster relief" was rated the highest (mean = 4.24, standard deviation = 0.75), followed by "Disaster management" (mean = 4.15, standard deviation = 0.80), then "Discipline introduction" (mean = 3.95, standard deviation = 0.71). The corrected ITC of the scale's 19 items ranged from 0.48 (item 5, "Interpersonal relationship and coordination") to 0.75 (item 6, "Common knowledge and skills of disaster rescue" and 10, "Occupation protection of medical staff"). The values of the scale's Cronbach's alpha if the item is deleted ranged from 0.939 to 0.943.

4.1. Validity of the LNDNS-A

For the content validity of the LNDNS-A, the I-CVIs of the 19 items were all 1.00, and the S-CVI/Ave was 1.00, implying acceptable content validity. The PCA supported the three-factor solution of the scale, with each extracted component having eigenvalues more than 1.00. The three components extracted had a cumulative explained variance of 63.7%, "Kaiser–Meyer–Olkin test" value [KMO] = 0.93, Bartlett's test $p < .001$. Table 3 shows that items 6 to 15 loaded in component 1 with an explained variance of 50.0%

Table 2
Item mean, Corrected Item-Total Correlations and Cronbach's α if item deleted for the Learning Needs for Disaster Nursing Scale Arabic version.

No	Items	Mean (SD)	Corrected Item-Total Correlation	Cronbach's α if item is deleted
1	Related concepts and characteristics	3.79 (0.96)	0.52	0.942
2	Current status and future of disaster nursing	3.99 (0.89)	0.61	0.941
3	Nurses' roles and tasks in a disaster	4.18 (0.97)	0.62	0.941
4	Ethical issues in disaster nursing	3.98 (0.95)	0.58	0.941
5	Interpersonal relationship and coordination	3.81 (0.98)	0.48	0.943
6	Common knowledge and skills of disaster rescue	4.36 (0.83)	0.75	0.939
7	Rescue equipment and survival skills	4.28 (0.92)	0.73	0.939
8	Prevention and nursing of secondary disasters	4.10 (0.97)	0.70	0.939
9	Epidemic prevention and epidemiology	4.20 (0.96)	0.65	0.940
10	Occupation protection of medical staff	4.29 (0.96)	0.75	0.938
11	Disaster rescue knowledge education	4.23 (0.92)	0.71	0.939
12	Preview and triage of first aid	4.25 (0.94)	0.70	0.939
13	Scene rescue technique	4.22 (0.97)	0.69	0.939
14	Transport and on-the-way rescue	4.26 (1.01)	0.72	0.939
15	Accident intervention command system	4.10 (1.08)	0.73	0.939
16	Medical and health response	4.15 (1.00)	0.73	0.939
17	Public health system response	4.13 (0.95)	0.73	0.939
18	Management and utilization of nursing information	4.09 (0.98)	0.63	0.941
19	Formulation of the disaster emergency plan	4.27 (0.95)	0.58	0.941

Table 3
Results of the principal components analysis for the Learning Needs for Disaster Nursing Scale Arabic version (n = 204).

Item	Component 1 Skills and knowledge in disaster relief	Component 2 Discipline introduction	Component 3 Disaster management
12	0.79		
11	0.73		
13	0.73		
8	0.72		
10	0.70		
6	0.69		
9	0.69		
14	0.66		
7	0.64	0.48	
1		0.79	
2		0.78	
3		0.71	
5		0.57	
4		0.51	
18			0.79
17			0.71
19			0.70
16			0.69
15	0.46		0.52
Eigenvalue	9.51	1.46	1.14
Variance explained (%)	50.0	7.7	6.0
Cumulative variance explained (%)	50.0	57.7	63.7

and factor loadings ranging from 0.64 to 0.79. Items 1 to 5 and 7 were loaded in component 2 with an explained variance of 7.7% and factor loadings from 0.48 to 0.79. Items 15 to 19 were loaded in component 3 with an explained variance of 6.0% and factor loadings from 0.46 to 0.79. Two items were cross-loaded, as revealed by the PCA. Item 7, "Rescue equipment and survival skills," was loaded in components 1 (factor loading = 0.64) and 2 (factor loading = 0.48). Item 15, "Accident intervention command system," was loaded in components 1 (factor loading = 0.46) and 3 (factor loading = 0.52). Item 7 was retained in component 1, while item 15 was retained in component 3. Component 1 was labeled "Skills and knowledge in disaster relief" (items 6 to 14), component 2 was named "Discipline introduction" (items 1 to 5), and component 3 was labeled "Disaster management" (items 15 to 19).

The three extracted components of the LNDNS-A showed a strong correlation. As indicated in Table 4, "Skills and knowledge in disaster relief" manifested a strong positive correlation with "Discipline introduction" ($r = 0.63$, $p < .001$) and "Disaster management" ($r = 0.75$, $p < .001$). Similarly, "Discipline introduction" had a strong positive relationship with "Disaster management" ($r = 0.64$, $p < .001$).

4.2. Reliability of the LNDNS-A

The computed Cronbach's a for the full scale was 0.943. For its subscales, Cronbach's alpha were 0.927, 0.806, and 0.987 for "Skills and knowledge in disaster relief," "Discipline introduction," and "Disaster management," respectively (Table 5).

5. Discussion

This study demonstrated new research findings relevant to the psychometric properties of the LNDNS-A within the context of Saudi nursing students in an academic nursing institution. The findings support the ability of the LNDNS-A to validly and reliably measure the learning needs for disaster nursing of Arabic-speaking nursing students.

Table 4
Correlation between the three factors of the Learning Needs for Disaster Nursing Scale Arabic version (n = 204).

Components	Skills and knowledge in disaster relief *r* (*p*)	Discipline introduction *r* (*p*)
Discipline introduction	0.63 (<.001)	–
Disaster management	0.75 (<.001)	0.64 (<.001)

Table 5
Internal consistency reliability of the Learning Needs for Disaster Nursing Scale Arabic version (n = 204).

Variable	Cronbach's alpha
Skills and knowledge in disaster relief	0.927
Discipline introduction	0.806
Disaster management	0.870
Learning Needs for Disaster Nursing Scale Arabic version	0.943

Regarding the CVI of LNDNS-A, a panel of specialists reviewed the items of the scale and examined their relevance to the concept of "learning needs for disaster nursing." The panel rated all the items relevant to the intended concept as manifested by the I-CVI and S-CVI/Ave more than the cut-off value [16]. Therefore, the items in the scale are considered acceptable, relevant, and appropriate for Saudi Arabia as judged by the panel experts.

Furthermore, a PCA was conducted to examine the scale's factors utilizing the varimax rotation to support its construct validity. According to Knapp and Brown [19], PCA analysis is used to examine which factors of a scale were comprised of coherent groups of items. Item analysis were also conducted within the scale. The results showed that ITCs were between the preferred range of values of 0.30–0.80. This indicates that each item of the scale was correlated with the full scale. Furthermore, if deleted, none of the items will cause more than a 10% increase in the scale's Cronbach's alpha. These two findings made the researchers decide to retain all the items in the scale and enter them into PCA. In ascertaining the appropriateness of the factor analysis, the KMO measuring sample adequacy and Bartlett's test of sphericity were computed. The KMO value was >0.50, indicating sample adequacy for performing factor analysis.

The PCA revealed three distinct components of the LNDNS-A with an overall explained variance of 63.7%. The three extracted components of the scale met the criteria set for extraction (i.e., Eigenvalue >1 and factor loading >0.40). Tabachnick and Fidell explained that more than 50% variance supports good construct validity [20]. Similarly, Dancey and Reidy [21] and Field [22] described that if the result of the three-component model was more than 50%, it was interpreted as appropriate. These findings agreed with the study of Della-Monica and Connell [23], which reported more than 50% of explained variance. In this regard, the 63.7% result supports decent construct validity. The three components of the LNDNS-A were consistent with the components of the original version [11]. Hence, the components were labeled similarly: Component 1, "Skills and knowledge in disaster relief," Component 2, "Discipline introduction," and Component 3, "Disaster management."

However, two items were loaded into two components: item 7, loaded in "Skills and knowledge in disaster relief" and "Discipline introduction," and item 15, loaded in "Skills and knowledge in disaster relief" and "Disaster management." Nunnally and Bernstein [18] explained that an item loaded in two or more factors should be kept in the factor with which it is strongly associated. Another psychometric study reported that one sub-factor item could be retained if the factor loadings are above an acceptable level [24].

Item 7, *"rescue equipment and survival skills,"* is suited more *in* Component 1 (Skills and knowledge in disaster relief) than in Component 3 (Disaster management) as it has higher factor loading of 0.64 compared to 0.48 respectively. Rescue equipment and survival skills are one of several vital skills needed for disaster prevention and mitigation [25]. Nursing students are the future actors in disaster rescue and operations, survivors' safety, and educating the public about public health emergency rescues. Rescue equipment and survival skills are crucial disaster relief operations competencies [26]. Therefore, it is appropriate for nursing students and nurses to be trained in various rescue equipment survival skills.

Item 15, *"accident intervention command system," is* suited more to Component 3 (Disaster management) than Component 1 (Skills and knowledge in disaster relief). This item aligns with those items in the component of the original scale. In recent decades, Saudi Arabia experienced several disaster emergencies, affecting its citizen, causing casualty incidents and death [27]. These disasters prompted the Ministry of Health (MOH) [28] to strengthen its disaster preparedness and response system. The MOH [28] explained that the Saudi government created several disaster management strategies to reduce the disaster damage among its population. Moreover, the International Council of Nurses [29] further stress establishing scalable response system and disaster emergency plans that will better prepare nurses effectively and correctly.

Component 1, "Skills and knowledge in disaster relief," consists of 9 items: "Preview and triage of first aid," "Disaster rescue knowledge education," "Scene rescue technique," "Prevention and nursing of secondary disasters," "Occupation protection of medical staff," "Common knowledge and skills of disaster rescue," "Epidemic prevention and epidemiology," "Transport and on-the-way rescue" and "Rescue equipment and survival skills." These items are consistent with the different knowledge and skills on disaster relief that nursing students should learn. Future nurses must prepare with disaster knowledge and skills in dealing with disaster events. Thus, nursing students should develop their skills by attending disaster skills programs and core competencies training. Chegini et al. [30] explained that learning their disaster competencies skills enables nurses to work more efficiently before, during, and post-disaster events. Likewise, academics are also responsible for providing future nurses with significant disaster knowledge and skills in preparing them to face disaster events competently.

Component 2, "Discipline introduction," has five items: "Related concepts and characteristics," "Current status and future of disaster nursing," "Nurses' roles and tasks in a disaster," "Ethical issues in disaster nursing," and "Interpersonal relationship and coordination." These fundamental concepts of disaster nursing are paramount in understanding the roles and competencies in responding to disasters. Understanding the fundamental concepts of disaster nursing means that nurses are aware that their practice is bound by the legal, cultural, and code of ethical framework standards [31].

Furthermore, good interpersonal relationships, a clear definition of disaster procedures, processes, responsibilities, structure, and coordination with other health care teams during a disaster were shown to reduce interruptions in service providing, improve economic efficiency and quality of services, establish continuing services, and reduce rework [32]. One narrative review argued that having a good interpersonal relationship in times of disasters is very important, as healthcare professionals must work collaboratively toward a common goal under a predetermined plan [33]. Apart from this, one study conducted in Saudi Arabia about nurses' disaster readiness and response reported that when disaster hits the country, some nurses face ethical dilemmas regarding how to respond due to a lack of discipline on how to handle the emergency [1]. Hence, these fundamental concepts of disaster nursing must be integrated into courses or educational programs to ensure that nursing students will learn them.

The third component is "disaster management," composed of five items: "Accident intervention command system," "Medical and health response," "Public health system response," "Management and utilization of nursing information," and "Formulation of the

disaster emergency plan." Aruta et al. [25] argued that disaster management is crucial for an effective and efficient disaster nursing response. For this reason, improving the disaster relief management evidence is essential. New techniques are also explored in distinct disaster management areas, especially logistics, and equipment, making disaster response more vigorous, faster, and efficient [5,12]. Nevertheless, despite some research that reports the involvement of nurses and nursing students in disaster preparedness and response, the evidence for disaster health management in the country is scarce [27,34].

The scale's Cronbach's alphas, including all three components, are above the cut-off value of 0.70, which implies acceptable reliability. This finding is consistent with what was reported for the original scale [11]. This implies that the items in the scale are related and measure the same concept, which is the learning needs of disaster nursing among nursing students. Similarly, the items loaded on each component of the scale are related to each other in measuring that component's construct.

5.1. Limitations

Some limitations need to be considered when assessing the current study. The Arabic version was only tested for its validity and reliability among student nurses in Saudi Arabia. Future studies can adapt the tool to practicing nurses. The use of convenience sampling limits the ability of the results to be generalized. Although Cronbach's a supported the LNDNS-A's reliability, other reliability measures, such as test-retest reliability, should be performed to support current findings. Another limitation is the use of only one method (PCA) to provide evidence for the LNDNS-A's construct validity. In future investigations, other tests of construct validity (i.e., convergent and divergent validity, criterion-related validity, predictive validity, concurrent validity, hypothesis testing, and known-groups validity) should be done. Furthermore, confirmatory factor analysis should also be conducted to provide more evidence of the factor structure of the Arabic version. Despite the limitation, this is the first investigation to examine the psychometrics of the LNDNS-A and thus contribute to the disaster nursing literature.

6. Conclusion

Based on the findings, the LNDNS-A is a valid and reliable measure to assess the learning needs of Saudi student nurses in disaster nursing. The findings indicate that the tool had acceptable content validity and is appropriate and relevant within the context of Saudi Arabia and the practice of disaster nursing in the country. The findings also support the three-factor solution of the tool, which is consistent with the original version of the tool. The construct validity of the tool was acceptable in measuring the construct "disaster nursing learning needs of Saudi nursing students." The tool also exhibited acceptable reliability, as evidenced by the computed Cronbach's alpha of the three components and the full scale. Therefore, The LNDNS-A can be used to accurately assess the learning needs of disaster nursing of Saudi nursing students and possibly other Arabic nursing students, expanding the scientific research on this area in the Arab region.

7. Implications

The paper makes an original contribution to the broader area of disaster nursing by establishing the reliability and validity of a tool in the Arabic language that can be used to determine the learning needs of student nurses in the Arab region. Nurse educators can use this tool to assess their students' needs regarding disaster nursing and develop educational programs or revise an existing course to suit the identified learning needs of the students. Also, the tool can be used by the students to conduct a self-assessment of what areas in disaster nursing they need to focus more on to improve their knowledge and competencies in this area of nursing. The tool can be adapted in clinical practice to regularly assess the nurses' learning needs. These assessments are essential in planning, designing, and implementing educational interventions in the clinical set-up that target the nurses' identified learning needs. Finally, nurse researchers can use the tool in scientific studies to advance disaster nursing in the Arab region. These studies will provide evidence for policymakers, educators, and research consumers on disaster nursing. These studies will also contribute to the global disaster preparedness and response literature, ensuring that Arab countries are represented in the world literature on disaster nursing.

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Ethical approval

The Research Ethics Standing Committee at Shaqra University approved the study with approval number ERC_SU_2021006.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

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