

Development and Psychometric Evaluation of The Ethical Competence Questionnaire in Disasters for Nurses (ECQD-N)

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ABSTRACT

Background: Ethical competence is crucial for nurses, particularly in disaster situations, where they face numerous challenges such as limited resources, triage decisions, and patient confidentiality. While various instruments have been developed to assess nurse competencies in disaster contexts, none specifically address ethical competence.

Purpose: This study aims to develop and determine the psychometric properties of the Ethical Competence Questionnaire in Disasters for Nurses (ECQD-N).

Methods: A mixed-method sequential exploratory design, consisting of two phases, was used. In Phase I, the ECQD-N was developed through in-depth interviews and focus group discussions with disaster-experienced nurses, based on the ethical competence literature. Phase II involved testing the psychometric properties of the instrument through a content validity test, a pilot study, and exploratory factor analysis (EFA). The reliability of the instrument was assessed using Cronbach's alpha.

Results: The final sample for the psychometric testing phase consisted of 250 nurses. The Cronbach's alpha value ranges from 0.774 to 0.902, indicating good reliability. Factor analysis identified four factors: ethical knowledge, ethical skills, ethical attitudes, and ethical issues, collectively explaining 61.655% of the total variance. The final scale with 22 items and four subscales, namely, ethical attitudes (9 items), ethical knowledge (5 items), ethical skills (4 items), and ethical issues (4 items).

Conclusion: The ECQD-N demonstrated satisfactory validity and reliability for assessing nurses' ethical competence in disaster settings. As the first instrument specifically developed to comprehensively measure ethical competence in disaster nursing, the ECQD-N provides a practical tool for nursing education, disaster preparedness programs, competency evaluation, and future psychometric research.

Keywords: Ethics; disaster; nurses; psychometrics testing

BACKGROUND

The ethical practice of nurses in a disaster setting has a significant role in saving the victims from further harm and humiliation. However, in practice, nurses face numerous ethical challenges due to disasters, such as resource limitations, triage priorities, informed consent problems, and patient privacy concerns (Aliakbari et al., 2015; Ozge Karadag & Kerim Hakan, 2012). This difficult situation happens because the disaster situation is very different from the daily care situation in the hospital (Alrajhi et al., 2018). In addition, nurses also contribute significantly to providing care in all aspects of health to the victims and their families. Meanwhile, the primary purpose of health services in disaster situations is to save the lives of the patients (Al Thobaity et al., 2016).

Ethical practices also influence effective and efficient emergency services during a disaster. The study conducted by Sevimli et al. (2015) revealed that health workers participating in disaster management benefit from adhering to ethical principles, ethical education, and ethical consultation while providing services. Nurses' ethical sensitivity enables them to recognize ethical problems more easily (Jiang et al., 2021). This contributes to improving the professionalism and quality of the health services provided so that the knowledge and understanding of nurses regarding their ethical competencies in disasters are fundamentally important (Kirilmaz, 2015). A systematic review by (Y. N. Fithriyyah et al., 2023) on trends and ethical issues in nursing during disasters, disclosed that ethical issues in disasters potentially lead to ethical dilemmas, highlighting the importance of identifying factors that support ethical decision-making and their impact on patient care quality.

Currently, the phenomenon of nursing ethics in disasters shows a gap between theory and practice in the field. Not all nurses understand the application of ethical principles in disaster situations and have the necessary ethical readiness to deal with emergencies. As a result, they may experience many obstacles in applying ethical principles in disaster settings (Johnstone & Turale, 2014). Accordingly, valid, and reliable instruments are needed to identify the ethical competence of nurses in disaster situations.

Several instruments have been developed to assess disaster nursing competencies, including disaster preparedness, disaster response, and disaster nursing core competencies. However, these instruments primarily evaluate technical competencies and preparedness rather than ethical competence. They do not comprehensively assess ethical knowledge, ethical skills, ethical attitudes, and ethical issues encountered by nurses during disaster response. Consequently, there remains a methodological gap in evaluating nurses' ethical competence in disaster settings. Therefore, the present study aimed to develop and psychometrically validate the Ethical Competence Questionnaire in Disasters for Nurses (ECQD-N).

OBJECTIVE

To develop and test the psychometric properties of the Ethical Competence in Disasters for Nurses (ECQD-N) instrument to provide a valid and reliable tool capable of measuring the ethical competence of nurses, encompassing aspects such as ethical

sensitivity, knowledge, reflection, decision-making, and ethical behavior in disaster situations accurately, and comprehensively.

METHODS

The study used a mixed-method sequential exploratory research design utilizing DeVellis's instrument development framework (Figure 1) (DeVellis, 2016). This study was conducted from August to December 2022.

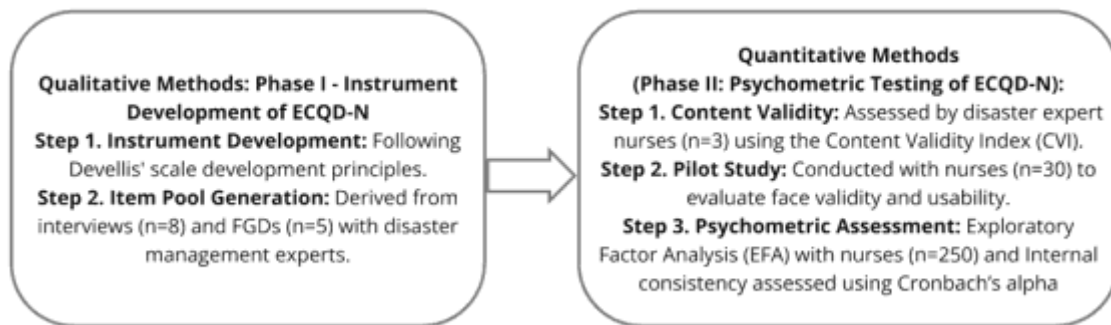


Figure 1. Instrument development framework

Qualitative Methods: Phase I: Instrument Development ECQD-N

Step 1. Instrument Development

The initial instrument development and item pool were developed following DeVellis' scale development principles (DeVellis, 2016) and the work of Schünemann et al. (2010) which guided the identification of key concepts, and the generation of items based on emerging themes. This study is based on an integrative review by Lechasseur et al. (2016) which delineates ethical competencies, including 1) Ethical Sensitivity, 2) Ethical Knowledge, 3) Ethical Reflection, 4) Ethical Decision Making, 5) Ethical Action, and 6) Ethical Behavior. The purpose of this integration was to broaden the understanding of ethical considerations undertaken by healthcare professionals.

Step 2. Item Pool Generation

Items for the ECQD-N were developed based on in-depth interviews and focus group discussions (FGD). Data collection for this study utilized purposive sampling from two hospitals: Dr. Sardjito General Hospital and the Universitas Gadjah Mada Academic Hospital in Yogyakarta. The inclusion criteria for in-depth interviews required nurses with at least five years of experience in disaster management and a minimum of a Diploma-III in nursing. Each Interviews lasting up to 60 minutes. Data collection continued until saturation was achieved.

The FGDs were held with head nurses and nurse managers, all with a minimum of five years' experience in disaster management and a bachelor's degree in nursing. The discussion lasted 65 minutes and followed Krueger's guidelines for focus groups (Krueger & Leader, 2002). The data from both the interviews and FGDs were analysed using thematic analysis (Braun & Clarke, 2014). Each transcript was independently coded by the authors. The codes were grouped into categories, and emerging themes were organized into dimensions and indicators (Ose, 2016).

Quantitative Methods: Phase II: Psychometric Testing of ECQD-N

Step 1. Content Validity Test

The Content Validity Index (CVI) was calculated using four assessment criteria: relevance, clarity, simplicity, and ambiguity. Three experts, meeting two rounds in Gadjah Mada of the following criteria, were selected: a) master's degree in nursing with at least ten years of experience, and b) expertise in disaster management or instrument development. For each item, the CVI was calculated by summing the scores and dividing by the total number of items (Polit & Beck, 2006). The CVI was no less than 1.00, as each item was assessed by three raters using four rating criteria (Aiken, 2016).

Step 2. Pilot Study

The pilot study was conducted to test the ECQD-N. The items were measured using a 5-point Likert scale: Strongly Disagree (1) to Strongly Agree (5) (DeVellis, 2016). Data were collected using Google Forms (GForm), which was distributed to selected nurses as representatives from various hospitals across Indonesia. These representatives then shared the survey link via WhatsApp groups within their workplaces. Inclusion criteria for 30 participants were: 1) At least one year of nursing experience, 2) A minimum of a Diploma-III in Nursing, and 3) Willingness to participate in the study. Participants who agreed accessed the GForm, which included: a) General research information, instructions for completing the form, and participant consent; b) Demographic data to ensure eligibility; and c) The 30-item ECQD-N questionnaire. All responses were marked as "required" to ensure full participation. The GForm was configured to accept only one response per email and required participants to include their ID number to prevent duplicate submissions. ID numbers were removed after verification by the representative nurse to maintain participant anonymity. The results were tested for correlation using Pearson's coefficient (Fernández Batalla et al., 2022). Reliability was assessed using Cronbach's alpha, with values above 0.7 considered acceptable for reliability (Heale & Twycross, 2015).

Step 3. Psychometric Assessment

A cross-sectional design was used for psychometric testing. The sample size of 250 nurses was determined based on the recommended ratio of 5-10 participants per item for factor analysis (Boateng et al., 2018). Data collection and inclusion criteria was like the pilot study phase, but with a larger number of nurse representatives to identify eligible respondents. To identify the construct validity of the instrument, the Exploratory Factor Analysis (EFA) was conducted because the ECQD-N instrument was still in its initial development stage. The suitability of the data for EFA was assessed using Bartlett's test of sphericity (significant at <0.05) and the Kaiser-Meyer-Olkin (KMO) test, which checks for partial correlations between variables. A KMO value > 0.90 was considered very good, eigenvalue > 1 , while values < 0.60 were considered unacceptable (Yong & Pearce, 2013). EFA was performed using the maximum likelihood method with varimax rotation to ensure construct validity. The loading factor was set at a cut-off value of > 0.40 . Oblique rotation was applied because the factors were expected to be correlated. Cronbach's alpha with values above 0.7 indicating acceptable reliability.

Ethical Considerations

Ethical approval was granted by the Medical and Health Research Ethics Committee (MHREC), Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada. Ref.No: KE/FK/0729/EF/2022.

RESULTS

Qualitative Methods: Phase I - Instrument Development of ECQD-N

The Participant characteristics

In-depth interview and focus group discussion

There were eight in-depth interviews. Most in-depth interview participants were male, aged 32 to 47 years. Five participants worked at Dr. Sardjito Central General Hospital. Most participants have diploma-III and have worked in the hospital for more than ten years. Furthermore, there were five FGD participants, most of whom were male, aged 35 to 53 years. Three participants worked at Dr. Sardjito Central General Hospital, and two others worked at the UGM Academic Hospital. The majority have a Master of Nursing degree and more than ten years with experience in disaster management (Supplementary Appendix A.1).

The results of data analysis on in-depth interviews obtained 30 categories that became the domains. Then in the FGD data analysis, 14 categories were obtained, all of which were already in the in-depth interviews. We found that from all the combined categories of in-depth interviews and FGDs, there were four main themes or dimensions: ethical knowledge, ethical skills, ethical attitudes, and ethical issues. Following are the details of the highlighted categories and themes (Table 1).

Step 2. Item Pool Generation

The authors identified the definition of four main themes as dimensions: ethical knowledge (Lechasseur et al., 2016), ethical skills (Robichaux, 2012), ethical attitudes (Moosavi et al., 2017), and ethical issues (Ulrich et al., 2010), and 30 categories or domains that describe the indicators of ethical competence in disaster for nurses. (Table 1). Each domain produces at least two items (Huijg, 2014) from the 60 candidate items in the preliminary item generation.

Table 1. List of dimensions (themes) and indicators (categories) of the ethical competence questionnaire in disasters for nurses (ECQijD-N)

Dimension/Themes (n=4)	Definition of dimension	The indicator of dimension/ Categories/item (n=30)
1. Ethical knowledge (IEK) (6 items)	This dimension encourages nurses' understanding based on theoretical and practical knowledge to reflect critically and bring up ethical practice.	1.1 Knowledge of disaster conditions* 1.2 Experience in a disaster 1.3 Understand ethical principles* 1.4 Ethical education 1.5 Disaster competence 1.6 Recognize ethical situations*

Dimension/Themes (n=4)	Definition of dimension	The indicator of dimension/ Categories/item (n=30)
2. Ethical skills (IES) (9 items)	This dimension shows nurses' ability to solve problems and make ethical decisions.	2.1 Collaboration* 2.2 Communication skills* 2.3 Functions and roles* 2.4 Operational standards of disaster nursing skills 2.5 Triage* 2.6 Safety of rescuers and patients 2.7 Evaluation 2.8 Information literacy 2.9 Ethical decision-making*
3. Ethical attitudes (IEA) (7 items)	This dimension stimulates ways of behaving that show motivation in understanding and responding to situations.	3.1 Empathy 3.2 Be patient 3.3 Altruism 3.4 Norms and culture* 3.5 Professional commitment* 3.6 Readiness to handle patients 3.7 Respect the patient's perception
4. Ethical issues (IES) (8 items)	This dimension describes conflict situations that can be considered when making decisions and choices.	4.1 Maintenance documentation 4.2 Analysis of human resource needs* 4.3 Adapt the situation 4.4 Facility requirement analysis* 4.5 The psychological impact of health workers* 4.6 The psychological impact on the patient 4.7 Informed consent 4.8 Protect patient confidentiality

Remarks: *Domain/categories that appear in FGDs and in-depth interviews

Quantitative Methods: Phase II: Psychometric Testing of ECQD-N

Step 1. Content Validity

In this study, three experts discussed and assessed the content validity of the questionnaire based on four assessment criteria (Supplementary Appendix A.2) calculated by the content validity index (CVI). An acceptable CVI value should be 1.00 if using three experts (Polit et al., 2007). The first stage showed 24 invalids of 60 questionnaire items ($CVI < 1$). The authors and experts modified and revised each item. Then, we agreed to drop out two items (items 11 and 32) considered to have been represented by other items. The initial questionnaire results total 58 items for the pilot test study (Supplementary Appendix A.3).

Step 2. Pilot Study

Thirty pilot study respondents were nurses who all worked in hospitals (100%) (Supplementary Appendix A.4). The results of the pilot study in the form of an item validity test showed a range of values between 0.363-0.838. We identified 13 items that did not meet the valid requirements because $r_{\text{count}} < r_{\text{table}}$ ($r_{\text{table}} = 0.361$). These

exclude items; item 1, item 7, item 8, item 16, item 22, item 31, item 37, item 44 to 47, item 49, and item 56 (Supplementary Appendix A.5).

All invalid items were excluded, leaving 45 valid items. Then, the reliability test is carried out for these valid items, which are determined through internal consistency analysis using Cronbach's α coefficient. Cronbach's α value on the 45 items is 0.973. Furthermore, the authors and two experts agreed to delete 15 items considering the pilot study r-value. The final initial total of the questionnaire items was 30 (Supplementary Appendix A.6).

Step 3. Psychometric Assessment Characteristics of the participants

Most respondents in this study were female (76.6%), with an average age of 35.26 years. The majority (84.0%) were from Java, 82.0% of the respondents work in hospitals, and 15.6% in public health centers. Most respondents are nurses in inpatient rooms (48.4%). The most common level of education was Diploma III (46.4%), followed by a registered nurse (42.8%) with work experience of 1-5 years (29.6%). Most respondents (88.0%) had experienced a disaster within 1-5 years (73.2%), but majority of never attended ethics training (75.2%) (Table 2).

Table 2. Respondent characteristics of psychometric testing (n=250)

Characteristic	Categories	n	Frequency (%)
Gender	Male	58	23.2
	Female	192	76.8
Age (Years)	≤ 25	23	9.2
	26 - 35	124	49.6
	36 - 45	75	30
	> 45	30	12
		205	82
Institution	Hospital	205	82
	Public health center	39	15.6
	Government agencies	3	1.2
	College/University	3	1.2
Place of origin	Yogyakarta	73	29.2
	Java (West, Central, East) & Bali	137	54.8
	Jakarta	4	1.6
	Kalimantan & Sulawesi	3	1.2
	Sumatera	20	8
	N/A	13	5.2
Department/Unit	Inpatient	121	48.4
	Outpatient	20	8
	Emergency	13	5.2
	Intensive care	42	16.8
	Public health care	36	14.4
	Nursing management	7	2.8
	Others	11	4.4
		116	46.4
Education level in Nursing	Diploma-III	116	46.4
	Diploma-IV	5	2
	Undergraduate	9	3.6
	Register Nurse	107	42.8

Characteristic	Categories	n	Frequency (%)
Length of work (Years)	Master Nursing	13	5.2
	1-5	74	29.6
	6-10	61	24.4
	11-15	50	20
	> 15	65	26
Disaster experience	Yes	220	88
	No	30	12
Length of disaster experience (Years)	1-5	183	73.2
	6-10	7	2.8
	> 10	30	12
Ethics training experience	Yes	62	24.8
	No	188	75.2

Exploratory factor analysis

Exploratory factor analysis (EFA) was performed four times until saturation items were obtained. The results of the first EFA analysis showed that the KMO was 0.907, and the Barlett test χ^2 3812.492, $p=0.000$ (significant), the sample represented the population. The eigenvalues of the four dimensions were > 1 , and the total variance explained was 54.141%, meaning that the scale could explain the construct of disaster ethics competence for nurses by 54.141%. The rotation Method with Varimax with Kaiser Normalization achieves convergence criteria in 7 iterations. Item saturation model matrix less than 0.40 excluded $n=5$ items (IES6, IEI4, IEI2, IEK2, IES8).

The second EFA was carried out by removing unsaturated items. The value of Bartlett's test of sphericity (χ^2 3380.690; df 300; $p<0.000$; KMO $p=.908$) is significant. All four factors were again confirmed with 59,300% of the variance. The oblique rotation reaches the convergence criterion in 7 iterations. Two items not well saturated in the matrix model were omitted (IES1 and IES7).

A third EFA was performed, where the Bartlett sphericity test was significant (χ^2 3045.576; df 253; KMO $p < 0.000$). The four factors extracted explained 60.568 % of the variance. Rotations reach the convergence criterion in 7 interactions. 1 Item (IEI5) was omitted due to unsaturation.

Finally, a fourth EFA was performed, where Bartlett's sphericity test was always significant (χ^2 2916.051; df 231; $p < 0.000$). The four factors explain 61.655% of the variance. Rotations reach the convergence criterion in 7 interactions. 1 Item (IEI5) was omitted due to unsaturation. The items of the four factors showed satisfactory saturation (Table 3).

Table 3. Fourth Exploratory Factor Analysis (n=250)

Item	Factor (Dimension)				Item	Factor (Dimension)			
	1	2	3	4		1	2	3	4
IEA4	.770	.055	.130	.234	IEK4	.030	.565	.138	.158
IEA7	.722	.134	.230	.129	IEK3	.140	.505	.200	.136

IES9	.672	.152	.169	.222	IEK1	.308	.467	.303	.107
IEI8	.653	.171	.274	.090	IES5	.374	.131	.718	.073
IEA2	.620	.153	.289	.253	IES4	.318	.285	.664	.115
IEA1	.607	.138	.179	.287	IES3	.477	.196	.604	.148
IEA3	.597	.140	.253	.312	IES2	.413	.182	.488	.239
IEI6	.519	.173	.303	.265	IEA6	.179	.279	.143	.716
IEI7	.517	.072	.187	.032	IEA5	.268	.147	.116	.704
IEK5	.168	.816	.044	.116	IEI3	.291	.311	.026	.544
IEK6	.081	.723	.071	.182	IEI1	.387	.218	.342	.413

Extraction Method: Maximum Likelihood; Rotation Method: Varimax with Kaiser

Normalization: a. Rotation converged in 7 iterations.

The details of the items deleted from the initial version of the ECQD-N during the EFA 1-4 process can be identified in (Supplementary Appendix A.7).

The naming of the factors/dimensional did not change, but the grouping of items changed after EFA, so the order of the items changed. Cronbach's alpha coefficient on all dimensions shows the range. 0.774-0.902, and high reliability can be accepted (Table 4). The final items of the ECQD-N were 22 items (Supplementary Appendix B)

Table 4. The final item of The Ethical Competence Questionnaire in Disasters for Nurses (ECQD-N)

Dimensions of ECQD-N	Initial Item of ECQD-N	New Item of ECQD-N	Item	Cronbach's alfa
Ethical attitudes (9 items)	1 IEA4	IEA1	I respect other people's customs, norms, culture	0.902
	2 IEA7	IEA2	I respect the perception, value the patient's beliefs	
	3 IES9	IEA3	I make decisions while respecting the rights and obligations of patients and other health workers	
	4 IEI8	IEA4	I respect the privacy and confidentiality of information and only share it with family or people involved in patient care.	
	5 IEA2	IEA5	I am patient with patients and their families	
	6 IEA1	IEA6	I understand the condition experienced by the patient	
	7 IEA3	IEA7	I have a strong urge to help	
	8 IEI6	IEA8	I understand and provide appropriate psychological support for disaster victims	
	9 IEI7	IEA9	I need the consent of the patient when carrying out nursing actions, except in emergency rescue efforts	
Ethical knowledge (5 items)	1 IEK5	IEK1	I know the competence of nurses in disasters from education or training/seminars	0.774
	2 IEK6	IEK2	I can recognize ethical issues in disaster situations	
	3 IEK4	IEK3	I participated in a training/seminar related to nurse ethics in disaster.	
	4 IEK3	IEK4	I practice ethical principles during a disaster	
	5 IEK1	IEK5	I understand disaster conditions	

Ethical skills (4 items)	1	IES5	IES1	I determine priorities for handling disaster victims based on triage principles	0.856
	2	IES4	IES2	I provide care to disaster victims according to standard care procedures	
	3	IES3	IES3	I am aware of the role and responsibility as a nurse	
	4	IES2	IES4	I have good communication skills with patients, families and other health workers	
Ethical issues (4 items)	1	IEA6	IEI1	I am at the forefront of providing care for disaster victims	0.802
	2	IEA5	IEI2	I am willing to work at the disaster site with an effort that exceeds normal conditions so that it is hoped that I can provide maximum care to the victims	
	3	IEI3	IEI3	I feel prepared for unforeseen situations during a disaster	
	4	IEI1	IEI4	I document disaster care according to ethical principles procedures	

DISCUSSION

Phase I - Instrument Development of ECQD-N

The ECQD-N was developed through in-depth interviews and FGDs with disaster nurses. Four key themes emerged: ethical knowledge, ethical skills, ethical attitude, and ethical issues, aligning with Lechasseur et al.'s framework of ethical competence (Lechasseur et al., 2016). In this study, the first theme or dimension identified was ethical knowledge. This dimension helps nurses assess right and wrong actions in practice (Iglesias & Vallejo, 2014). A lack of ethical knowledge can confuse clinical settings (Huang et al., 2015). Studies emphasize the need for ethical education to improve nurses' decision-making (Osingada et al., 2015), particularly in disaster situations (Sö et al., 2015). The second dimension was ethical skills. Ethical decision-making and triage skills became this study's most highlighted indicator. Other studies also explain that multidisciplinary collaboration, effective leadership, communication, and creative problem-solving skills are needed in situations of rapid change (Poikkeus et al., 2014; Pourvakhshoori, 2017).

The ethical attitude was the third theme, which is a combination of beliefs, emotions, and actions in response to an event while remaining committed to ethical values (Moosavi et al., 2017). Ethical attitude fosters a sense of responsibility, altruism, respect, empathy, and commitment to patients, which affect the quality of care (Cevi & Aslan, 2022). The findings of this study supported the identification of these domains, which suggest that empathy, altruism, and commitment to the profession are components of nurses' ethical competence in disasters.

The fourth theme identified is ethical issues. Ethical issues are conflict situations when nurses face an unclear choice between right and wrong actions that involve professional decision-making (Ulrich et al., 2010). Ethical issues arise when nurses face difficult choices, such as maintaining patient confidentiality and obtaining informed consent under challenging circumstances (Alrajhi et al., 2018; Stenlund & Strandberg, 2021). The stress of disaster situations further complicates these ethical decisions

(Pourvakhshoori, 2017). Several studies showed ethical sensitivity as a component of the ethical competence of nurses (Han et al., 2010; Lechasseur et al., 2016; Yoshioka, 2019). However, in this study, ethical sensitivity is included as a domain of ethical knowledge. Ethical sensitivity is the ability of nurses to recognize ethical situations from their experience and knowledge (Ersoy & Göz, 2001; Weaver et al., 2008).

The initial item pool consisted of 60 items, with each indicator contributing at least two items (Boateng et al., 2018; Huijg, 2014). In this study, the answer to the question item is in the form of a response, so it is a Likert scale type. According to Krosnick et al. (2009) a two- to three-point Likert response scale has lower constraints in its application. However, another study found that a 5-point scale yielded better-quality data (Revilla et al., 2014).

Content validity was assessed in two phases using expert evaluations, resulting in a high Content Validity Index (CVI) (Hasnida & Ghazali, 2016), indicating excellent validity. This method aligns with the Delphi technique for expert consensus (Pancorbo-Hidalgo & Bellido-Vallejo, 2019). The final instrument demonstrated strong content validity, ensuring its robustness for use in assessing ethical competence in disaster nursing (Koller et al., 2017).

Phase II: Psychometric Testing of ECQD-N

In this study, the psychometric properties of the ECQD-N instrument consisting of 30 items designed to assess the ethical competence of nurses in disaster situations. The KMO test and the Bartlett test from the ECQD-N showed $p < 0.05$. This follows the Young & Pearce study that if Bartlett's Test of Sphericity $p < 0.05$ and the KMO value of sampling adequacy is above 0.05. It indicates a relationship pattern between variables and the data collected with exploratory factors and a sample representing the population (Yong & Pearce, 2013). The reported outcome variance of the EFAs of these four studies is 61.655%. According to Streiner, the total variance explained for a new instrument is at least 50% (Streiner, 1994).

Cronbach's alpha calculates the instrument's internal consistency (52). Internal consistency tests the extent to which all items can measure the same construction (17). Acceptable Cronbach alpha values range from 0.70 to 0.95 (Polit & Beck, 2012). In this study, the internal validity of alpha is between 0.774-0.902, which indicates that the reliability of this instrument is high and acceptable.

A total of 30 items from the ECQD-N, the result is 22 items that have acceptable validity and reliability. However, several items were changed to grouping dimensions between ethical attitudes and ethical issues. These results are from the study of Aung et al. (2017), which revealed that in disaster ethics, nurses would be influenced by ethical issues in making decisions and behaving following professional ethics. Ethical issues that arise during disaster conditions such as the treatment priorities, lack of privacy, consent prior to treatment, cultural or religious beliefs (Alrajhi et al., 2018). Ethical issues during a disaster such as the treatment priorities, lack of privacy, consent prior to treatment, cultural or religious beliefs (Moosavi et al., 2017), intersect with respect, commitment to patients, and responsibility, which encourage an ethical attitude.

The results of the study prove that the four dimensions: ethical attitude, ethical knowledge, ethical skills, and ethical issues in analysis, form the Ethical Competence of nurses in disasters. Higher scores on the ECQD-N indicate better ethical competence in disaster nursing, reflecting stronger decision-making, knowledge, skills, and attitudes. Lower scores highlight areas for improvement in ethical competence. Ethical competence is a fundamental qualification or capacity. Therefore, the ECQD-N has proven to be a valid and reliable instrument to evaluate nurses' ethical competence in disasters.

LIMITATIONS

This study has several limitations. First, the use of convenience sampling may limit the representativeness of the study population and reduce the generalizability of the findings. Second, the data were collected using self-administered questionnaires, which may introduce response bias. Third, only exploratory factor analysis was performed; therefore, future studies should conduct Confirmatory Factor Analysis (CFA) to verify the stability of the proposed factor structure. Finally, because the ECQD-N was developed and validated within the Indonesian context, additional cross-cultural validation is recommended before broader international application.

CONCLUSION

The Ethical Competence Questionnaire in Disasters for Nurses (ECQD-N) demonstrated satisfactory validity and reliability as an instrument for assessing nurses' ethical competence in disaster settings. The final instrument consists of four dimensions—ethical knowledge, ethical skills, ethical attitudes, and ethical issues—that collectively represent the multidimensional construct of ethical competence in disaster nursing. The ECQD-N provides a practical and evidence-based tool for nursing education, disaster preparedness programs, and future research. Further studies are recommended to validate the factor structure through Confirmatory Factor Analysis (CFA), evaluate measurement invariance across different populations and healthcare settings, and assess the instrument's predictive validity.

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