STUDY PROTOCOL

AN INTERVENTION PROGRAM TO IMPROVE NURSES’ COMPETENCIES IN DISASTER RESPONSE: A MIXED-METHODS STUDY PROTOCOL

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Abstract

Introduction: Indonesia has the highest risk and vulnerability to both natural and non-natural disasters in the world. Aceh Province located on the confluence of two earth fault plates has been discovered to be exposed to a higher risk leading to significant physical, emotional, and psychological problems. Therefore, there is a need for immediate disaster response efforts to reduce the impacts, and nurses are the largest care providers with adequate competencies to ensure effectiveness.

Objective: The study aims to develop a study protocol to measure the effectiveness of the intervention program to improve nurses’ competencies in disaster response.

Methods: A sequential exploratory mixed-method study design will be used. A qualitative phase is to explore nurses’ competencies in disaster response according to nurses, disaster survivors, hospitalized patients, members of the Ulama Consultative Assembly of Aceh, and hospital policymakers using FGDs and in-depth interviews. The result of this phase is to develop intervention and instruments. Data are analyzed using a content analysis. A quantitative phase is to examine the effectiveness of the initiated intervention programs on nurses’ competencies in disaster response with a randomized controlled trial study design. There will be three groups in this phase, namely Evidence-Based Intervention (EBI) group, Islamic-Based Intervention (IBI) group, and Control Group (CG). The nurses’ competencies related knowledge, skill, and attitude will be measured using valid and reliable instruments. Data will be analyzed using independent t-test, and a repeated measure one-way ANOVA.

Discussion: The findings are expected to be the basis for the development of appropriate tools and better intervention in nursing practice and education in relation to evidence and Islamic-based disaster curriculum as well as a guide for future research.

Trial registration: ongoing process with request number ANZCTR 378930

KEYWORDS
nurse; competencies; disaster; response; Islamic; mixed-methods

INTRODUCTION

Indonesia is one of the countries with the highest risk and vulnerability to disaster in the world and this has damaged community livelihoods with significant impacts on the physical, emotional, and psychological conditions of the survivors (Presiden Republik Indonesia, 2007). Natural disasters such as earthquake, tsunami, volcanic eruption, landslide, flood, and storm as well as those related to human activities such as a terrorist attack, chemical explosion, nuclear failure, social conflict, and wars have been reported to have significant effects on the survivors around the world (Al Thobaity et al., 2017; Park & Kim, 2017; Yi et al., 2010). In Indonesia, 42 earthquakes were reported during 2018-2019 and these included those experienced in Lombok, Donggala-Palu, and Banten Provinces. The frequency and consequent effects of these disasters have led to the need for urgent preparedness and effective response, especially for the related health professionals (Siswadi & Prima, 2018). This is very important considering there were 5,405 natural disaster occurrences in Indonesia since the 2018-2019, and the number increases significantly annually (Badan Nasional Penanggulangan Bencana, 2019).

Hospital is a public health service center with significant importance in disaster response and this means each personnel is required to have sufficient competencies to handle the situation. For example, nurses, as the largest population of care providers in the hospitals and communities, are expected to have adequate skills and knowledge to provide immediate medical helps for the survivors (Halstead, 2017; Warsint et al., 2015). However, several studies have reported their
Objectives

The objectives of this study are to develop the study protocol to develop an intervention to improve nurses' competencies in disaster response as well as to examine the effectiveness of the intervention programs.

Methods

Study Design

This research will be conducted using a sequential exploratory mixed-method study design, including the use of phenomenology design for qualitative phase, followed by a randomized controlled trial (RCT) for quantitative phase.

Settings

Qualitative phase

The qualitative phase in this study has been conducted in hospital and community settings on February 12, 2019 - March 23, 2019.

Quantitative phase

The quantitative phase will be conducted at Meuraxa Hospital of Banda Aceh, Ibu dan Anak Hospital of Aceh Government, and Pertamedika Ummi Rosnati Hospital of Banda Aceh. The study population includes nurses who work in the hospitals specifically in the following five wards: emergency department (EDs), intensive care unit (ICU), intensive coronary care unit (ICCU), medical ward, and surgical ward. Those wards are selected based on their importance to the provision of care for patients in the effort towards responding to a disaster.

Sample

Qualitative phase

The qualitative study has been conducted involving 24 nurses from three hospitals as well as other participants including eight disaster survivors, eight hospitalized patients, eight members of the Ulama Consultative Assembly of Aceh, and eight hospital policymakers, with a total of 56 participants.

Quantitative phase

The quantitative study (RCT) will be conducted among 150 nurses from three hospitals, and these participants will be selected using a cluster random sampling and divided into three groups with a total of 50 participants for each group. A medium effect size with a power of 0.80, confidence level at 95% and an alpha of 0.05 with a value of d = 0.60 was used in the determination of sample size. The inclusion criteria for the sample will include (a) working at EDs, ICU, ICCU, medical, and surgical wards, (b) working experience for ≥ 2 years, (c) holding at least a diploma degree, and (d) having no annual/study assignment leaves during the study.

Study Procedures

Qualitative phase

The qualitative phase has been completed. The qualitative study was conducted using phenomenology design to understand the experiences of an individual concerned a phenomenon (Creswell, 2009). The study involved the use of FGDs and in-depth interviews. The findings were used for training intervention material (modules) and questionnaire development.
Quantitative phase

The feasibility, acceptability, and effectiveness of the interventions program will be assessed using the quantitative approach. In this regard, a randomized controlled trial (RCT) will be used and the results will be assessed by independent sample t-test with pre-test - post-test control group design to compare the mean of the three groups. Further, a repeated measure one-way ANOVA will be used to determine the effectiveness of the intervention (Politi & Beck, 2010) on pre-test and post-test (follow up I and II) within 2-6 weeks after the completion of the program (Jannah et al., 2016). The description of study design and process are described in Figure 1 and 2.

![Figure 1 Study design](image)

**Intervention Programs for Quantitative Phase**

Based on the qualitative findings, three intervention programs have been developed, namely the Evidence-Based Intervention (EBI), Islamic-Based Intervention (IBI), and Control Group (CG), have been developed and will be tested in this study.

1) The Evidence-Based Intervention (EBI)

The EBI group will focus on nurses’ competencies on managing psychological, psychosocial, and spiritual aspects (Bisson & Tavakoly, 2008; Hughes et al., 2017; International Council of Nurses & World Health Organization, 2009) and was developed based on Standar dan Instrumen Sertifikasi Rumah Sakit Syariah (Dewan Syariah Nasional Majelis Ulama Indonesia (Dsn- Mui) & Majelis Upaya Kesehatan Seluruh Indonesia (Mukisi), 2017) and also the results of the needs assessment. This is also conducted for six sessions over a six-week period with each session being approximately 90 minutes. The program consists of session I - introduction and build a relationship of trust with respondents, session II - the concept of disaster in Islamic perspective, session III - nurses’ Islamic-based disaster response competencies in managing psychological problems, session IV - nurses’ Islamic-based disaster response competencies in managing psychosocial problems, session V - nurses’ Islamic-based disaster response competencies in managing spiritual problems, and session VI - review, conclusions, and follow-up plans. The IBI will provided by nurses’ educators and an Islamic psychologist using lecture, discussion, videos, demonstration, cases scenario, and story-telling.

2) The Islamic-Based Intervention (IBI)

The IBI group will focus on managing psychological, psychosocial, and spiritual aspects (Bisson & Tavakoly, 2008; Hughes et al., 2017; Husna, C., Kamil, H., Yahya, M., Tahlil, T. (2020); International Council of Nurses & World Health Organization, 2009)

3) The Control Group (CG)

The control group will be conducted as routine day care according to the competencies gained in the hospital without any specific intervention.

**Training for Program Providers for Quantitative Phase**

One day training will be provided to all program providers (three nurses' health educators and one psychologist/Islamic psychologist) to ensure that they can administer the intervention program as expected. The program will be trained in Banda Aceh by the researchers one week before conducting the study.

**Retention of Participants**

To maintain and improve the fidelity of the participants, we will provide door prizes for each session, attractive training material, snacks box, transportation cost for every training session, souvenir, and a 3 credit points training certificate from the Indonesian National Nurses Association (INNA).

**Measurements for Quantitative Phase**

In the RCT study, respondents will be asked to fill the demographic data including age (years), gender, latest level of education, religion, length of work (in years), working unit/ward, experience in disaster/emergency training, as well as the type of training attended and year. The nurses’ competencies are measured based on knowledge, skills, and attitude in managing psychological, psychosocial, and spiritual problems in disaster response. The knowledge will be measured using the questionnaire named “Nurses’ Knowledge in Disaster Response Questionnaire (NKDRQ)” consisting of 28 questions with multiple choices and each correct answer scored 1 while the incorrect one was scored 0 and this means the highest obtainable score is 28 while the lowest is 0. The attitude will be measured using the “Nurses’ Attitude in Disaster Response Questionnaire (NADRQ)” and consisted of 30 statements with a Likert scale (1-5) indicated by “strongly agree = 5”, “agree = 4”, “doubt = 3”, “disagree = 2”, “strongly disagree = 1” and this means the highest possible score is 150 and the lowest is 30. Furthermore, the skills will be measured using the “Nurses’ Skill in Disaster Response Questionnaire (NSDRQ)” consisting of 28 items using “true and false” dichotomous scales with the “true” scored 1 and the “false” 0 and this means the highest obtainable score is 28 and the lowest is 0. At the end of each session,
program evaluation will be conducted using three essay questions and an observation sheet consisting of 12 statements with a checklist of "yes" and "no".

The three self-report questionnaires were developed based on an extensive literature review. The validity will be conducted with three experts including a disaster nurse, a mental health nurse, and an Islamic psychologist. The content validity index (CVI) score of 0.9 will be used as the excellent standard (Polit & Beck, 2010). Interrater reliability will be assessed with randomly selected 25% sample of baseline (N=38) (Ford et al., 2011). This will involve a test-retest to measure the correlation between the same person’s score as well as the application of internal consistency to evaluate the interrelatedness among items or sets of items in the scale (Polit & Hungler, 1991). The results satisfied the criteria for reliability as observed with the score ≥ 0.7 (Polit & Beck, 2010).

Data Analysis

Qualitative phase
The qualitative analysis was conducted manually using conventional inductive content analysis (Graneheim & Lundman, 2004), and eight subthemes and four themes were created and these were used to support the module developed to improve the Islamic-based disaster response competencies for nurses in Banda Aceh hospitals.

Quantitative phase
The quantitative data will be analyzed using SPPS version 21 for window. Descriptive statistics will be used to explain the percentage, mean, standard deviation, and median of the population studied. Meanwhile, the data for each variable will be assessed using Intra-Class Correlations (ICCs) after the Cronbach's Alpha test is provided values of ≥0.7 for the variables (Polit & Beck, 2014). The disaster response competencies between groups will be analyzed using inferential statistics independent t-test with pre-test-post-test-control group design (Polit & Hungler, 1991) to compare the mean scores of knowledge, skills, and attitudes before and after the intervention in the three groups. Moreover, a repeated measure one-way analysis of variance (ANOVA) will be also applied to compare the scores of pre-tests on follow-up I and II in the three groups while the Between-Subject Effect will be used to evaluate the difference of scores between the intervention and control groups. However, the variations within the same group will be evaluated using Within-Subject Effects while those observed within each measurement time will be assessed using the Interaction Effect.
AUTHORS’ CONTRIBUTIONS

No conflicts of interest are reported in this study.

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