Disaster Healthcare Workers' Experience of Using the Psychological First Aid Mobile App During Disaster Simulation Training

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Abstract

Objective: The study aimed to examine the experience of disaster healthcare workers with simulation training using the Psychological First Aid (PFA) mobile app.

Methods: This study was designed using qualitative research methodology with focus group interviews. The participants were 19 disaster healthcare workers from community mental health service centers who attended disaster simulation training in flood, fire, or leakage of hazardous chemicals. Before the simulation, participants were provided the PFA mobile app and allowed to practice the PFA techniques to apply them during the simulation. Data were collected through focus group interviews and qualitatively analyzed using the content analysis method.

Results: The findings were divided into 6 categories: experience in realistic disaster situations, satisfaction with education methods using a mobile app, effectiveness of the PFA app in disaster relief, confidence in disaster relief by integrating experience and knowledge of the PFA app, self-reflection as a disaster healthcare worker, and identifying limitations and making developmental suggestions.

Conclusions: Based on the participants' developmental proposals in this study, the disaster simulation training, incorporating improvements in the disaster simulation training and the PFA app features, will serve as a new framework for disaster support education and systematic mental health services to survivors by disaster healthcare workers.

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Disasters have a significant and threatening effect on the mental health of individuals, families, and communities.[1] People who experience disasters can suffer from mental trauma, which can lead to anxiety, depression, sleep disorders, and serious mental health issues such as posttraumatic stress disorder, psychosis, and suicide.[2] Moreover, disaster survivors suffer from chronic symptoms, and in the event of repeated occurrences, they may feel like their life has lost meaning due to helplessness.[3]

Psychological first aid (PFA) is designed to reduce the initial mental distress of disaster survivors and prevent posttraumatic stress disorder. It focuses on providing psychological comfort, practical assistance, information on coping, and connection with social supports.[4,5] Because PFA should be implemented carefully after considering the psychological state and cultural characteristics of disaster survivors, it is important for disaster healthcare workers to be aware of the psychological responses of survivors and to be properly trained in interpersonal skills and problem-solving.[6,7] Therefore, several organizations that support disaster survivors, such as the World Health Organization (WHO), the American Red Cross, and the National Child Traumatic Stress Network, provide the PFA training programs or manuals to healthcare professionals, teachers, priests, and volunteers as well as disaster healthcare workers.[8,9]

Simulation[10] is defined as a technique that creates a situation in which a person can experience representations of real-world events for practice, learning, or understanding of systems. Simulations in healthcare are designed to foster participants' critical thinking and decision-making in an environment that resembles a clinical setting.[11] Simulation-based education has been used for disaster preparedness training for current and future healthcare professionals. In particular, the effect of simulation-based disaster psychological support education improves learner's positive learning attitude, crisis management, problem-solving skills, knowledge of psychosocial support, and confidence.[12–15] However, in a qualitative study with mental health workers, many participants reported that training was often conducted inconsistently, and the lack of follow-up made it difficult to apply what was learned to their disaster encounters.[16] Another qualitative study indicated that disaster healthcare workers preferred training in a

mixture of approaches, including online, face-to-face, and real-world applications, and desired manuals in-between training and on-site for personal review.[17] Therefore, it is necessary to expand and organize disaster training more effectively, and it would be useful to further explore the experience of disaster healthcare workers.

Recently, with the popularization of smartphones, various mobile applications have been developed and distributed, beneficial for various purposes in numerous fields. In particular, smartphones have advantages such as easy portability and rapid information acquisition, making them suitable for use during disasters.[18] Due to these benefits, there have been recent attempts to use mobile apps in disaster situations. Recent researches on disaster-related mobile apps include communication and clinical information management, emergency medical services for large-scale accidents, and mobile mental health intervention in the event of a war or disaster. However, the available research on disaster education applying mobile apps is rare.[19–22] Therefore, this study aimed to conduct disaster simulation training with a mobile application to provide psychological support for disaster survivors and analyze training participants' experiences through focus group interviews. By exploring the nature of training experiences, this study will provide initial data that can be used to tailor PFA training for disaster relief workers to address their actual needs.

Methods

Design

This study was designed using qualitative research methodology with focus group interviews to explore and provide an in-depth understanding of disaster healthcare workers' experiences of disaster simulation training using the PFA mobile app.

Simulation

Disaster simulation was conducted in the C University's nursing simulation center with prebriefing, simulation, and debriefing stages. Participants were assigned to 1 of 3 scenarios: flood, fire, or leakage of hazardous chemicals. In prebriefing, the instructor informed procedures of the simulation training, learning objectives, scenario case, and precautions for 30 min. In simulation implementation using standardized patients held in the simulation room, each participant performed PFA to provide emotional support to disaster survivors for 15 min. They were allowed to use the PFA mobile app when desired freely. Debriefing was conducted for 30 min by 2 participants each in the debriefing room and composed of 5 stages of Share, Explore, Notice, Support, and Extend based on the SENSE model (Figure 1).[23]

PFA Mobile App

The PFA mobile app, named Psychological Life Support, was developed to provide disaster workers information on disaster situations, apply PFA techniques, and assist the recovery of their traumatic stress after a disaster.[24] The app can be downloaded for free on the ONE store, a Korean app store (https://m.onestore.co.kr/mobilepoc/apps/appsDetail.omp?prodId=0000747600#). The menu is largely composed of PFA preparation, PFA implementation, and psychological healing (Figure 2). The simulation participants were able to practice PFA techniques by downloading the app and can apply its contents during the simulation.

Participants and Procedures

The simulation participants were recruited by posting advertisements on bulletin boards such as fire departments, mental health welfare centers, and medical institutions, and snowball sampling was used as well. A total of 30 participants were assigned to 1 of 3 disaster simulation scenarios: flood, fire, or leakage of hazardous chemicals. They attended a whole simulation experience involving prebriefing, high-fidelity simulation using standardized patient, and debriefing. Before the simulation, participants were provided the PFA mobile app, an application that provides information on disaster situations applies the PFA techniques, and assists the recovery of relief workers after a disaster.[24] They were allowed to practice the PFA techniques in advance to apply them during the simulation. After the simulation, purposive sampling was used, and participants who completed the disaster simulation were invited to attend focus group interviews. Finally, 19 participants were recruited for focus group interviews. All participants were mental health workers who provided support during disasters and attended simulation training using the PFA mobile app (Table 1).

Data Collection

One of the authors conducted the focus group interviews in a local language, Korean, to explore disaster healthcare workers' experience in simulation training using the PFA mobile app. The interviews were effective in collecting qualitative data by encouraging group conversations between participants with a common background by focusing on specific topics.[25]

A total of 19 participants were interviewed in 3 focus groups of 4 to 10 participants. An interview guide was developed with 3 open-ended main questions: (a) How was your experience using the PFA app for the simulation training? (b) What were your learning outcomes from the simulation training using the PFA mobile app? (c) How do you expect this simulation training using the PFA mobile app to affect your actual practice? The focus group interviews were audio-recorded and lasted 60 to 90 min. Recordings were verbatim in Korean.

Data Analysis

The transcribed interview material was analyzed by the team of authors according to the principles of qualitative content analysis.[26] All authors read the transcripts repeatedly to obtain an overview and formed meaning units with meaningful words, sentences, or paragraphs from the participants' statements. The authors met several times to discuss the coding process to complete the sub-categories and defined the categories by grouping the common sub-categories. The final categories were completed after several revisions. The bilingual translator translated condensed meaning units, sub-categories, and categories. Back-translation was also used from English to Korean to ensure the accuracy of the transcripts. Two bilingual experts in disaster research and all authors were involved in reaching a final agreement on the translation.

To ensure the trustworthiness of the results, 2 participants were asked member checks to confirm the data used in the analysis and the results to ensure credibility, and 2 experts in qualitative research consulted the entire process and the results of the research for auditability. Transferability was achieved by presenting the results of this study to 2 disaster healthcare workers who had experience in disaster simulation training and were not participating in the research.

Groups	Prebriefing (30mins)	Simulation (15mins)	Debriefing (30mins)	FGI (60-90mins)
Flood (n=10)	**<Orientation>** • Procedures • Learning objectives -Provide PFA according to priority -Perform appropriate interventions for reducing anxiety -Employ therapeutic communication skills • Scenario case • Precautions	Scenario case: Flood SP: 30-year-old pregnant woman at 24 weeks Chief complaint: anxiety, helplessness, flashback	• Share -Share the events and emotions of the simulation practice • Explore -Analyze what causes the difficulty with the case • Notice -Identify the learner's educational level and help needed • Support -Encourage learning achievements and offers educational direction -Guide relaxation techniques • Extend -Apply new-found knowledge and experience in clinical practice	3 Groups (n=19) • How was your experience of using the PFA app for the simulation training? • What were your learning outcomes from the simulation training using the PFA mobile app? • How do you expect this simulation training using the PFA mobile app to affect your actual practice?
Fire (n=10)		Scenario case: Fire SP: 58-year-old woman with burns Chief complaint: anxiety, fear, feeling of loss, flashback		
Leakage of hazardous chemicals (n=10)		Scenario case: Leakage of hazardous chemicals SP: 19-year-old woman with right fibula fracture Chief complaint: anxiety, anger, flashback		

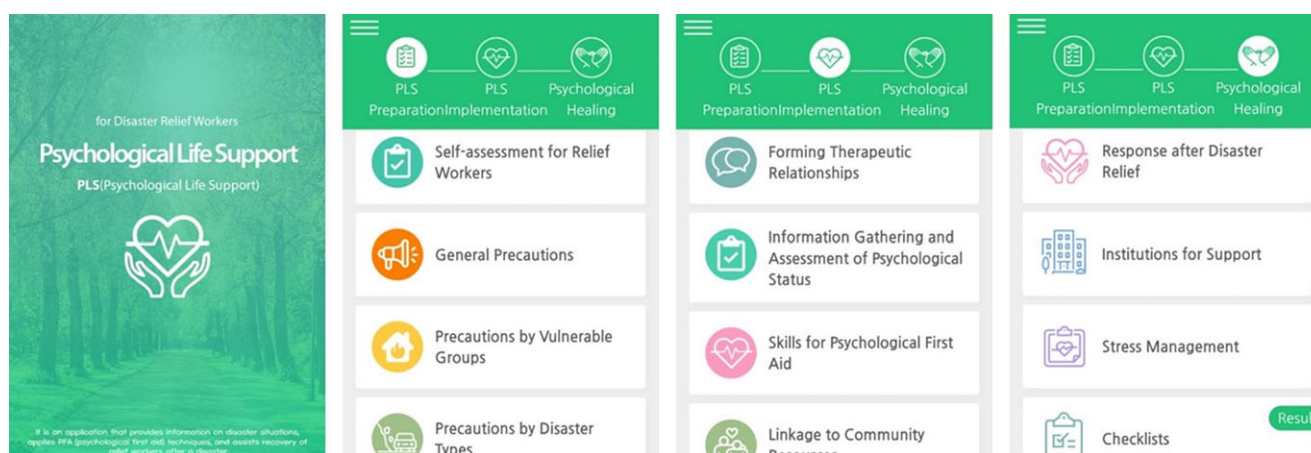**Figure 1.** Simulation process.

Figure 2. Images of the PFA mobile app (name of the app: Psychological Life Support).

Results

The disaster healthcare workers' simulation training experiences using the PFA app can be categorized into 13 sub-categories and 6 categories (Table 2).

Experience in Realistic Disaster Situations

Participants experienced realistic disaster situations through this simulation training. They were able to empathize with the standardized patient (SP) and immerse themselves in the disaster with realistic scenarios that dealt with the SP's actual reactions and disaster situations. They also considered it as an opportunity to experience a disaster. Therefore, this simulation training was evaluated as realistic and highly immersive.

I engaged in role-plays when learning, so I thought it was a simple role-play. However, the environment was decorated with disaster scenes, and the SP was crying like a survivor, so I was embarrassed because it was more realistic than I expected. I thought that if I went to the scene of a disaster without that simulation training, I would be in big trouble. So, I could think more about what I should improve and what kind of mindset I should have while talking to survivors through this simulation. (FG2 P2)

At the beginning of the simulation training, a video of the fire scene was presented, making it easy to imagine that I was actually at the scene of a fire. (FG3 P1)

Satisfaction With Educational Methods Using a Mobile App

Participants were satisfied with the educational method of using a mobile app. They were also satisfied with the educational environment as well as with the knowledge provided and benefited from experiencing a new teaching method using a mobile app.

I had much information about disaster relief, but it was not well organized. However, in the PFA mobile app, important content related to the disaster was organized by topic. In particular, it included inspection tools, counseling records, and contents to be checked, which was very helpful, and I thought it would be good to use the PFA app in a disaster scene. (FG2 P5)

The educational environment was good. The many things needed for training were available, including a well-equipped audio and video system for the disaster simulation. It was also good because the training process was systematic. (FG3 P7)

Table 1. Characteristics of focus grup interview participants (N = 19)

Items	Contents	N
Sex	Female	15
	Male	4
Age (M±SD)		35.27±6.82
Education	Associate degree	2
	Bachelor's	13
	Master's	4
Occupation	Nurse	1
	Social worker	8
	Mental Health professional	10
Work experience (y)	< 5	8
	5 ~ 10	8
	>10	3

Table 2. Sub-categories and categories

Sub-categories	Categories
Realistic training	Experience in realistic disaster situations
Highly immersive training	
Highly satisfying training	Satisfaction with the educational methods using a mobile app
Benefits of training with a mobile app	
Effectiveness of the PFA app	Effectiveness of the PFA app in disaster relief
Providing intervention using the PFA app	
Integration of experience and knowledge	Confidence in disaster relief by integrating experience and knowledge of the PFA app
Understanding disaster psychological relief	
Gaining confidence	
Opportunity to look back on oneself	Self-reflection as a disaster healthcare worker
Realizing the need for preparation	
Barriers to training	Identifying limitations and making developmental suggestions
Suggestions for the future	

Effectiveness of the PFA App in Disaster Relief

Participants saw the emotional stability of the disaster survivors during the simulation, and hence, they acknowledged the PFA app's effectiveness, noting that it helped during disaster relief. They also provided interventions through the PFA app, depending on the level of assistance needed by the survivors. In conclusion, they realized that the PFA app was an effective tool during disaster relief.

When I started the simulation, I felt like I fell into the disaster scene, but I relied on the mobile app because there was a lot of information. I realized that the app was really effective when I saw how the SP had been changed, how her expression had changed, and how she felt relieved while shedding tears. (FG1 P2)

During the simulation, the PFA app was used to provide psychological support, and various interventions were possible depending on the symptoms of the disaster survivor. For example, when she was in tears and anxious, we watched the app's video and followed the butterfly hug together. (FG3 P2)

Confidence in Disaster Relief by Integrating Experience and Knowledge of the PFA App

Participants were able to address the limitations in clinical practice with simulation training using a mobile app. It helped connect the clinical experience with the knowledge provided by a mobile app. They also gained confidence by understanding the meaning and importance of providing psychological support during disasters.

Through simulation training, I realized that it was important to empathize with survivors and help them stay psychologically stable. Also, I felt it was essential to provide the necessary information to those who were anxious. I learned what disaster survivors need. (FG1 P3)

The instructor complimented me a lot for carrying out the simulation. It was then I realized that I was performing well, and I was encouraged a lot. I think I got positive feedbacks that enhanced my confidence. I wanted to learn more about disaster psychological support. (FG2 P3)

Self-Reflection as a Disaster Healthcare Worker

Participants were able to reflect on themselves and their lack of preparedness as disaster healthcare workers through this training. Moreover, they realized that preparation is necessary. Eventually, they experienced self-reflection through simulation training.

Through the debriefing, I had an opportunity to see what I was doing and identify my strengths and weaknesses. It was a great opportunity to observe my usual performance and learn from what I did wrong. (FG3 P4)

There was a debriefing process because it's simulation training. Watching the recorded video during the debrief, I learned what I did wrong during the simulation and how to be careful with facial expressions and words while talking to the survivors. Moreover, it was an opportunity to look back on previous relief experiences. (FG2 P1)

Identifying Limitations and Making Developmental Suggestions

Participants experienced barriers in simulation training. In other words, they felt nervous during the training and were also reluctant to use the app in relief situations. They also thought that the simulation situation was different from the real one and believed that more diverse disaster scenarios were needed. Moreover, they suggested that the simulation curriculum should be revised, and useful functions were proposed for the PFA app. They also believed the limitations of simulation training while using the mobile app but made developmental suggestions.

The disaster situation is usually very chaotic and not calm, but the simulation environment was in order, which was unfortunate. It would be more realistic to provide loud noises and create chaotic situations. (FG3 P5)

It would be nice to have a text-size enlargement function to make it easier for senior survivors to use the app, and it would be helpful to add a function that allows them to print test questions and results when necessary. (FG2 P4)

Discussion

Experience in Realistic Disaster Situations

The participants reported experiencing realistic and immersive disaster situations through a simulation-based curriculum that dealt with disaster survivors or standardized patients in an environment similar to actual disaster situations, rather than instructor-led education. Simulation training is an activity in which participants use multiple techniques to solve problems through

a simulated reality.[11] A simulation-based learning method has the advantage of providing the experience of high-risk situations safely.[27] The findings of a qualitative study of professional caregivers with experience in disaster response showed that the effective training method for learning disaster management and response is a small group simulation, similar to that of this study.[28] In conclusion, disaster simulation training can be an effective educational strategy to enhance the core capacity of disaster relief by allowing disaster healthcare workers to experience disaster situations in advance and acquire coping skills.

Satisfaction With Education Methods Using a Mobile Application

The participants found the use of the mobile app beneficial and expressed satisfaction with this mode of education. They also acknowledged that the mobile app was an easy-to-use tool, which helped them cope with disasters. The mobile app used in this study included helpful information to help with the preparation and performance process of PFA, psychological interventions such as videos and games for mental relaxation, and psychological assessment for disaster survivors. It is assumed that participants had a positive experience because they could provide psychological support more systematically by using the information provided by the PFA app rather than relying only on their skills or knowledge. Hambrick et al.[17] reported that disaster healthcare workers wanted to learn practical techniques that were readily available during disasters, and Lee et al.[29] indicated that they needed to be educated on how survivors could be used in consultation with disaster victims through qualitative research. To summarize, there is a need for disaster healthcare workers to learn easy-to-use and practical methods and to reflect on them. In this study, we showed how mobile applications could be effective educational tools for them. In recent times, many people are using mobile phones in real life. Smartphones, in particular, are considered practical and easy to use, making them an effective tool for use in disaster situations.[30] For further research, it may be worth investigating the effectiveness of using the PFA mobile app in an actual disaster situation rather than a simulation.

Effectiveness of the PFA App in Disaster Relief

According to the survivor's level, the participants provided PFA intervention as per the PFA app's manual and reported effective disaster relief. They also introduced various relaxation techniques to the survivors guided by the app and witnessed their psychological stability. It suggests that a mobile app can be effective in providing psychological support at disaster sites. Moreover, relief workers at the disaster site can also receive help by obtaining necessary information through the app. If victims urgently need psychological help, but relief workers are not available, we expect the app to assist them. In previous qualitative studies, mental health service apps were insufficient in emotionally supporting users with mental problems but helped alleviate levels of distress and strived to solve problems in a constructive manner.[31] Additionally, a systematic literature review that analyzed the effectiveness of mobile apps that provide psychotherapy showed that compared with conventional face-to-face psychotherapy, the effectiveness of the apps was unclear.[32] Therefore, it is believed that further research will be needed to verify the specific effects of the PFA app used in this study. It will also be necessary to assess the experience of the disaster survivors who received psychological support through the PFA app.

Confidence in Disaster Relief by Integrating Experience and Knowledge of the PFA App

The participants integrated their relief experience and knowledge of the PFA app through simulation training and further gained understanding and confidence on what was important during disaster relief. It is consistent with the findings of previous studies that indicated simulation training leads to improved PFA knowledge, confidence in PFA skills, readiness, and connectivity.[13,15] Moreover, this is also consistent with the results of prior qualitative studies that simulation-based training of public health workers led to an awareness of the role of disaster healthcare workers and the importance of disaster relief.[33] It is believed that using the PFA app during simulation promoted positive emotions such as self-confidence and a sense of achievement by providing clinical knowledge instantly and helping solve problems. Moreover, the PFA app contains a variety of information that disaster health workers can instantly access in the field. Using the app can supplement the disaster training to close the existing gaps in knowledge or skills.

Many disaster healthcare workers often feel that they lack the resources needed to help the survivors, resulting in negative feelings such as frustration, helplessness, loss of confidence, mental stress, and exhaustion.[16,34] Mobile apps can alleviate these problems and hopefully become resources by providing disaster healthcare workers with the required knowledge and interventions. The positive educational experience of simulation using the PFA app identified in this study suggests that using the app can be an efficient tool to help disaster healthcare providers deal with complex and unpredictable disaster sites.

Self-Reflection as a Disaster Healthcare Worker

Through the simulation training, participants recognized the lack of preparation as disaster healthcare workers, and it allowed them to reflect on their performance. It was reported that prior training was necessary, and they should have been more prepared as disaster healthcare workers. It is similar to previous studies' findings where disaster training increased participants' awareness of disaster preparedness.[35,36]

Critical awareness and reflection as disaster healthcare workers can have a positive impact on professional preparation and growth. A previous study found that self-awareness of disaster preparedness promoted preparation for disaster response.[37] Disaster healthcare workers must be prepared, equipped with basic knowledge of the survivor's psychological characteristics and changing psychological conditions over time, and respond accordingly.[6] Therefore, self-reflection can provide growth opportunities for PFA providers by allowing them to recognize their responsibilities and roles in the event of a disaster and driving them to acquire the required core competencies.

Identifying Limitations and Making Developmental Suggestions

The participants experienced psychological difficulties during simulation training and suggested enhancing the features of the PFA app and revising the disaster simulation course. According to a previous study, simulation trainees experienced difficulties coping with unexpected situations during simulation due to unfamiliarity with new teaching methods.[36] In this study, participants may also have experienced psychological stress because they had difficulty with the new teaching method, a simulation using a mobile app, and were not informed about the disaster scenario situation in

advance. However, it is important to note that participants expressed both negative and positive experiences as well as suggested ways to improve the app. Hence, providing sufficient information in advance and prior experience in using the PFA app will enable disaster healthcare workers to demonstrate their competencies more effectively.

Limitations and Future Research

This study was conducted with a relatively small sample of male disaster healthcare workers, so that gender bias might be a concern. Moreover, the recruitment of participants was mainly done in the community mental health service centers, and data on previous disaster education or disaster relief were not collected; therefore, the differences from the previous experiences could not be identified. This study also lacked verification of the participants' prior experience of the PFA app; thus, it was not possible to conclude whether the comfort and ability to use technology were improved solely due to the experience of using the PFA app. Therefore, a diverse study sample must be considered and obtained from healthcare institutions or government organizations in future studies. Furthermore, detailed information about participants should be collected to understand the difference between disaster relief training, actual relief experience, or familiarity with the PFA app. In this study, the PFA app was used in a simulation situation, but in the future, a study should assess the experience of using the PFA app in a real disaster site.

Conclusions

Disaster simulation training using the PFA mobile app provided disaster healthcare workers with an opportunity to experience realistic disaster situations, which was highly effective in disaster relief, and integrated knowledge and experience to increase their confidence. It allowed them to self-reflect as disaster healthcare workers. Based on the limitations and improvements suggested by participants in this study regarding the disaster relief simulation training, the PFA app functions could serve as a new framework for providing disaster relief education and systematic mental health services to survivors at the disaster site by disaster healthcare workers.

Ethical standards. This study was approved by the Institutional review board of Chung-Ang University in Korea. Participants were given sufficient explanation about the study's purpose and procedures and informed that they could withdraw from the study at any time without receiving any penalty. All participants voluntarily signed the informed consent form.

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