Validity and Reliability of Public Health Center Resilience Questionnaire in Flood-Prone Areas of East Java Province, Indonesia

Introduction: Public Health Center is the front line that plays a major role in disaster preparedness and management so that efforts are needed to increase the resilience of the Public Health Center to ensure that the Public Health Center remains resilient, safe and continues to operate in the event of a disaster. To prevent the impact of paralysis of health services at the Public Health Center, a tool is needed to measure the resilience of the Public Health Center. This research aims to identify indicators of Public Health Center resilience which were synthesized from various sources. ***Methods:*** This research is a cross-sectional study of 30 Public Health Center in flood-prone areas of East Java Province and experienced floods, from September to October 2021. Confirmatory factor analysis (CFA) was used to assess the suitability of the structural model of Public Health Center resilience. The validity of the questionnaire has been tested using the Coefficient of Reproducibility and Coefficient of Scalability with values of Kr = 0.903 and Ks = 0.903 so that it is declared valid. ***Results*****:** The results showed that the reliability value= 0.843> 0.7 which indicates adequate reliability. All items in the Health Center Resilience questionnaire have a factor loading greater than 0.32 and obtained AVE > 0.5 which indicates good convergent validity and CR obtained > 0.7 means that the questions in the questionnaire are reliable. ***Discussion and Conclusion:*** In conclusion, there are 13 indicators that make up the significant Public Health Center Resilience questionnaire.

Keyword: flood, public health center, resilience, validity, reliability

Introduction

Health issues are national security issues. The National Disaster Management Agency (BNPB) noted that until December 31, 2020, there were 2,952 disasters. According to the Indonesia Disaster Risk Index (IRBI) 2020, East Java Province has a risk index of 126.42 (high). The threat of flooding in East Java is in the medium-high category (BNPB, 2018a). Public Health Center (Public Health Center) is the front line that plays a major role in disaster preparedness and handling (Sugino et al., 2014). This is reinforced by the global target in the Sendai Framework by 2030 (SFDRR, 2015). The research results of Sugino et. al. (2014) stated that during a disaster the Public Health Center was badly damaged by the disaster, causing major disruption to health services (Sugino et al., 2014). Another study stated that the impact of the paralysis of health services at the Public Health Center has the potential to increase disease outbreaks and increase the number of deaths and injuries due to delays in life saving measures and medical treatment (Pascapurnama et al., 2018). Given the importance of the role of Public Health Center in the event of a disaster, efforts are needed to increase the resilience of the Public Health Center to ensure that the Public Health Center will be resilient, safe and will continue to operate in the event of an emergency or disaster (Ministry of Health, 2012). To prevent the impact of the paralysis of health services at the Public Health Center, a tool is needed to measure the resilience of the Public Health Center.

Method

Ethical clearance this study was obtained from Research Ethics Committee of the Faculty of Nursing, Universitas Airlangga, Indonesia, with number 2317-KEPK. This was cross-sectional study. After obtaining the informed consent forms, we distributed questionnaires, and we ensured the confidentiality of respondents. The data was collected from a 30 public health centers in East Java taken by total population from September to October 2021. The inclusion criteria for the participants were inpatient health centers, located in flood-prone areas, and have experienced floods in January 2019–February 2021. Public Health Center Resilience questionnaire was measured using one hundred questions from synthetic materials from various sources, including Zhong (2014), Hospital Safety Index (2015), Oktari & Kurniawan (2016), BNPB (2018), and Aliabadi (2020). The health center resilience questionnaire consists of 100 questions using the Guttman scale. All questions have two answer choices consisting of "yes" and "no" with an assessment score of "yes = 1" and "no = 0". The scale and category of each indicator with categories: Level 1 = score 0; Level 2= score 1; Level 3= score 2; Level 4= score 3; and Level 5 = score 4. The validity of the questionnaire has been tested using the Coefficient of Reproducibility and Coefficient of Scalability with values of Kr = 0.903 and Ks = 0.903 so that it is declared valid. The results of the reliability test showed that the reliability value = 0.843 > 0.7, then the reliability value was acceptable. The data that has been obtained is then analyzed using Confirmatory Factor Analysis (CFA). Confirmatory factor analysis (CFA) was used to assess the suitability of the structural model of the Public Health Center Resilience questionnaire. The following match indexes are evaluated using the match index (GFI), the comparative match index (CFI), and the incremental match index (IFI) must be greater than 0.9. Convergent validity was calculated using Pearson's correlation, by testing the relationship between each item and the total score of the Public Health Center Resilience questionnaire.

Results and Discussions

Table 1: Frequency Distribution of Public Health Center in East Java Province, 2021

Characterictics	n	%
Accredited		
Plenary	2	6.7
Main	4	13.3
Middle	21	70.0
Basic	3	10.0
Total	30	100.0
Work Areas		
Rural	9	30.0
Urban	21	70.0
Total	30	100.0
Flood Vulnerability Level		
High	29	96.7
Moderate	1	3.3
Total	30	100.0

Table 1 shows that 70% of the Public Health Center have middle accreditation, which is a fairly good result and the criteria for the Public Health Center are above average. 70% of Public Health Center located in urban work areas are Public Health Center whose work area covers areas that meet at least more than 50% population activity in the non-agricultural sector, especially industry, trade and services. Health centers that have a work area with a high level of flood vulnerability as much as 96.7% are located in locations that are directly associated with the presence of a river. The East Java Regional Disaster Management Agency (BPBD) stated that out of 38 regencies/cities in East Java, 22 regions (56.4%) were categorized as prone to flooding. Areas that have the potential to be flooded are located along seven rivers, including the Bengawan Solo River, the Brantas River, the Welang-Rejoso River, the Kemuning Sampang River, the Bajul Mati River in Banyuwangi, the Pekalen Situbondo River, and the Bondoyudo Lumajang River.

Confirmatory Factor Analysis (CFA)

The results of the initial measurement model for the resilience of the health center showed that indicators measuring latent variables of structural, non-structural, and functional resilience had a fairly high loading factor, ie > 0.5, except for indicators X_1 and X_9. The following is the loading factor value from testing the validity of each indicator on the latent variables shown in Table 2.

Table 2: Loading Factor Indicators of Public Health Center Resilience

Correlation	Loading Factor	p-value	Description
Structural Resilience ← Public Health Center Resilience	1.2547	0.306	Not Significant

Correlation	Loading Factor	p-value	Description
Non Structural Resilience ← Public Health Center Resilience	0.5987	0.095	Not Significant
Functional Resilience ← Public Health Center Resilience	0.4018	0.000	Significant
Transportation (X_4) ← Structural Resilience	0.5574	0.000	Significant
Health facilities and equipment (X_3) ← Structural Resilience	0.7685	0.010	Significant
Building structure (X_2) ← Structural Resilience	0.6500	0.016	Significant
Accessibility (X_1) ← Structural Resilience	0.2073	0.337	Not Significant
Critical System (X_6) ← Non Structural Resilience	0.6608	0.000	Significant
Access protection, infrastructure & physical security (X_5) ← Non Structural Resilience	0.6921	0.026	Significant
Training (X_{16}) ← Functional Resilience	0.7723	0.000	Significant
Recovery (X_{15})← Functional Resilience	0.9013	0.000	Significant
Funding (X_{14})← Functional Resilience	0.7190	0.000	Significant
Health human resources (X_{13}) ← Functional Resilience	0.8502	0.000	Significant
Service continuity (X_{12}) ← Functional Resilience	0.7340	0.000	Significant
Emergency supply & logistics management (X_{11}) ← Functional Resilience	0.7985	0.000	Significant
Command, coordination & cooperation (X_{10}) ← Functional Resilience	0.7028	0.000	Significant
Disaster data collection system (X_9) ← Functional Resilience	0.3201	0.089	Not Significant
Risk assessment and reduction (X_8) ← Functional Resilience	0.6785	0.000	Significant
Disaster Plan (X_7) ← Functional Resilience	0.5600	0.002	Significant

Table 2 shows that there are three significant indicators, namely the building structure (X_2), facilities and equipment (X_3), and transportation facilities (X_4) that make up the structural resilience component, two significant indicators namely infrastructure protection, access, physical security (X_5), and a critical system (X_6) that forms a non-structural resilience component, and nine significant indicators namely disaster contingency plans (X_7), risk reduction assessment (X_8), command, coordination, cooperation (X_{10}), inventory, logistics management (X_{11}), continuity of service (X_{12}), Health HR (X_{13}), funding (X_{14}), recovery (X_{15}), training (X_{16}) which form a component of functional resilience because it has a p-value> (0.1). The components of structural resilience and non-structural resilience, as well as accessibility indicators (X_1) and disaster data collection systems (X_9) are not significant because they have a p-value > (0.1), so they cannot be analyzed at a later stage. The next stage continued to identify the model. Model testing aims to see the undimensionality of indicator variables in explaining latent variables, with hypotheses and model suitability criteria shown in Table 3.

Table 3: Criteria for Goodness of Fit Public Health Center Resilience Questionnaire

Criteria	Cutt-off value	Model Results	Model Evaluation
P-value	≥0,05	0.069	Fit
CMIN/DF	≤2	1.281	Fit
GFI	≥0.90	0.751	Marginal Fit
RMSEA	0.05-0.08	0.098	Marginal Fit
CFI	≥0.90	0.914	Fit

Table 3 shows that the p-value>0.05 is not significant because the results indicate that there is no difference between the model and the data so that the model is in the fit category. The value of CMIN/DF=2 means that the model is in the fit category. The GFI value < 0.90 is an index of the accuracy of the model in explaining the model is still in the marginal fit category, meaning moderate. The RMSEA value > 0.08 explains that the residue in the model is still in the marginal fit category, meaning moderate. The CFI value 0.90 is the comparison value of the model compiled with the ideal model in the fit category. Overall the criteria for the goodness of the model are met, so that it can be continued at the significance testing stage to show the validity of the indicators on the latent variables.

The following is the loading factor value from testing the validity of each indicator against each component as shown in Table 4. Confirmatory factor analysis was conducted to evaluate the construct validity of the Public Health Resilience questionnaire. The number of items in the questionnaire is 16 items and only 9 items have a factor loading greater than 0.5, which indicates good convergent validity (Table 4). Table 4 shows indicators of building structures (X_2), facilities and equipment (X_3), and transportation systems (X_4) having p-value =0.1, which is significant because these results indicate that there is a difference between the model and the structural resilience component data. The critical system indicator (X_6) has a p-value =0.1, which is significant because these results indicate that there is a difference between the model and the non-structural resilience component data. Indicators of training (X_{16}), recovery (X_{15}), funding (X_{14}), health human resources (X_{13}), service continuity (X_{12}), supply and logistics management (X_{11}), command, coordination, and cooperation (X_{10}), risk assessment and reduction (X_8), and the disaster contingency plan (X_7) has a p-value =0.1, which is significant because these results indicate that there is a difference between the model and the functional resilience component data.

The Average Variance Extracted (AVE) and reliability/composite reliability (CR) to test the reliability value of each indicator on a variable shown at Table 5. Table 5 shows the composite reliability (CR) value of the structural resilience component= 0.705, the non-structural resilience component= 1.000, and the functional resilience component= 0.919. The CR value > 0.7 indicates that the questions in the questionnaire are reliable (Ghozali, 2008). Average Variance Extracted (AVE) value of the structural resilience component= 0.669, the non-structural resilience component= 1.000, and the functional resilience component= 0.751. The AVE value > 0.5 indicates good convergent validity (Ghozali, 2008).

The results of the Second Order CFA modeling on the resilience of the Public Health Center obtained 13 indicators that formed the latent variables of significant functional resilience, namely building structures, facilities and equipment, transportation facilities, critical systems, disaster contingency plans; risk assessment & reduction; command, coordination & cooperation; supply & logistics management; service continuity; health human resource; funding; recovery; and training., this is indicated by the p-value < (0.1).

Table 4: Loading Factor of Public Health Center Resilience Indicator in East Java Province, 2021

Correlation	Loading Factor	P-value	Description
Structural Resilience ← Public Health Center Resilience	0.5042	0.019	Significant
Non Structural Resilience ← Public Health Center Resilience	0.3513	0.049	Significant
Functional Resilience ← Public Health Center Resilience	1.0000	0.000	Significant
Transportation (X_4) ← Structural Resilience	0.6104	0.013	Significant
Health facilities and equipment (X_3) ← Structural Resilience	0.7977	0.000	Significant
Building structure (X_2) ← Structural Resilience	0.5809	0.015	Significant
Critical System (X_6) ← Non Structural Resilience	1.0000	0.000	Significant

Correlation	Loading Factor	P-value	Description
Training (X_{16}) ← Functional Resilience	0.8327	0.000	Significant
Recovery (X_{15})← Functional Resilience	0.9556	0.000	Significant
Funding (X_{14})← Functional Resilience	0.7002	0.000	Significant
Health human resources (X_{13}) ← Functional Resilience	0.8267	0.000	Significant
Service continuity (X_{12}) ← Functional Resilience	0.6829	0.000	Significant
Emergency supply & logistics management (X_{11}) ← Functional Resilience	0.7694	0.000	Significant
Command, coordination & cooperation (X_{10}) ← Functional Resilience	0.7120	0.000	Significant
Risk assessment & reduction (X_{8}) ← Functional Resilience	0.6281	0.000	Significant
Disaster Plan (X_{7}) ← Functional Resilience	0.5850	0.000	Significant

Table 5: AVE and CR of Public Health Center Resilience

	Loading Factor	Average Variance Extracted (AVE)	Composite Reliability (CR)
Transportation (X_{4}) ← Structural Resilience	0.6104	0.669	0.705
Health facilities and equipment (X_{3}) ← Structural Resilience	0.7977		
Building structure (X_{2}) ← Structural Resilience	0.5809		
Critical System (X_{6}) ← Non Structural Resilience	1.0000	1.000	1.000
Training (X_{16}) ← Functional Resilience	0.8327	0.751	0.919
Recovery (X_{15})← Functional Resilience	0.9556		
Funding (X_{14})← Functional Resilience	0.7002		
Health human resources (X_{13}) ← Functional Resilience	0.8267		
Service continuity (X_{12}) ← Functional Resilience	0.6829		
Emergency supply & logistics management (X_{11}) ← Functional Resilience	0.7694		
Command, coordination & cooperation (X_{10}) ← Functional Resilience	0.7120		
Risk assessment & reduction (X_{8}) ← Functional Resilience	0.6281		
Disaster Plan (X_{7}) ← Functional Resilience	0.5850		

Structural resilience covers all elements of the hospital building. This domain consists of architectural elements and the design of spaces and structures as subdomains for the optimal functioning of hospitals to be inherently flexible, robust, and adaptive to emergency situations (Aliabadi, 2020). Public Health Center buildings can survive in the event of a disaster, it is necessary to assess the location, accessibility, building structure, facilities and equipment in the Public Health Center (WHO, 2015). Based on the results of the study, it was found that the latent variable of structural resilience on the accessibility indicator had the highest percentage at level 5. Level 5 means that the accessibility of the Public Health Center shows that there are benefits from the results / implementation that can realize long-term changes. This is in accordance with the building requirements of the Public Health Center according to the building rules in the accreditation of the Public Health Center (Ministry of Health, 2012). The results of the analysis of the initial model measurements show that there are 3 significant indicators, namely the structure of buildings, facilities and equipment, and transportation facilities that make up the latent variable of structural resilience, while the accessibility indicator is not significant because it has a p-value > (0.1) so it cannot be analyzed at The next step. The results of the Second Order CFA modeling on the resilience of the Public Health Center obtained that all indicators that formed the latent variable of structural resilience were not significant, this was indicated by the p-value> (0.1).

Building structure indicator

The results of the study show that the Public Health Center has a level 5 building structure indicator. This is indicated by most of the Public Health Center buildings having building structural elements that are in accordance with the flood hazard. The structure of the Public Health Center building complies with the requirements of the Public Health Center building, which is not built in flood-prone areas (Kemenkes, 2013). In line with the research of Yusoff et. al (2017) mentioned that hospitals located near riverbeds, rainwater channels, and areas with lower elevations suffered more severe damage. Hospitals must be designed and built to prevent potential functional disturbances due to flooding (WHO, 2010). The results of the study found that there were still Public Health Center whose building structure was lower than the road and irrigation channels did not function properly in front of the Public Health Center, causing flooding. Research Sulaiman et. al. (2020) stated that in addition to climate change, the age of buildings between 50-100 years also makes adaptation to the threat of flooding more difficult. Based on the research, the Public Health Center building was renovated when it was classified as old and urgent to be repaired so that it was maximal in providing health services.

Facilities and equipment indicator

The results showed that the Public Health Center had level 5 facilities and equipment indicators. This was shown by the Public Health Center participating in evaluating the facility and equipment capacity program in collaboration with the local district/city health office. Based on the basic data of the Public Health Center and the observations of the researchers, the facilities and equipment of the Public Health Center such as service rooms, treatment rooms, and medical equipment are in good condition and in sufficient quantity. The cross-tabulation shows that Public Health Center accredited middle have a moderate level of structural toughness, but there are still Public Health Center that have a low level of structural toughness. Public Health Center must be periodically accredited at least once every 3 (three) years to improve service quality. This is in line with the research of Sulaiman et. al. (2020) which states that to understand the risks and impacts of disasters, facility managers need to understand the needs of facilities and equipment.

Transportation facilities indicator

The results showed that the Public Health Center had level 5 indicators of transportation facilities. Based on the basic data of the Public Health Center and the observations of the researchers, the Public Health Center transportation facilities such as ambulances, motorbikes, and four-wheeled mobile health centers (Pusling) are in good condition so that when there is a flood or emergency situation, the Public Health Center ambulance or pusling functions to support and help carry out the activities of the Public Health Center in its working area. The health center does not have a health center vehicle around the waters to evacuate patients when a flood occurs, so they are waiting for rubber boat assistance from the East Java Regional Crisis Management Center (PPK) to evacuate patients. This is in line with the research of Duy et. al. (2019) which mentions the importance of transportation planning and advocates for the application of a Resilient Transport System (RTS) that can be integrated into flood-prone areas to reduce potential impacts due to flooding.

Non-structural resilience is a non-structural element that facilitates hospital functions (Aliabadi, 2020). Based on the results of the study, it was found that the latent variable of non-structural resilience in the critical system indicator had the highest percentage at level 5. Level 5 means that the critical system which includes energy and alternative emergency facilities for backup with good quality at the Public Health Center shows there are benefits from the results / implementation that can be achieved bring about long-term change. The results of the initial model measurement analysis show that all significant indicators are infrastructure protection, access, physical security, and critical systems that make up the latent variable of non-structural resilience because it has a p-value < (0.1). The results of the Second Order CFA modeling on the resilience of the Public Health Center obtained that all indicators that formed the latent variable of non-structural resilience were not significant, this was indicated by the p-value > (0.1).

Critical system indicator

The results showed that the Public Health Center had a critical system indicator level 5. This was shown by the Public Health Center actively participating (proposing, advocating, etc.) in increasing the amount and quality of energy and emergency facilities in collaboration with the local district/city health office. The results of the primary health center data and the researcher's observations showed that there were alternative energy and emergency facilities for backup (for example, pumping electricity, oxygen and clean water, telecommunications systems, sewage and liquid waste disposal facilities, fire systems, fuel storage systems, and monitoring systems to provide heating, ventilation, and air conditioning (HVAC) system failure warning) is in working condition. The results of the study showed that the Public Health Center accredited middle had a moderate level of non-structural toughness, but there were still Public Health Center that had a low level of non-structural toughness. Based on basic data, Public Health Center have alternative energy and emergency facilities for backup, namely electricity sources from PLN, diesel, and generators with electricity availability 24 hours/day, clean water sources from PAM and ground water, telecommunications systems consisting of radio communications. with a Very High Frequency (VHF) network, internet network, computers and laptops that function well, functioning solid and liquid waste disposal facilities, functioning fire systems, and medical oxygen available so that when there is a flood or emergency situation it will facilitate the function of the Public Health Center in providing basic health services. for society. This is in line with the research of Lapčević et. al. (2019) which states that critical systems, namely backup power supply and telecommunications are placed on the ground floor, so that when a flood occurs, critical systems are flooded and cannot be used. Aliabadi's research (2020) mentions that the literature shows that other utilities in hospitals such as communication systems, gas supply systems, sewage systems and non-structural components of buildings, such as architectural elements are less considered. Based on the results and previous research, a critical system is needed to facilitate the function of the Public Health Center and it is necessary to pay attention to the location of the critical system on a higher floor so that it is not submerged during a flood.

Functional/administrative resilience includes hospital disaster management activities, such as hazard and vulnerability reduction measures, preparedness, response, and recovery plans (Aliabadi, 2020). Based on the results of the study, it was found that the functional resilience latent variable on the service continuity indicator has the highest percentage at level 5. Level 5 means that service continuity when a flood disaster occurs at the Public Health Center shows that there are benefits from the results / implementation that can realize long-term changes.

Disaster contingency planning indicator

The results showed that the Public Health Center had an indicator of a level 5 disaster contingency plan. It was shown that most of the Public Health Center had experience dealing with flood disasters so that the Public Health Center could operate in accordance with disaster planning during an emergency. Only a small number of Public Health Center have a flood disaster contingency plan document and have evaluated and revised flood disaster plans in the last two years. This is because Public Health Center that do not have a contingency plan do not yet understand the meaning and importance of a contingency plan, even though this contingency plan is important as an effort to prevent and reduce disaster risk, which includes the initial setting process so that it can make plans or develop strategies and procedures in response to potential crises or an impending emergency. This is in line with the research of Forino et. al. (2017) which mentions the importance of disaster contingency plans by integrating Climate Change Adaptation (CCA) & Disaster Risk Reduction (DRR) into strategies, policies and plans that can broaden understanding of climate change response. Based on the results and previous research, the development of disaster contingency plan documents at the Public Health Center level (Public Health Center Disaster Plan) is still rarely carried out. Health centers experience chaos in health services when a disaster occurs. Public Health Center that do not yet have a disaster contingency plan document will find it difficult to operationalize disaster management management starting from a clear division of tasks, communication lines, and alternative plans.

Risk assessment and reduction indicator

The results showed that the Public Health Center had level 5 risk assessment and reduction indicators. This is in line with research which states that the impact of paralyzed health services at the Public Health Center has the potential to increase disease outbreaks and increase the number of deaths and injuries due to delays in life saving measures and medical treatment (Pascapurnama et. al., 2018). The results of interviews with researchers found that cases that arise during floods are skin, eye, diarrhea, and ARI diseases due to polluted water sources and lack of clean water supply. One example at the Gondang Health Center, Bojonegoro Regency and Sitiarjo Health Center, Malang Regency explained that there was a Rapid Action Team (TGC) and the Flood Alert Brigade (BSB) that carried out Rapid Health

Command, coordination, and cooperation indicator

The results showed that Public Health Center have indicators of command, coordination, and level 5 cooperation. This is shown by most of the Public Health Center having crisis communication protocols that can be used for communication during flood emergencies, for example, communication with other Public Health Center, local district/city health offices, society, and the mass media. The Head of the Provincial/District/City Health Health Office is responsible for the implementation of Health Crisis Management at the regional level and coordinates with the Regional Disaster Management Agency (BPBD). The Public Health Center holds the command at the pre-health crisis/pre-disaster stage to mobilize the Rapid Action Team (TGC) or the Flood Alert Brigade (BSB) by activating the health cluster if needed in the emergency alert status, taking into account the results of the Rapid Health Assessment (RHA). This is in accordance with PMK No. 75 of 2019 which states that for Health Crisis Management it is necessary to form several health teams, namely the Rapid Health Assessment Team (RHAT), the Public Health Rapid Response Team (PHRRT), and other health teams as assistance health workers in supporting the local health care system. The Public Health Center coordinates to carry out a Rapid Health Assessment (RHA) during an emergency alert status and is carried out by a team consisting of General Practitioners, Epidemiologists, and Sanitarians. The health center also has a communication network with other health centers in one district/city through social media (facebook, whatsapp, and instagram applications), and collaborates with health NGOs, PMI, BMKG which issues the potential for extreme weather and the Public Works Department which issues water level data.

Supply and logistics management indicator

The results showed that Public Health Center had level 5 inventory and logistics management indicators. This was shown by the Public Health Center actively participating (proposing and advocating) in increasing the number and quality of supplies of medicines and emergency facilities in collaboration with the local district/city health office. The results showed that the Public Health Center was ready for all logistics for various diseases, consisting of various types of emergency drugs at the Public Health Center (eg, antimicrobial agents, cardiac drugs, insulin, anti-hypertensive agents, IV fluids), facilities and resource tracking including food, water, hand hygiene, stretcher, wheelchair, IV pump, IV pole, and tourniquet. Body bags and tents from the Public Health Center do not provide and usually borrow from the local BPBD. This is in line with the research of Istiqomah et. al. (2015) which states that the Public Health Center does not have special logistics supplies for disasters. This is related to the expiration period and budget funds that are not available for disasters and when there is a disaster, the logistics used for emergencies are the logistics available in the program and then the Health Office will provide assistance to supply when supplies run out. This is in accordance with the Technical Guidelines for Disaster Management of Health from the Ministry of Health of the Republic of Indonesia that the provision and distribution of medicines and health supplies in disaster management will basically not form new facilities and infrastructure, but use existing facilities and infrastructure, only the intensity of the work is increased by empower resources. Medicines and Health Supplies available at the Pustu and Public Health Center can be directly used to serve disaster victims, if there is a shortage, they can request additional additions from the District/City Health Office (Kemenkes RI, 2011).

Service continuity indicator

The results showed that the Public Health Center had level 5 service continuity indicators. The results showed that the Public Health Center has a sufficient number of treatment beds and can still provide basic health services with hospitalization during floods or crisis situations. The results of the interview found that there were still Public Health Center that were unable to evacuate patients during floods due to limited equipment, namely the Gitik Health Center in Banyuwangi Regency, so that outpatient services were transferred to Kabat Health Center and Gladag Health Center. This is in line with the research of Yusoff et. al. (2017) which mentions that hospitals must provide the number of treatment beds for patients affected by disasters.

Health Human Resources indicator

The results showed that the Public Health Center had an indicator of Health HR at level 5. This was indicated by the Public Health Center having emergency staff who could be sent during a flood disaster for on-site rescue. The results of interviews with researchers that Public Health Center have health human resources consisting of general practitioners, nurses, midwives, nutritionists, medical analysts, dental nurses, medical records, public health experts, pharmacist assistants and sanitarians who carry out disaster management activities before, during, and after a disaster. The Public Health Center has a Rapid Action Team (TGC) that is ready to be deployed to flood locations by establishing field health posts or through mobile health centers to continue to provide basic health services. This is in accordance with the activities of the Public Health Center in disaster management, namely going to the disaster location by bringing the equipment needed to carry out triage and providing first aid and sending personnel and health supplies as well as ambulances/other transportation equipment to disaster locations and refugee shelters (Kepmenkes No. 145, 2007). Based on PMK No. 75 (2019) concerning Health Crisis Management states that the health cluster consists of several health teams, namely the Rapid Health Assessment Team (RHAT), the Public Health Rapid Response Team (PHRRT), and other health teams as personnel. health assistance in supporting local health care systems. This is in line with the research by Madan & Routray (2015) which states that one of the factors that influence institutional preparedness for disasters is human resources.

Funding indicator

The results showed that the Public Health Center had a level 5 funding indicator. This was indicated by the Public Health Center having an evaluation of the use of disaster management funds. Public Health Center have disaster management funds or more precisely, Health Crisis Management funds sourced from the State Revenue and Expenditure Budget (APBN), Regional Revenue and Expenditure Budget (APBD), and/or the community. Funding is regulated in PP No. 22 (2008) which states that disaster management funds are funds used for disaster management for the pre-disaster, emergency response, and/or post-disaster stages. Disaster management funds are a shared responsibility between the Government and local governments originating from the APBN, APBD, and/or the community. In the disaster management budget sourced from the State Budget, the Government provides disaster contingency funds; ready-to-use funds; and grant-patterned social assistance funds. Based on the research, it was found that the funds for disaster management in Bojonegoro Regency were sourced from the APBD. The process of disbursing funds is that if the health office needs funds in terms of flood disaster management, the health office submits an application for funds to the local BPBD and after being approved by the BPBD the new funds can be given to the health office. The limit for submitting funds for flood prevention activities in the health sector is Rp. 12,000,000.00 per year. Overall the funds provided are still insufficient considering that floods sometimes occur more than 1 time in 1 year, besides that the funds must also be divided into 3 management activities (pre-disaster, during disaster, and post-disaster). Some activities that cannot be carried out due to lack of funds are post-disaster or non-physical rehabilitative activities, such as counseling about post-disaster diseases. This is in line with the research of Madan & Routray (2015) and Olu (2017) which states that financial or funding resources are one of the factors that affect institutional preparedness for disaster prevention.

Recovery indicator

The results showed that the Public Health Center had a level 5 recovery indicator. It was shown that more than half of the Public Health Center were involved in handling the health of the people affected by the flood and there was an evaluation report mechanism after the flood disaster. The Public Health Center has a special section that is responsible for recovery and reconstruction work related to public and individual health efforts, because recovery activities are centered on the local Regional Disaster Management Agency (BPBD). Based on research on recovery activities carried out by Public Health Center in promotive and preventive efforts, including the design of recovery strategies for the community, evaluation of public health status, improving social health or public health interventions, rehabilitation of flood victims, and organizing psychological consultations for affected victims in collaboration with psychiatrists. The results of the interview found that the physical recovery of the Public Health Center was carried out if there was damage to buildings, facilities, and infrastructure that interfered with basic health services. This is in accordance with PMK No. 75 (2019) concerning Handling the Health Crisis.

Training indicator

The results showed that the Puskesmas had level 2 training indicators. This was shown by most of the Puskesmas aware of the importance and feeling safe with the implementation of preparedness training (rehearsal), but only a small number of Puskesmas had a flood disaster training curriculum which was updated regularly. The results of interviews and observations of researchers in preparedness exercises (rehearsals) are generally carried out by the local district/city health office which include basic skills for trauma treatment (BTLS), cardiopulmonary resuscitation (BCLS), victim transfer, triage, and flood disaster management simulations. This is in accordance with the activities of the Puskesmas in disaster management, namely conducting disaster management training (Kepmenkes No. 145, 2007). Disaster management training is important to improve preparedness. This is in line with the research of Thobaity et. al. which shows that nurses in Saudi Arabia mostly acquire their knowledge and skills from disaster drills (Thobaity et. al., 2015). Disaster management training is not only carried out by health workers at the Puskesmas but also involves the surrounding community. The results showed that there were high school level student organizations (SMA) such as Saka Bakti Husada (SBH) and Community-Based Disaster Preparedness (SIBAT) volunteers who are routinely fostered by the Sitiarjo Public Health Center, Malang Regency in collaboration with the Indonesian Red Cross (PMI), and are ready to be deployed to help the success of the flood disaster management program. The results of previous studies stated that skills and training related to disaster preparedness can affect the quality of health workers, including knowledge, attitudes, and behavior of a person. Providing skills training such as training in disaster planning, first aid, and basic life support training can improve the preparedness of health workers in dealing with flood disasters. Disaster management training is needed to improve health workers in disaster preparedness during pre-disaster, disaster emergency response, and post-disaster (Widayatun & Fatoni, 2013). This is not in line with the research of Hikmah, Febrianty, & Haksama (2021) which states that training on disaster management has no effect on the preparedness of the puskesmas in the face of the Bengawan Solo flood disaster.

This tool can be used to measure the resilience of the public health center. Additionally, it can be used in research settings. The limitation of this study is that we only focused on construct validity and did not compare the public health center resilience questionnaire with other scales, therefore further research is needed to compare it with other scales to measure public health center resilience. In addition, this study was only used for one disaster, namely a flood disaster, therefore further research is needed to compare it with other types of disasters to measure the resilience of the public health center.

Conclusions

Based on the results of the study, it was found that there are 13 indicators that make up the significant public health center resilience indicators, namely: building structures, facilities and equipment, transportation facilities, critical systems, disaster contingency plans; risk assessment & reduction; command, coordination & cooperation; supply & logistics management; service continuity; health human resource; funding; recovery; and training.

1

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