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APPLICATION OF THE JITUPASNA MODEL IN POST-FLOOD HEALTH CRISIS SURVEILLANCE

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ABSTRACT

Flood-induced health crises are one of the major problems impacting the public health sector, especially in disaster-prone areas such as Bungo District, Jambi Province. Floods often result in the spread of infectious diseases, poor sanitation, and psychological stress, so there is a need for effective health surveillance. This study aimed to evaluate the application of the JITUPASNA model in post-disaster health crisis surveillance in flood-prone areas. This quasi-experimental study used a pre-test and post-test design on two groups with a total of 57 respondents, consisting of health surveillance officers from local health centers and the Health Office. Data was collected using a questionnaire that measured the respondents' knowledge level before and after the intervention. The results of the analysis showed a significant increase in respondents' knowledge, with 100% reaching a high level of knowledge in the second post-test phase. The JITUPASNA model had a significant impact on health surveillance knowledge, enabling faster and more accurate responses in post-disaster health crises. These findings underscore the potential of JITUPASNA to improve health surveillance systems, especially in disaster-prone areas where rapid response is critical.

Keywords: JITUPASNA Model, Health Crisis Surveillance, Flood Disaster, Post-disaster Management, Bungo District

ABSTRAK

Krisis kesehatan akibat banjir merupakan salah satu masalah besar yang berdampak pada sektor kesehatan masyarakat, terutama di daerah rawan bencana seperti Kabupaten Bungo, Provinsi Jambi. Bencana banjir sering kali mengakibatkan penyebaran penyakit menular, sanitasi yang buruk, dan stres psikologis, sehingga perlu adanya pengawasan kesehatan yang efektif. Penelitian ini bertujuan untuk mengevaluasi penerapan model JITUPASNA dalam pengawasan krisis kesehatan pascabencana di daerah rawan banjir. Penelitian quasi eksperimen ini menggunakan desain pre-test dan post-test terhadap dua kelompok dengan total 57 responden, yang terdiri dari petugas pengawasan kesehatan dari puskesmas setempat dan Dinas Kesehatan. Pengumpulan data dilakukan dengan menggunakan kuesioner yang mengukur tingkat pengetahuan responden sebelum dan sesudah intervensi. Hasil analisis menunjukkan adanya peningkatan pengetahuan responden yang signifikan, dengan 100% mencapai tingkat pengetahuan tinggi pada fase post-test kedua. Model JITUPASNA berdampak signifikan terhadap pengetahuan pengawasan kesehatan, sehingga memungkinkan respons yang lebih cepat dan akurat dalam situasi krisis kesehatan pascabencana. Temuan ini menggarisbawahi potensi JITUPASNA untuk meningkatkan sistem pengawasan kesehatan, terutama di wilayah rawan bencana di mana respons cepat sangat penting.

Kata kunci: Model JITUPASNA, Surveilans Krisis Kesehatan, Bencana Banjir, Penanggulangan Pascabencana, Kabupaten Bungo

INTRODUCTION

Flood disasters have become a global concern due to their widespread and destructive impacts. Between 2000 and 2019, floods around the world were estimated to have caused USD 650 billion in damages, 1.7 million refugees and more than 100,000 deaths. (1) In 2023 alone, there were 852 floods, making it the most common natural disaster that year. In Indonesia in early December 2023, there were 989 flood events. (2) In the records of the National Disaster Management Agency (BNPB), in 2020 alone 726 flood events resulted in more than 2.8 million people being displaced. (3) Based on data from the Jambi Regional Disaster Management Agency (BPBD), there were 11,774 houses submerged due to flooding in the area. A total of 17,293 people were also affected, involving 41 villages. In addition, flood victims in Kerinci and Sungai Penuh Jambi reached 40,780 people. Based on data from the Regional Disaster Management Agency (BPBD), the flood that hit Muaro Bungo Regency, Jambi on December 21-22, 2023 resulted in 485 families or 1550 people affected. (4) This certainly has a significant impact.

The impacts of floods can affect not only communities but also governments. For communities, floods can destroy homes and infrastructure, disrupt access to health and education facilities, and damage agricultural land that is a source of income. (5,6) In addition, floods can also cause health problems such as skin diseases and diarrhea due to contaminated water. Meanwhile, for the government,

flooding demands a large allocation of resources for emergency response, infrastructure rehabilitation and reconstruction, and economic recovery. Floods also have far-reaching impacts on the physical and psychological health of individuals. (7,8) In terms of physical health, floods can cause the spread of infectious diseases such as diarrhea, dengue fever, and leptospirosis due to contaminated water. In addition, flooding can also cause physical injury and even death. (9) From a psychological perspective, flooding can cause stress and trauma, especially for those who have lost their homes or family members. Children experience difficulties in learning and sleeping, while adults can experience depression and anxiety. (9-11) Therefore, it is necessary to assess the needs after a flood disaster.

Post-disaster needs assessment (JITUPASNA) is a critical process undertaken to determine and understand the impact of a disaster and the immediate needs that must be met for recovery and reconstruction. (12,13) This process involves assessing physical damage, such as infrastructure and property damage, as well as social and economic impacts, such as population displacement, loss of livelihoods, and psychological trauma. (10,14) It also includes identifying local resources and capacities available for recovery.(5,15,16) The results of this assessment are then used to plan and implement effective and timely interventions, including relief distribution, infrastructure repair, psychosocial support, and economic recovery programs. (17-19) Therefore, post-disaster needs assessment is a critical step in disaster management that aims to minimize human suffering and accelerate the recovery of affected communities. (20-22). This JITUPASNA is important to minimize the impact of future flood disasters.

The Health Office has an important role in JITUPASNA to address the health and well-being of the local population, by addressing the potential spread of disease and psychological trauma. (9,23) Flood disaster JITUPASNA by the Health Office involves a series of actions designed to minimize post-flood public health impacts. (18,24) This includes the deployment of emergency medical teams to provide immediate medical care to those affected, as well as the provision of medicines and vaccinations to prevent the spread of waterborne diseases. (10) Prevention efforts are also undertaken, such as education on sanitation and hygiene to the community to prevent disease outbreaks. (11,25) The Health Office also coordinates with other agencies to ensure proper and sufficient access to clean water and food for affected communities. (26) This needs assessment is important to ensure a quick and effective recovery from the flood disaster and to prepare the community for future disasters.

Post-disaster needs assessment (JITUPASNA) in communities is essential to minimize negative impacts and speed up recovery. (27-30) This includes knowledge of the first actions to take after a flood, such as finding a safe place, ensuring personal and environmental hygiene, and avoiding floodwater that may be contaminated. (31,32)

Based on the background described above, this study aims to determine the effect of applying the JITUPASNA model to post-disaster health crisis surveillance in Bungo District.

METHOD

The research was conducted with a quasi-experimental method using a pretest and posttest design on two groups. Data collection was conducted through a survey using a questionnaire instrument that measured the level of knowledge before and after the implementation of JITUPASNA as well as a comparison of the implementation test. The number of respondents in this study was 57 respondents, 30 health department surveillance respondents, and 27 health center surveillance respondents.

RESULTS

Univariate Analysis

Respondent Characteristics

1. Based on the Respondent's Age

Table 1.
Frequency Distribution of Characteristics of Respondents of Puskesmas and Health Office Surveillance Based on Respondent's Age

Surveillance	Age	Frequency	Percentage	Total	
				F	%
Health Center	25-30 years	2	7,4	27	100
	31-35 years	12	44,4		
	36-40 years	13	48,1		
Health Office	25-30 years	5	16,7	30	100
	31-35 years	17	56,7		
	36-40 years	8	27,7		

Table 1 explains that from the Puskesmas surveillance with 27 respondents, most of them were in the age range of 36-40 years, 13 respondents (48.1%), and the Health Office surveillance with 30 respondents, most of them were in the age range of 31-35 years, 17 respondents (56.7%).

2. Based on the Respondent's Gender

Table 2.
Frequency Distribution of Characteristics of Health Center and Health Office Surveillance Respondents Based on Respondent Gender

Surveillance	Gender	Frequency	Percentage	Total	
				F	%
Health Center	Male	18	66,7	27	100
	Female	9	33,3		
Health Office	Male	11	36,7	30	100
	Female	19	63,3		

Table 2 explains that most of the Puskesmas surveillance respondents were male as many as 18 respondents (66.7%) and the Health Office surveillance was female as many as 19 respondents (63.3%).

3. Pretest Results Before Implementation of the Use of the JITUPASNA Application

Table 3.
Frequency distribution of pretest health center surveillance respondents

Knowledge Level	Frequency	Percentage
Good	0	0
Fair	0	0
Less	27	100
Total	27	100

Based on Table 3 pretest frequency distribution before being given the implementation of the use of the JITUPASNA application, it was found that the overall results of Puskesmas surveillance respondents had poor knowledge as many as 27 respondents (100%).

4. Pretest Results Before Implementation of Booklet Use

Table 4.

Frequency Distribution of Surveillance Respondents of the Pretest Health Office

Knowledge Level	Frequency	Percentage
Good	0	0
Fair	0	0
Less	30	100
Total	30	100

Based on Table 1.4 pretest frequency distribution before being given the implementation of the use of booklets, it was found that the overall results of the Health Office surveillance respondents were poor knowledge of as many as 30 respondents (100%).

5. Posttest Results of the First Trial After Implementing the Use of the JITUPASNA Application

Table 5.

Frequency Distribution of Health Center Surveillance Respondents posttest first trial

Knowledge Level	Frequency	Percentage
Good	4	14,8
Fair	23	58,2
Less	0	0
Total	27	100

Based on Table 5 regarding the frequency distribution of the first trial posttest, it was found that 23 respondents (58.2%) had sufficient knowledge category and 4 respondents (14.8%) had good knowledge.

6. Posttest Results of the First Trial After Implementation of Booklet Use

Table 6.

Frequency Distribution of Health Office Surveillance Respondents in the first trial posttest

Knowledge Level	Frequency	Percentage
Good	4	13,3
Fair	26	43,3
Less	0	0
Total	30	100

Based on Table 6 regarding the frequency distribution of the first trial posttest, it was found that 26 respondents (43.3%) had sufficient knowledge category and 4 respondents (13.3%) had good knowledge.

7. Posttest Results of the Second Trial After Implementing the Use of the JITUPASNA Application

Table 7.

Frequency Distribution of Health Center Surveillance Respondents posttest second trial

Knowledge Level	Frequency	Percentage
Good	27	100
Fair	0	0
Less	0	0
Total	27	100

Based on Table 7 regarding the frequency distribution of the second trial posttest, it was found that 27 respondents (100%) had a good knowledge category.

8. Posttest Results of the Second Trial After Implementing the Use of Booklets

Table 8.

Frequency Distribution of Health Office Surveillance Respondents posttest trial kedua

Knowledge Level	Frequency	Percentage
Good	30	100
Fair	0	0
Less	0	0
Total	30	100

Based on Table 8 regarding the frequency distribution of the second trial posttest, it was found that the Health Office surveillance as many as 30 respondents (100%) had a good knowledge category.

Bivariate Analysis

1. The Effect of JITUPASNA Implementation on Health Center Knowledge and Implementation of Bungo District Health Office Booklet Implementation in the First Trial

Table 9.

The Effect of Implementation of JITUPASNA and Booklet on the Knowledge of Surveillance Respondents of Health Center and Health Office in the First Trial

Surveillance		N	Nilai Z	*p*
Health Center	Knowledge Before Implementation of JITUPASNA Implementation	27	-6,451	0,001
	Knowledge After Implementation JITUPASNA Implementation First Trial	27		
Health Office	Knowledge Before Implementation of Booklet Implementation	30	-6,771	0,000
	Knowledge After Implementation of the First Trial Booklet Implementation	30		

Based on Table 9, the results of the first trial pre-posttest statistical test using the Mann-Whitney Test obtained a Z value of -6.451 and a significance value of 0.001 because the P value <0.05, there is an effect of providing the implementation of JITUPASNA implementation on the surveillance knowledge of the bungo district health center in the first trial.

The results of the first trial pre-posttest statistical test using the Mann-Whitney Test obtained a Z value of -6.771 and a significance value of 0.000 because the P value <0.05, so there is an effect of giving the implementation of the booklet application on the surveillance knowledge of the Bungo district health office in the first trial.

2. The Effect of JITUPASNA Implementation on Health Center Knowledge and Implementation of Bungo District Health Office Booklet Implementation in the Second Trial

Table 10.

The Effect of Implementation of JITUPASNA and Booklet on the Knowledge of Surveillance Respondents at Health Center and Health Office in the Second Trial

Surveillance		N	Nilai Z	*p*
Health Center	Knowledge After Implementation of JITUPASNA Implementation First Trial	27	-6,131	0,001
	Knowledge After Implementation of JITUPASNA Implementation Second Trial	27		
Health Office	Knowledge After Implementation of the First Trial Booklet Implementation	30	-6,643	0,000
	Knowledge After Implementation of the Second Trial Booklet Implementation	30		

Based on Table 10, the results of the second trial pre-posttest statistical test using the Mann-Whitney Test obtained a Z value of -6.131 and a significance value of 0.001 because the P value <0.05, there was an increase in the implementation of the implementation of JITUPASNA on the surveillance knowledge of the bungo district health center in the second trial.

The results of the second trial pre-posttest statistical test using the Mann-Whitney Test obtained a Z value of -6.643 and a significance value of 0.000 because the P value <0.05, so there was an increase in the implementation of the booklet application on the surveillance knowledge of the Bungo district health office in the second trial.

3. Comparison of JITUPASNA Implementation Test of Puskesmas Surveillance and Implementation of Bungo District Health Office Surveillance Booklet

Table 11.

Comparison of JITUPASNA and Booklet Implementation Test on Surveillance of Health Center and Health Office

	N	Nilai Z	*p*
Health Center	27	-5,205	0,001
Health Office	30		

Based on Table 11 of the Wilcoxon test results, the Z value is -5.205 and the significance value is 0.001 ($p < 0.005$). The results of this statistical test can conclude that there is a comparison between the application test using JITUPASNA and the application test using the booklet.

DISCUSSION

Discussion of Research Results

1. **Overview of Respondent Characteristics**
   This study involved two groups of respondents, namely surveillance personnel from Puskesmas and the Bungo District Health Office. Respondents from the Puskesmas were mostly between 36 to 40 years old, with the majority being male, while respondents from the Health Office were mostly 31 to 35 years old and dominated by women. This composition reflects the health workers in Bungo District, most of whom are at a productive age. According to the Indonesian Ministry of Health (2020), productive-aged health workers have a better ability to adapt to change, especially in handling emergencies such as disasters.
   Notoatmodjo (2018) argues that age and work experience need to be considered in the design of health training programs. Younger health workers tend to be faster in the learning process, although it does not always correlate positively with the ability to apply knowledge in real situations. This suggests that although the health workers were younger, their increased knowledge after the intervention was an important marker of the success of the training.
2. **Knowledge of Puskesmas and Bungo District Health Office Before Implementation**
   Before the implementation of the intervention, both respondents from the Puskesmas and the Health Office showed low levels of knowledge regarding post-disaster health management. The pretest results showed that all respondents had limited knowledge regarding health disaster response and management, indicating a knowledge gap among health workers. Khasanah (2019) in her research also found that the knowledge of health workers in remote areas tends to be lower than health workers in urban areas.
   The low level of knowledge of health workers in Bungo District may be due to a lack of ongoing training and limited access to the latest information on disaster management. Iskandar et al. (2020) asserted that health workers in remote areas often do not have adequate access to ongoing professional training, which impacts their ability to deal effectively with emergencies. According to UNICEF (2021), the preparedness of health workers for disasters is highly dependent on continuous training and access to up-to-date information.
3. **Overview of Knowledge of Bungo District Health Office After First Trial Implementation**
   After the first trial using the JITUPASNA at the Puskesmas and the booklet at the Health Office, there was a significant increase in knowledge. At the Puskesmas, 58.2% of respondents increased to the "sufficient" knowledge level, while at the Health Office, 43.3% of respondents experienced a similar increase. Hasibuan (2022) in his research stated that interactive learning methods involving field simulations such as JITUPASNA are more effective in improving knowledge compared to passive learning methods.
   Green and Kreuter (2019), mentioned that simulation-based training is very effective in improving participants' skills, especially in emergencies. The JITUPASNA simulation allows

participants to not only understand the theory but also apply the knowledge in a practical context.

The use of booklets in the Health Office also yielded significant results, although the improvement was lower compared to JITUPASNA. The booklet as a written guide acts as a quick reference that helps health workers understand the procedures to be followed in emergencies. According to Brieger et al. (2020), written guides such as booklets are very useful in emergencies, especially for health workers who need quick access to information.

4. **Overview of the Bungo District Health Office's Knowledge after the Second Trial Implementation**

   In the second trial implementation, all respondents from the Puskesmas and the Health Office showed a remarkable increase in knowledge. All respondents fell into the "good" category, indicating that the two program implementations had a significant impact on improving knowledge. This result is in line with the findings of McConnell et al. (2021) who stated that repeated training in the context of emergency management improves retention of information and skills better than one-time training.

   In the second trial implementation, all respondents from the Puskesmas and the Health Office showed a remarkable increase in knowledge. All respondents fell into the "good" category, indicating that the two program implementations had a significant impact on improving knowledge. This result is in line with the findings of McConnell et al. (2021) who stated that repeated training in the context of emergency management improves retention of information and skills better than one-time training.

5. **Effect of JITUPASNA and Booklet Implementation on the Knowledge of Health Center and Health Office in the First Trial**

   In the first experiment, the application of JITUPASNA had a significant effect in improving the knowledge of Puskesmas surveillance personnel. Notoatmodjo (2018) states that simulation-based training programs such as JITUPASNA are more effective than theoretical methods alone because they allow participants to internalize the actions needed in disaster situations. Statistical tests showed that the Z value = -6.451 with p = 0.001, indicating a significant increase in knowledge. Meanwhile, the implementation of the booklet at the Health Office also had a significant effect with a Z value = -6.771 and p = 0.000. Fleming et al. (2020) argue that written guidance such as booklets is effective in providing a basic understanding of disaster management procedures, especially for health workers in remote areas.

6. **The Effect of JITUPASNA Implementation and Booklet on the Knowledge of Health Center and Health Office in the Second Trial**

   In the second experiment, both JITUPASNA and the booklet showed a significant effect. Anderson et al. (2021) confirmed that repetition of training and continuous exposure to educational materials can reinforce learning and improve skills. With a value of Z = -6.131 for JITUPASNA and Z = -6.643 for the booklet, both methods showed a significant increase in knowledge.

7. **Comparison of JITUPASNA Implementation Test of Puskesmas Surveillance and Implementation of Bungo District Health Office Surveillance Booklet**

   The comparison test showed that there was a significant difference between the application of JITUPASNA and the booklet, with a value of Z = -5.205 and p = 0.001. Anderson (2022) argues that simulation-based training methods are more effective in situations where quick action is required, as they involve the active participation of participants. On the other hand, the booklet plays an important role as a reference tool that can be used in emergency conditions.

LIMITATION OF THE STUDY

This literature review highlights the limitations encountered during the search process, particularly noting the scarcity of relevant literature in various databases.

CONCLUSIONS AND SUGGESTIONS

Based on the research results obtained in the study on the application of JITUPASNA and psychological interventions after critical flooding in the community and the Bungo District Health Office, it can be concluded as follows:

1. The characteristics of respondents of Puskesmas surveillance with 27 respondents were mostly in the age range of 36-40 years as many as 13 respondents (48.1%) and Health Office surveillance with 30 respondents was mostly in the age range of 31-35 years as many as 17 respondents (56.7%). Respondents of Puskesmas surveillance were male as many as 18 respondents (66.7%) and Health Office surveillance was female as many as 19 respondents (63.3%).
2. In the pretest frequency distribution before the implementation of the use of the JITUPASNA application, all Puskesmas surveillance respondents had poor knowledge as many as 27 respondents (100%) and the pretest frequency distribution before being given the implementation of the use of booklets found that the results of all Health Office surveillance respondents had poor knowledge as many as 30 respondents (100%).
3. The description of the frequency distribution of the first trial posttest after the implementation of the use of the JITUPASNA application, most of the Puskesmas surveillance respondents as many as 23 respondents (58.2%) had sufficient knowledge categories and the frequency distribution of the first trial posttest showed that the Health Office surveillance as many as 26 respondents (43.3%) had sufficient knowledge categories.
4. The frequency distribution of the second trial posttest after the implementation of the use of the JITUPASNA application, all 27 respondents of the Puskesmas surveillance (100%) had a good knowledge category and the frequency distribution of the second trial posttest showed that the Health Office surveillance as many as 30 respondents (100%) had a good knowledge category.
5. The results of the first trial pre-posttest statistical test using the Mann-Whitney Test obtained a Z value of -6.451 and a significance value of 0.001 because the P value <0.05, so there was an effect of providing the implementation of the JITUPASNA application on the surveillance knowledge of the bungo district health center in the first trial. The results of the first trial pre-posttest statistical test using the Mann-Whitney Test obtained a Z value of -6.771 and a significance value of 0.000 because the P value <0.05, so there is an effect of providing the implementation of the booklet application on the surveillance knowledge of the Bungo district health office in the first trial.
6. The results of the pre-posttest statistical test of the second experiment using the Mann-Whitney Test obtained a Z value of -6.131 and a significance value of 0.001 because the P value was <0.05, so there was an increase in the implementation of JITUPASNA on the surveillance knowledge of Bungo district health centers in the second experiment. The results of the pre-posttest statistical test of the second experiment using the Mann-Whitney Test obtained a Z value of -6.643 and a significance value of 0.000 because the P value was <0.05, so there was an increase in the implementation of the booklet on the surveillance knowledge of the Bungo district health service in the second experiment.
7. The Wilcoxon test results obtained a Z value of -5.205 and a significance value of 0.001 ($p < 0.005$). The results of this statistical test can conclude that there is a comparison between the

implementation test using JITUPASNA and the implementation test using booklets.

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Conflict of Interest Statement

The authors declare that there are no competing interests.

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