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## RESEARCH ARTICLE

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### Development of Instruments to Detect Disaster Risk in Children Under Five

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#### ABSTRACT

The research that has been conducted is aimed to develop disaster risk instruments for children under five. So that can do disaster mitigation, reduce the risk of disaster in children under five, through awareness based on community empowerment. Variables that have been shown to affect disaster risk: the level of threat, vulnerability, and community capacity. These three factors need to be developed specifically in order to be used to assess the level of disaster risks for toddlers. Development of the instrument has been done through 4 stages: 1) conducted preliminary study 2) developed the instrument, 3) conducted data analysis and 4) given the recommendation of the research results. Of the 32 items of disaster risk instrument items, 2 invalid items have been discarded. Of 30 valid instrument items, all significant values have been indicated > 0.700, all instrument items accepted.

**Keywords:** Disaster risk, Instruments, Toddlers

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#### INTRODUCTION

##### Background

The current disaster management paradigm emphasizes community empowerment to enable the community to become a helper rather than an object that needs help. The part of the community that needs to be empowered is the family<sup>(1)</sup>.

The family risk to the occurrence of the disaster is influenced by 3 factors, namely Hazard, Vulnerability and capacity<sup>(2)</sup>. This means that the amount of risk received by the family determined the amount of Hazard (potential disaster) and Vulnerability (level of vulnerability). While the mitigating factor is the community Capacity<sup>(1)</sup>.

Which include families with Maternal Child Health problems include family existing pregnant women, lactating women, have children under five, who have reproductive problems. The choice of families who have problems of Maternal Child Health, which has children under five, because they are a vulnerable group and need to get nursing care<sup>(3)</sup>. Toddlers in the family can be a problem for maternal and child health (MCH) if unable to do good care.

Disaster risk in the hazard aspect is already attached to the geographical condition of the community, so the potential for change is very small. While the aspect of vulnerability and capacity has a great opportunity to determine the status of disaster risk in one family or community group. Potential capacity depends on economic status, educational status, knowledge of disaster risk, attitude on disaster risk, availability of facilities and infrastructure, organization or institutional existence, and disaster risk reduction behavior<sup>(4)</sup>.

Because of its importance, this research needs to be done to get the instrument of disaster risk scoring in children. If families and communities have the ability to provide disaster risk scores in children, it is expected that the incidence of disasters in children can be reduced.

##### Formulation of Problem

The formulation of this research problem was how the development of disaster risk scoring instruments in children by identifying the vulnerability and capacity of the family.

**Purpose**

In general, the purpose of this study was to develop a disaster risk instrument for children by identifying threats (hazards), vulnerability and capacity.

**Benefits of Research**

Communities know the potential risks of disaster in children, so as to maximize community empowerment. Healthcare workers can determine the priority of services performed based on risk mapping.

**METHODS**

Location of research conducted in 2 places, laboratory and field trials. Laboratory trials were conducted at the Magetan Midwifery Department, experimental research experiments were conducted in Poncol Village, Magetan Regency, East Java, Indonesia. The research was conducted in 2017, the instrument trial was conducted in May 2017-August 2017.

Experienced population in research that has been consulted, disaster consultant from Regional Disaster Management Agency (BPBD) of East Java Province and from Yogyakarta Disaster consultant. Participants in Focus Group Discussion (FGD): facilitators of *Destana / Desa Tangguh Bencana* (Village Resistant to Disaster), facilitators of SMAB / "Disaster Safe School", lecturers with specialization of disaster, lecturers specialization of child care field.

The subjects of the experimental study were students of Magetan Midwifery Department, Kindergarten Teachers, Early Childhood Teachers and Volunteers. Development of Disaster Risk Mapping in Children has been done in 8 steps to get final instrument of research result<sup>(5)</sup>.

Table 1. Instrument development scheme

Goal	Steps	Application
Content Validity	The Search of Theory	Journals, Books, Browsing
	Digging from who has Experience	Conducting FGDs with Practitioners, SMAB Facilitators, Destana Facilitators, Lecturers
	Refer to Expert Judgment	Expert in the Field of Disaster, methodology of instrument development
Construct Validity	Constructing the Instrument Grille	Pre-Questionnaire Research Instrument Items
	Field trials	Toddler of Poncol Village, Poncol Sub-district, Magetan District
	Instrument Analysis	Revision and fixation
	Validity test	Product Moment
	Test Reliability	Cronbach Alpha

**Data Analysis**

To produce a disaster risk measurement instrument for children under five, several stages of analysis are needed: 1) Descriptive stage of Risk indicators; 2) Description of Disaster Risk indicators for children; 3) Analysis of risk instrument items; 4) Indicator Analysis; 5) Presentation of research recommendation products.

**RESULTS**

**Preliminary Overview of Research Sites**

The disaster risk in Poncol Village can be viewed from various perspectives, such as vulnerability due to social economic condition, education level, and geography condition. The results showed that most of Poncol villagers who have children under five have the junior high education (60%). The data also shows the evacuation facility of children under five if experiencing disasters mostly using motorcycles (88%). Poncol Village people who have children under five, showed a high level of poverty, indicated by the poor card recipients of 27%.

As a baseline for instrument development, several activities were carried out: conducting Theoretical Review covering 1) journal tracking; 2) confirmation with disaster practitioners and child care practitioners; 3) conducting referrals with expert judgment.

**Development of Disaster Risk Instruments in children**

Instrument development steps include: a. Constructing the Instrument Grille, b. Arrange the instrument items. To ensure the content validity in preparing the items of the research instrument, it is expected to meet the rules of logical validity and face validity<sup>(6)</sup>. At this stage is done with 2 activities: 1) Drafting the instrument item grids; 2) Consulting with expert judgment. Disaster risk instruments for children under five are composed of 32 items of the statement, where each item of threat, vulnerability, and the capacity statement is given a score of 1-10, ranging from the least meaningful to the most meaningful.

### **Analysis of Test Results of Research Instruments.**

The result of Pearson Correlation Hazard analysis shows that of 8 instrument items all have significance value  $<0.05$ , meaning that all hazard instruments of Disaster for toddlers are valid. The result of Pearson Correlation Vulnerability analysis shows all valid instruments, except k3 and k15 instruments. Then invalid instrument items will be discarded. The results of the Pearson Correlation capacity analysis show all valid capacity instruments and can be used to measure the capacity of Disasters for Toddlers.

The results of reliability analysis of instrument items with Cronbach Alpha obtained results as follows: The degree of reliability of the hazard instrument shows the number 0.908, greater than 0.700. This means that threat instruments are generally reliable to be a gauge of disaster threats for children under five. The degree of reliability of the vulnerability instrument shows a figure of 0.847, greater than 0.700. This means that the overall vulnerability instrument is reliable to become a disaster vulnerability measure for Toddlers. The instrument capacity reliability level shows the figure of 0.902, greater than 0.700. This means that the instrument's overall capacity is reliable to become a gauge of disaster capacity for children under five

## **DISCUSSION**

### **Initial Identification of Research Subject Instruments**

Disaster risk for the community depends on the severity of the disaster, and the preparedness of the community during pre-disaster. They need to be prepared so that they have good capacity when disaster strikes. Community capacity in Poncol Village in the face of disaster, influenced by economic condition, education level, availability of infrastructure at home, and training that has been obtained before the disaster.

The results of other research indicate that the level of preparedness of society to face disaster affected by the level of formal education, means of transportation, means of communication<sup>(8)</sup>. From the theoretical study, the variables obtained empirically, that the risk of disaster is determined by threat, vulnerability and capacity factor. From the discussion with experts, there are several variables that need to be considered from the risk of disaster in children under five are demography factor, health service, infrastructure, environment, social culture, and economy. Some initial input from experts includes: related to the focus of research work. Experts also provide input related to the scale of the field work

FGD results are in line with previous research that appropriate parenting gives children the opportunity to develop in a maximal way<sup>(9)</sup>. The development of disaster risk research instruments in children is carried out through the following activities: preparing a grid based on the initial baseline assessment, then composing instrument points. Organize instrument grid done by FGD and discussion with Communication and Social Dynamics / CSD as expert judgment.

The instrument grille is used to help arrange instrument items. In accordance with the grid of disaster risk instruments in children that have been developed, there are 32 items draft item of disaster risk instruments in children under five. Drafting of these instrument points is done to maintain logic validity. From 32 draft instrument items that have been prepared, then consultation with CSD as expert judgment. The results of consultation obtained some input, among others: Form / Formulation of instruments, mindsets, and statements of the instrument items. Formulation of the original instrument in the linear format with rating scale then changed to the semantic differential.

The instrument thought pattern that was originally spread, became the mindset grouped according to the theme of similar instrument items. Some statements of the instrument items also changed so that the statement item content was more easily understood by the respondents. The instrument items that are easily understood by the respondents allow for no difference in the perception of the content. The occurrence of bias is also possible if there is a difference of perception of the content statement<sup>(5)</sup>.

### **Analysis of Research Instruments**

The results of trials on the respondents indicate the instrument items need improvement and improvement. The risk of disaster in children is directly proportional to the multiplication of threats with vulnerability and is inversely proportional to the capacity of children under five.

Theoretically, FGD result shows that there is 3 sub-variable that cause disaster threat to children under five, that is the geographical condition, rainfall, and landslide. This means that the type of land determines the risk of disaster threats for children under five. Similarly, rainfall has a risk of causing the threat of disaster for children under five. Other factors that cause the risk of disaster threat for children under five are climate type, slope inclination, the existence of wind grabs, extreme weather, geographical condition and condition of bad house building. All of these cause a significant threat risk to children under five.

Factors that can lead to increased vulnerability of children is the psychological, physical and social economic conditions of the family. The dependence of toddlers to their parents causes the child to always be under parental supervision, so that vulnerability can be controlled. But at the same time make children under five become always need the protection of parent, so if escape from parental supervision will be dangerous because of increased susceptibility of the child. Therefore, if traveling or playing to an unusual location, parents should always take care of the child.

Psychological conditions of parents and families also affect the vulnerability of children in the face of danger and disaster. Excessive panic, lack of calm in the face of problems can lead to family incompetence to solve problems carefully<sup>(9)</sup>.

Another factor that causes increased susceptibility of children under five is the physical weakness due to illness, disability. Physical weakness causes decreased motoric ability and movement of children under five, making it difficult to immediately conduct self-evacuation during the disaster<sup>(10)</sup>. The level of activity of children under five can also increase the vulnerability to disasters and disasters<sup>(11)</sup>.

Physical vulnerability of children is also influenced by nutritional adequacy in children. Malnourished children will have more susceptibility than children who are sufficiently nutritional. Because it will be difficult to do activities and avoid the danger that comes<sup>(12)</sup>. Toddler capacity is also determined by the level of parent education, occupation, socioeconomic and family nutritional status<sup>(8)</sup>. The increasing age of children under five is expected to have the ability to defend themselves from the threat of disaster. But in general, the number of accidents actually increases with the age of children under five<sup>(11)</sup>. For that, it is necessary to preventive efforts and safety education in the household so that children avoid the calamity and disaster.

## CONCLUSION

The initial assessment of children's risk of disaster is determined by threat, vulnerability and capacity variables. Development of disaster risk variable instruments is done by obtaining 32 items of disaster risk instrument items for children, based on threat, vulnerability and capacity variables. The results of the analysis in this study indicate of 32 items of disaster risk instruments for children valid as many as 30 were invalid as much as 2 items. Of 30 valid instrument items are all reliable, it can be recommended to be used as a disaster risk measuring instrument for children under five. The threat, vulnerability and capacity indicators all have reliable. The recommendations of this research are: This research instrument is suitable to be used as an instrument of measuring the risk of disaster in children under five years old. Needs development and follow-up of the results of this study is to measure the level of disaster risk in children under five by using this instrument.

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