



Community-Based Fire Preparedness Practice in High Density Area

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Abstract

Fire is one of the common disasters in Indonesia especially in many big cities including capital city of Indonesia, Jakarta. Although it is considered as human error factor and happened incidentally but fire has become a disaster because its effect to many aspect of community life. It also usually happens in high density area with low social-economic status. Thus, this intervention intends to empower vulnerable community against fire hazard.

Research focuses at the aspect of preparedness based on social-cognitive model (Paton, 2006). It is used to elaborate the factors of intention to prepare including critical awareness, sense of community, action coping, and outcome expectancy of the community as the basic to design an intervention in order to develop a proper form of risk communication that match with local community need. Then, vulnerability and capacity assessment technique is used to obtain the whole picture about community's vulnerabilities and capacities. Intervention strategy was directed to organize community preparedness through local organization and enhance community capacity against fire hazard.

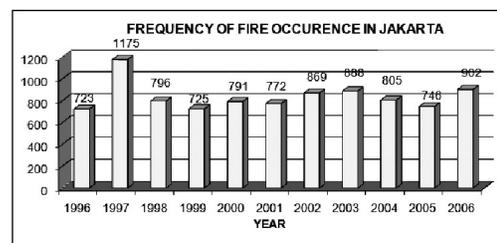
Results from this intervention indicate that fire preparedness can be an effective way to improve community capacity. The results also show that intervention succeed to : 1) improve community knowledge about fire preparedness; 2) improve community outcome expectancy through specific behavior change; 3) build local community alertness team ; 4) form nonformal information sharing about fire preparedness within community. These results strengthen previous research stating that the success of community-based fire preparedness intervention program need to pay attention to locality aspect and the participation of community as primary source of support.

Keywords: Fire hazards, preparedness, intention to prepare, risk communication

Introduction

Jakarta has the highest occurrence of fire disaster in Indonesia (Suharso, 1999). It can be seen from the stable frequencies of fire disaster in Jakarta in the last 10 years which are very high.

Figure 1. Frequency of Fire Disaster Occurrence in the last 10 Years



Source: Jakarta Fire Department (2006)

The occurrence of fire disaster in Jakarta is spread almost evenly in all of its municipalities. According to Kristantio (2006), density affects the potential of fire occurrence, i.e., the higher the density of a given area, the higher the potential of fire occurrence in that area. This factor made community living in a high-density area susceptible to the danger of fire disaster.

Fire disaster can be classified into several of classifications according to the types of burnt object. According to the Jakarta Fire Department this classification can be divided into residential building, public building, industrial building, and vehicle. However, for the purpose of this intervention program, the focus is restricted to residential buildings especially those in the high-density area.

Based on the frequency of fire occurrence (an area is classified as fire-hazard spot if there were five cases or more of fire in that area), there are generally 53 fire-hazard spots in Jakarta. Besides being determined by the frequency of fire occurrence, the fire-hazard spot are also determined by other characteristics of those areas such as the high density, simple and flammable building or housing material, insufficient access to housing alley and the scarce of water supply (Kompas, 25 May 2005; Suharso, 1999). Even though incidents are often considered to have been caused by negligence, the impact and the complexity of fire problem has made it a form of society disaster.

In responding to the high rate of fire disaster in Jakarta, the government of the city of Jakarta through Jakarta Fire Department had done numerous attempts in order to resolve the occurrence of disaster. However, due to high rate of fire occurrence, the key in the process of preventing fire occurrence lies in the hand of the community. In order to get people to participate in this process, Jakarta Fire Department has made a couple community-based programs like the forming Sistem Ketahanan Lingkungan terhadap bahaya Kebakaran (SKLK or The Community's Resistance System Against Fire Hazard), the training of BALAKAR (Barisan Sukarela Kebakaran or The Front of Volunteer against Fire), and direct elucidation (in Kristantio, 2006).

Even so, the effectiveness of above programs needs to be examined. Until now there is no evaluation of the above mentioned programs and there is no master plan made about the continuance of the programs that are already implemented (Kristantio, 2006). As a result, the sustainability and community-enhancement aspects are still regarded inefficient for the long-term target, such as the stability of the

community's resistance against fire, has not been reached yet.

Strother & Buchbinder (1980) stated that public educational programs preventing fire will work if they were planned by taking into account two aspects. First, when the program is constructed, attention should be given to problems existed in that area. Second, the community living in the area must be involved both in the planning and in the implementation phase. It means that active involvement of the community is prerequisite in order to create an effective program.

Based on the study by Kristantio (2006) on the role of the community in fire prevention, it can be concluded that active participation of the society is an important aspect to make the program successful. Thus, community-based programs are one of the solutions that need to be a priority in solving the problems of fire disaster in Jakarta. Therefore, the focus and the priority of the program must be chosen by paying attention to the complexities and the localities of the problems.

The complexity of the problems is also affected by the vulnerabilities of the community. Fire problem could not be seen only as a behavioral problem, but it is also related to the physical, economical, and social aspect of the community. Behavior change toward safety behavior and environments cannot be induced directly without the support of other aspects, like economical and social aspects. Many previous studies on fire prevention programs in the United States (among them are those from Fahy & Norton, 1989; Gunther, 1981; Karter & Donner, 1978; Munson, 1976 in McConnel, Dwyer & Leeming, 1996) showed that communities with low social economical status have higher risk to be hit by the fire disaster. This is due to the fact that those communities have insufficient facility to prevent fire and other resources needed in changing their behavior.

The localities of the problem are also needed to be taken into consideration in the planning of an intervention program. Strother & Buchbinder's study (1980) on numerous educational programs in the United States concluded that solving of fire problem needed to focus on specific local problems, and the community in that area must be involved in the planning process. This showed that there is no single formula that can work in every situation for every class of the society. A workable intervention program is one that is suitable to the condition of the community that becomes the target of the intervention.

In respect to the above mentioned issues, we can assume that there are no strategy and program that can produce instant change. Therefore, the authors decided to focus on the preparedness aspect of the community in order to face fire-hazard situation. It is based on the thought that, in order to reduce the fire risk in an area, one of the ways that can be done is by increasing the preparedness of the community to face the hazard. The prevention and mitigation against fire require basic changes in the behavioral, economical, and physical aspects of the community, but since fire disaster can happen at any time, a short-term program can be done by preparing the community against fire.

Preparedness refers to any activity done in order to stop and to avoid the effect of a disaster that are dangerous to the community (Carter, 1991).

According to Smith (1996) this process is a form of an adaptation that human has towards the danger that threatens his life. Activity in this level includes all acts aimed to reduce the loss that caused by the disaster by adapting the human to it.

According to Patton (2003), preparedness against hazard and disaster is important to reduce the risk of losing something. Preparedness can also facilitate the ability to cope in emergency when the disaster happens. This can shape the resiliency level of an individual against certain hazard. Smith (1996) said that preparedness can be increased by giving information and knowledge about the hazard to the community. However, in reality, this effort showed that it have not done any good to increase the preparedness level of the community against hazard (Ballantyne et al, 2000; Duval & Mullis, 1999; Lindel & Whitney, 2000; McClure et al, 1999 in Paton, 2003; Hurnen & McClure, 1997).

Paton (2003) then developed a theoretical model to explain the factors that influence preparedness. According to Patton this model can be implemented to create risk-reducing strategy. Paton et al (2006) then tried that hypothesis towards fire-hazard problem. By using factors in the social-cognitive model about preparedness, they found that in fire-hazard, factors such as; critical awareness, outcome expectancy, sense of community, and action coping are significant predictors to the intention to prepare. Factors which were not significant predictors are self-efficacy and the perception of risk.

Based on that finding, it can be concluded that critical awareness, outcome expectancy, sense of community, and action coping are the factors needed to be elaborated related to this study. By upgrading these factors, it can be expected that the community's

intention to do the act of preparedness can also be increased.

In addition to this preparedness program, this intervention used Capacity Enhancement (CCE) strategy and the risk communication as approach to community. Community Capacity Enhancement is a strategy focusing on the effort to mobilize the community's asset in order to solve the problem in the community or to enhance the capacity of the community (Delgado, 2000). The authors used CCE to find community's assets that can be used to increase community capacity to solve the fire problem. One of these assets is social organizations found in the community.

Other technique is risk communication, which is a social process in order to give information about hazard and to influence the community to perform behavioral change and to participate in the issue mentioned above (Rohrmann, 2000). Risk communication is essential in designing and evaluating the spread of information of a certain hazard. The success of the risk communication is not only determined by the content and the context of the message, but also by the psychosocial factors which play a more significant role in the process of behavioral change.

Objectives

The objective of this research-based intervention is to give the community knowledge to emerge first aid and to prevent the spread of fire, if fire occurs in community. The local social organizations must be involved in empowerment strategy to spread the knowledge to the community. Those organizations are not only expected to react effectively when the fire disaster happen, but in the long term becomes a rich resources in developing fire prevention plans via activities reducing the susceptibility in the community.

Building local preparedness also has its own obstacles. According to Paton, Kelly, Burglet, & Doherty (2006) preparedness against fire depended highly to the intention to prepare. Through increasing or reinforcing these factors of intention, it is expected that the community can in turn increased their preparedness.

Methods

Time and Location of the Intervention

For this research, the authors has chosen Manggarai district, to be exact at RW (Rukun Warga, sub district) 04 as the research location. RW 04 in the

Manggarai district consists of 16 RTs (neighborhood units) with a population of more than 3727 people under 1031 head-of-family/households (according to RW 04 statistic data, dated August 2006). According to the Central Bureau of Statistics of the South Jakarta municipality office, RW 04 has a wide slum area (54 hectare) in comparison with other RWs in Manggarai. Beside that, 2296 of the people from 669 households live in slum area, which make it more than 50% of the community living in the slum area. Most of the people living there are traders and laborers.

RW 04 has experienced several fire disasters (3 times between the years 1980-1986 and 4 times between the years 2003-2006). In the 2003 fire disaster, 800 households lost their houses. Here is the information about the fire disasters happened in the years 2003-2006.

Table 1. Fire Disasters Happened in the Next-to-lowest administrative unit Number 04 between the years 2003-2006

Date of incidents	Source of fire	Lost estimation/victims	Burned Area
July 14 th , 2005	short circuit	2 million rupiahs	6 m2
May 6 th , 2005	short circuit	10 million rupiahs	24.5 m2
July 28 th , 2003	cigarette bud	- 35 households lost its house - 875 households lost its house	3,500 m2
March 6 th , 2003	candle from child's play	- 800 house, 1 mosque, and 1 prayer house burned down - 10 people injured	80,000 m2

Source: South Jakarta Fire Department (2003-2006)

Target Participants

Target participants of this study are members of the Tim Peduli Lingkungan (TPL, Care for the Neighborhood Team) which represent the community of RW 04 in Manggarai district and have the capacity in doing various social activities. TPL is a non-formal organization which was formed by several of the community's significant figures and by representatives of the RTs in RW 04. Initially, TPL was formed to solve various conflicts among the people and among the RTs which often occurred in RW 04. But as time went by, TPL was often involved to represent RW 04 in numerous social activities. Therefore, TPL has grown into a significantly important organization in RW 04. Currently there are 20 active members in TPL.

Intervention Procedure

1. Baseline Study

The baseline to assess community intervention was created using the Vulnerabilities and Capacities Assessment (VCA). It used to help the researchers to comprehend the community's vulnerability to disaster. By apprehending the real condition, the program can be arranged according to what the

community really needs in order to decrease the level of the vulnerability.

Several techniques of data gathering were used based on the participatory rural/urban appraisal activities, including:

Secondary data gathering (November 2006 to February 2007)

Semi-structured interview (December 2006 to March 2007) with 24 members of the society, including the Head of Community, community's public figures, and the staffs of the South Jakarta Fire Department.

Hazard Mapping to the area RW 04 of the Manggarai district which are highly fire-hazardous. This process was done simultaneously with Focus Group Discussion.

Focus Group Discussion. The discussion was divided into 2 groups according to gender. The first group was the male member of the TPL (discussion held in April 15th, 2007) and the second group involving female group from PKK organization (Pendidikan Kesejahteraan Keluarga/Women Association for the Education of Family Welfare, held in April 18th, 2007). The reason for dividing the groups according to gender found from the interview. The researchers discovered that there were difference in the knowledge, perception, and the strategy to overcome fire disaster between the two groups. Females have lower knowledge to handle fire disaster when compared to males. This lack of knowledge often made female members of the community more emotional in handling fire disaster. The main topics of the discussion were the vulnerability of the community towards fire and the community's intention to form community preparedness in handling fire. Important findings from this discussion (besides the vulnerability aspects which will be explained in the next section) were the identification of factors which affect the intention of the community member to form community preparedness.

There were some problems which causes delay the assessment process, caused by flood that swiped the Manggarai district in February 2007.

The intervention program was arranged by analyzing the problem and making an objective tree in logical framework analysis (LFA). By giving attention to the cause factor of the problems and transfer it into objective tree, the researcher then focusing intervention program to the community's awareness about preparedness of the community against fire, by increasing the community's knowledge and skill

needed in preventing and handling fire disaster, changing the outcome expectancy, and increasing the intensity of community's preparedness against fire. The pre-intervention indicators which served as a reference on the change in the intervention process can be seen in Table 2.

Table 2. Pre-intervention Indicators

Aspects	Pre-intervention Indicators
The intention towards the community's fire preparedness	- still no interest to form Fire Preparedness team - lack of specific preparation in order to face fire disaster
Knowledge about fire preparedness	- lack of knowledge and skill about how to face fire disaster
Outcome expectancy toward community-based preparedness against fire	- lack of knowledge about the benefit of the community's fire preparedness - having no information about preparedness

Based on the baseline result, the risk communication strategy that needed to be concerned are efforts to increase:

- Knowledge on handling a disaster
- Information on the benefits of community's preparedness against fire through training and practice on planning process.

2. Implementation and Evaluation of the Intervention Program

The phases of the intervention program are:

- Assessment and approach towards the community which was started from November 2006 to April 2007.
- Community Meeting/FGD held in April 29th, 2007
- Fire preparedness training and extension working together with the South Jakarta Fire Department and Indonesian Red Crescent chapter Central Jakarta, in May 27th and 2nd and 9th of June 2007.
- Community-based workshop about fire preparedness in cooperation with the Indonesian Red Cross chapter South Jakarta in June 3rd, 2007.
- Activity-planning guide in the 9th, the 23rd, and the 27th of June 2007.

Results

The results of the intervention program are:

- The formation of the Fire Preparedness Team in the community as a new function of the TPL.

The increase in the community's knowledge about fire preparedness is indicated by the mean differences in t-tests from the pre-test and the post-test. The result of the t-test of paired-sample from pre-test and post-test indicated that the mean differences of 40.5263 (pre-test's mean = 51.05; post-test mean = 91.57). Based on this result, the score is significance with the value of $t = -18.205$ ($df = 18$; level of confidence 95%). Therefore, it can be concluded that the extension was quite effective in the increasing of the participant's knowledge.

2. The change in the outcome expectancy and the intention toward preparedness shown through the specific change in the attitude to prepare during post-intervention.

Facts were noted from questionnaires given before and after the workshop. The questionnaires contained statements of specific matters on what the individual is going to do in preparing him/herself when facing fire disaster (table 3).

Table 3. Items of Preparedness Behavior

Behavior	Before	After
Having wet towel/sack in the kitchen ready in use to extinguish fire	17%	94%
Drawing up emergency plan to be brought by the family in case a fire occur	17%	94%
Have first-aid medicines	94%	94%
Training fire extinguishing skills	0%	82%
To have special water supply serving only one purpose which is to extinguish fire	11%	47%

N = 17

3. The spread non-formal information about fire hazards awareness and fire preparedness through stickers.

Discussion

The very high-rate of fire occurrences in Jakarta is a problem which is need a comprehensive intervention. Placing the problem in the incidental category is no longer relevant knowing that, although there is no seasonal pattern of when it will happen there is a vulnerability pattern that can be identified. Looking at how big the loss it can inflict, the danger it produce, the vulnerability level, and the impact it causes to the lives of the society, fire disaster must be categorized as the disaster in the society. This resulted in an opportunity to resolve the fire disaster problem more comprehensively.

Community-based program is a strategy that has long been developed in countries with high frequency of fire disaster. It is proven to be an effective intervention in reducing fire occurrence frequency (Appy & Campton, 2003). According to Strother & Buchbinder (1980) choosing program which is appropriate with the needs of the community as well

as enhancing their active participation is an important thing to do.

The success of community-based program in reducing the occurrence of fire was proven by the Kristantio (2006) in his study in Galur district, Central Jakarta. According to Kristantio (2006) Galur now has become a relatively safe area from fire seen from the reduced frequency of the occurrence of fire disaster. In his study, Kristantio (2006) found that one of the main factors of the change in Galur is in the high participation of the community in handling the high frequency of fire. This showed that community-based program is an activity that needs to get further development and empowerment because it has been shown to be an effective program to solve fire problem.

On the other hand, based on the study by Kristantio (2006), perception is an important aspect in handling fire disaster. But speaking in terms of preparedness, the perception of the risk alone cannot be a strong predictor to the community's mobility to do the act of preparedness. According to Paton et al (2006) preparedness was determined by other factors, including, outcome expectancy, sense of community, and action coping. This can be seen in the community of RW 04 Manggarai district. According to the baseline, the community members of the RW 04 already have high critical awareness and the perception of risk. But those factors are not strong enough to initiate specific preparedness activity in facing fire disaster.

The absence of comprehensive study about the role of intentional factors within the society maybe become one of the cause of why the community-based programs against fire held by Jakarta Fire Department did not run optimally. In the study of Galur, participation and perception maybe become the dominant factors because those aspects are the ones being studied by Kristantio (2006). The programs usually executed without an extensive studies about the community being intervened although it was essentially important because the right model of risk communication can be determined only after we have a full understanding of the community.

The use of social-cognitive model towards preparedness also needs further much deeper investigation. In the intervention process of RW 04 Manggarai district, this model is used to elaborate intentional factors in the community. The assumption is, by activating the intentional factors which concluded as still weak, the intention to do

preparedness acts will become more factual.

However, the authors still have not found studies which used social-cognitive methods in community in Indonesia. Therefore, the use of this model will be better if preceded by quantitative study to predict factors which are relevant in the study as well as in the community.

Basically, social-cognition is needed to help plan the suitable risk communication for the society. In RW 04 Manggarai district, risk communication is focused on the development of preparedness against hazard and to the management needed to build local preparedness team. In a wider context, a country which is highly vulnerable to disaster such as Indonesia really needed a suitable risk communication design so the intervention programs can work effectively. Finding an effective program is important regarding the limited fund available for the education about disaster.

The building of local preparedness team is an initial step from other activity needed to create a fire-disaster-free community. This team then needs to plan further activity for the prevention of disaster as well as for the continuation of the team. Therefore, in the future, the team is expected to be able to plan the preparedness management in the community, for example, creating the procedure of alarm-system for disaster and evacuation training.

Other intervention programs which were focused on structural change as in the physical and economical aspects are also needed to reduce the vulnerability level. Example of such program is the use of micro-hydro powered electricity to be the substitute of the electricity from the State Electricity Enterprise. The use of this technology can help in reducing financial expenses for the use of electricity and to prevent the unsafe and illegal use of electricity. But, the implementation of the programs also has to consider the acceptance of the society and the readiness of the technology requirement.

Appy & Compton (2003) mentioned the "Five E-s" as the main and comprehensive strategy in creating community involvement to handle fire problem. According to Appy & Compton (2003), fire problem can only be resolved comprehensively if it involves these five elements, education, empowerment, environment enhancement, enactment of the development of security standard by the maintenance of law, and evaluation with behavioral research. The integration of the five elements will give effective result in handling fire problems.

Comprehensive understanding also means that fire problems are not only the responsibility of the society and the fire department, but also the responsibility of the policy makers, academic scholars and interventionist to determine the appropriate program and behavioral target. It means that optimal result from intervention program needs planning of a long-term program through many deeper studies which was involved comprehensive studies.

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