



Community awareness to prevent and control of Dengue fever after Sunda Strait Tsunami in Labuhan, Banten, Indonesia

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Abstract

Introduction: Natural disasters may lead to infectious disease outbreaks and change in the environment, in human conditions and in the vulnerability to existing pathogens for disease transmission. Volcanic activity and a high tide are suspected to be responsible for the devastation on Java and Sumatra islands. Many of the areas in the Labuan Banten affected by Sunda Strait Tsunami (SST) are endemic for dengue; therefore, dengue prevention was a priority in the initial post-disaster risk assessment

Methods: Field Study and Community Service “Kuliah Kerja Nyata Pembelajaran Pemberdayaan Masyarakat Universitas Gadjah Mada” (KKN-PPM UGM), involves the local communities in Labuan region rural area when developing dengue fever prevention measures. Participation of the community in capabilities, early detection and prevention of dengue outbreak after disaster. The philosophy behind the program is that university students are a privileged minority related dengue outbreak prevention and thus need to give back to the community using the skills acquired from multidisciplinary study program.

Result: This program covers surveillance, vector control activities, health promotion of dengue outbreak. Educational interventions to increase knowledge of dengue outbreak using posters, snake and ladder game and “smart wall calendar” about dengue outbreak for School-Based Health Education. The involvement of the community as part of the rural appraisal in the preparation of a plan will strengthen the community or individual assets and community response during prevention of dengue outbreak.

Conclusions: Community and academic integrated approach to problem solving involves people of different disciplines working together and bringing their complementary skill to find solution in dengue outbreak after SST.



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Introduction

Tsunami disaster impacts may intensify to infectious disease outbreaks and significant make changes in the environment, in human conditions and the vulnerability to existing pathogens for disease transmission. Volcanic activity and high tide are suspected to be responsible for the devastation on Java and Sumatra islands. The National Agency for Disaster Management (BNPB) and the Agency for Meteorology, Climatology, and Geophysics (BMKG) reported that flood tide or tsunami hit Caringin Beach in Labuan Banten Province and the coast around the Sunda Strait. A total of 681 houses, 69 hotels, 420 boats and dozens of vehicles reported damaged in four sub-districts, namely Pandenglang, South Lampung, Tanggamus and Serang. Labuan Pandenglang is the worst affected area with 164 deaths, 624 injured, 446 houses and nine hotels damaged. There were reports about population movement after this disaster as many holiday goers were in the tourist area. It is understood that a proportion of the fatalities and injured come from these national tourists visiting the area.

Dengue outbreaks is common after natural disasters such as tsunami, earthquakes, typhoons, and floods. SST rapidly destroyed or damaged houses, health facilities, and infrastructure on a devastating scale. Sustained rainfall in subsequent weeks resulted in the excessive accumulation of debris with stagnant water. Both provided the potential for a large increase in a mosquito breeding sites, leading to an expanding mosquito population and a higher risk of dengue transmission. Labuan Sub-district in Pandenglang Regency was designated as a red zone in the case of Dengue Hemorrhagic Fever (DHF) because the area was hit by a tsunami and flood. That way makes a lot of mosquito nests from garbage flooded with water. In January 2019, 15 cases of DHF have been found in the region. The number is the highest compared to other districts in Pandenglang. While overall, one month after SST the number of DHF in Pandenglang has been recorded as many as 60 cases.

Indonesia Ministry of Health in 2017 reported as the second largest with dengue fever cases among 30 endemic countries. The sum of cases of dengue fever is most prevalent in three provinces of Java (East Java, West Java, and Central Java). However, there are a number of provinces that are vulnerable to its high incidence rate of dengue fever. The first case occurred in Indonesia reported in Indonesia from the city of Jakarta (DKI Jakarta) and Surabaya (East Java) in 1968. Ever since the increased significantly numbers of dengue cases and spread to many locations have been reported. During the last 10 years starting in 2008 to be high until 2010 then experienced a drastic decline in 2011 of 27.67 per 100,000 population, followed by an upward trend of 2016 of 78.85 per 100,000 population but declined again drastic in 2017 with an Incidence Rate (IR) of 26.12 per 100,000 population. The following trends in the number of dengue fever during the period 2008-2017.

Flood disasters are the most common natural disasters worldwide and have been more widely documented than any other natural disaster. The public health consequences of flooding include disease outbreak resulting from the proliferation of mosquitoes resulting in an upsurge of mosquito-borne diseases such as dengue. The public health after-effects of a tsunami, especially infectious disease outbreaks, have been less documented compared with flood disasters. Given the potential for a large dengue outbreak following SST, the WHO public health risk assessment for SST recognized dengue fever as one of the health priorities for the affected areas with a potential increase

in cases occurring in the six weeks post-tsunami disaster. The aim of the response to dengue was to prevent an outbreak in the immediate aftermath of the disaster and to reinstate dengue control, surveillance and response capacity ahead of the usual peak season that would follow in the year after the tsunami and flood disasters.

The occurrence of a disaster produces a fundamental change in the way that a community functions. In a relatively short time, health needs may change dramatically. The opportunities and needs for community participation and health education for the dengue outbreak in the after disaster phases. Community participation synergy with student KKN PPM-UGM to the involvement of the people concerned in analysis, decision-making, planning, and programed implementation, as well as in all the activities. While the opportunities for community participation may vary greatly in the disaster-management cycle, a participatory approach to diseases after disasters should be promoted.

The rural community is at the borderline of any kind of tsunami disaster. Empowering the community by internalizing the tools and methods of the outbreak after disaster risk reduction is a good way to deal with future potential risks. Community empowerment is a type of capacity development where its members decide on the goals and strategies for prevention and control of dengue outbreak after a disaster. KKN-PPM UGM with the partnership, community empowerment can be conducted through various programs in wider coverage with the in-depth treatment that is more intensive. With a partnership, a synergy can be reached through programs that benefit all groups involved. This paper describes Field Study and Community Service (KKN) Universitas Gadjah Mada builds a synergy between various social elements such as local community dan local government elements to prevent and control of dengue outbreak after SST in Labuhan Banten Indonesia.

Methods

Surveillance

Collaboration student Field Study and Community Service (KKN UGM) with Primary Health Care teams worked together in surveillance reporting and case investigations outbreak dengue. Surveillance in the post-tsunami disaster was also activated four weeks after SST at selected sites such as evacuation centers and rural health units. Reports of dengue fever (DF) cases were monitored as these can be dengue cases, with any cases reported immediately referred to Primary Health Care (Puskesmas) Labuan Berkah General Hospital, Pandenglang for further verification and investigation.

Vector control activities and mosquito surveys

Vector control, operations, which larviciding (abate) and search-and-destroy activities were began 12 days after SST. Areas victim, disasters that had been damaged by the tsunami, damaged schools, and other public service centers were regularly targeted. Vector control, activities were supported by student Field Study Community Service (KKN-PPM UGM), Medical teams from Primary Health Center Labuan Pandenglang Banten and community in the local area. Additional insecticides (abate) was provided, following national standard requirements and specifications.

A mosquito survey was organized by National health authorities in Labuan district one month after the SST to identify the main dengue vector breeding sites, assess the vector density

after the SST and evaluate the effect of vector control interventions. Sanitation inspectors and community-based village dengue brigades were trained on vector surveillance and integrated vector control.

Some important health-related knowledge is available for communities to improve their awareness of dengue outbreak and infectious diseases after a natural disaster. Student KKN PPM-UGM for providing health education about the dengue outbreak should consider giving sufficient information about these matters. The effectiveness of these programs in establishing a good knowledge of dengue recognition, prevention, and control methods, although not necessarily in changing behavior.



Figure 1: Giant outdoor “Dengue Prevention and Health Promotion” snakes and ladders. Up to four players can use the giant inflatable die to roll their turn and chance their luck with the snakes and ladders for school-based health education.

Community health education is provided through "Smart Wall Calendar" using local language posters, leaflets, and giant outdoor “Dengue Prevention and Health Promotion” snakes and ladders for school-based health education. Aside from school-based health education, the community can also be important for attaining good practices in the prevention of dengue outbreak after natural disasters. Community-based allows the community to participate positively and actively in the Student KKN programs so that they can become empowered and have an improvement in their capacity to reduce the impact of diseases on their vulnerability to natural hazards.

Results

There were 60 dengue cases with warning signs and no death was reported in Labuan Region between disasters in December 2018 until 31 January 2019. There were two to three cycles of integrated vector control operations and mosquito surveys administered at one-week intervals in the 4 targeted villages there are Caringin, Labuan, Teluk and Cigondang of Labuan Districts, Pandeglang, Banten. The first cycle from 31 January-6 February 2019, 2nd cycle (7-13 February 2019), 3rd cycle (14-20 February 2019). The Breteau index decrease was most marked in Teluk Village (decreased from 55 to 8) and Cigondang Village (decreased from 21 to 0) where after a three-week interval. Local health offices had limited capacity for vector control due to reduced human resources and logistical support. Community participation in assessing household activities to eliminate breeding sites was high because collaboration with student

KKN PPM-UGM. Entomological surveys were undertaken three week post SST and comprised at least 100 households in each locality. Overall, the surveys found a high density of *Aedes aegypti* mosquitoes in all surveyed areas. In Caringin, Labuan and Cigondang Village only *Aedes aegypti* was detected, while in Teluk Village, both *Aedes aegypti* and *Aedes albopictus* were detected. The most common containers with mosquito breeding observed were discarded containers (60%), home utensils (11%), tyres (8%) water storage tanks (6%), flower pots (5%) and others (10%).

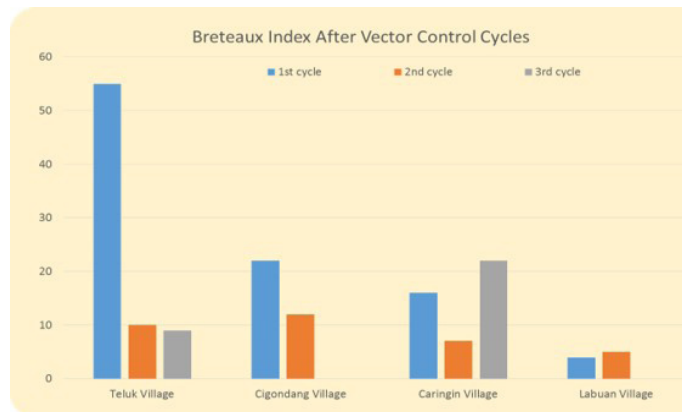


Figure 2: Breteau index after vector control cycles in dengue-affected villages, Labuan District, Pandeglang, Banten Indonesia January to February 2019



Figure 3: Community participation and collaboration with student KKN PPM-UGM in assessing household activities to eliminate breeding sites vector dengue fever.

Series of programs activities were conducted by Student KKN PPM UGM and local government Labuan staff, distribution of information, communication and education materials; and other health promotion activities.

Discussion

Natural Disaster events such as SST in December 2018 affect wide regions with devastating short-term impacts, extensive recovery and rebuilding efforts. The severe impacts on housing and community are not limited to destroyed and damaged physical buildings and infrastructure, but also deeply affect the socio-economic and environmental. After the SST, the Universitas Gadjah Mada established a temporary post-disaster student field study and community service in collaboration with local Government Pandeglang District focus on prevention of diseases after disaster alert and response for surveillance after tsunami phase emergencies including infectious disease outbreak. This observed increase may partly be due to the initial efforts for dengue surveillance, increased attention, and awareness of dengue outbreak for local communities.

Reducing dengue transmission of the response to SST, and this was achieved through strengthening dengue surveillance for early detection and targeted vector control. Moving to daily reporting of dengue cases through the surveillance team (student KKN collaboration with community participation) allowed for earlier identification of cases with targeted vector control efforts.

Indonesia is a country with a vast region with populated density and characteristics of various populations. The increasing number of people and the area of dengue fever spread in Indonesia is due to the high population mobility, the development of urban areas, natural disasters, climate change and increasing population density that can be affecting the breeding of *Aedes aegypti* mosquitoes. In Indonesia for non-disaster condition, an increase of clinically suspicious dengue cases usually occurs during the peak rainy season in Indonesia from July to October so that cases presenting with flu-like symptoms are diagnosed with dengue without any laboratory confirmation of suspected outbreaks dengue to be confirmed as not being dengue, especially in the early response after a disaster. Health promotion and education are essential for the control of diseases such as dengue. All Programs discuss mechanisms of dengue infection and mode transmission, reduce severe disease and avoid fatalities. Communication is important in ensuring local community empowerment. Participatory approaches in community empowerment can increased knowledge and awareness, and a higher level of critical thinking.

KKN PPM UGM programs are health education for dengue control is provided, school children, and their parents, therefore, they have some familiarity with the behavior and habitat of the *Aedes mosquito* in the local area after SST. Community involvement in the prevention and control of dengue is essential to result in action. Health education is a very important activity to promote health and prevent infectious diseases. It is the communication of information that enables people to make informed decisions about health-related activities at all stages of the dengue outbreak diseases. Health promotion helps local communities and victims disaster to understand perceptions of risk, and sustained dengue fever. Following a dengue infection, hygiene education is particularly important for reducing the risk of dengue fever disease and its transmission.

A collaboration between UGM and Pandeglang Regency government initiative known locally as the 'Desa Binaan' included programs and activities to increase health promotion and health knowledge and change behaviors. Collaboration Student KKN-PPM UGM with local community's participate plant mangroves can reduce impact of tsunamis in Labuan Pandeglang. Significant behavior change was measured through the prevention project, with an unexpected outcome being government officials becoming concerned with the health status of the children. Their health promotion using the "snake and ladder" game informed children about the transmission, vector control and also prevention of dengue fever. The early vector control activities that occurred post-SST comprised of chemical larviciding and these were initially conducted sporadically across affected areas without any entomological evidence base.

Larviciding of mosquito breeding sites, and around debris and garbage collection areas also reduced mosquito and fly densities, which was important due to the continuous rainfall in the months that increased mosquito breeding sites. The continued rain also encouraged more indoor time that can lead to increase exposure to indoor *Aedes aegypti* species.

Conclusion & recommendation

After natural disaster situations and their after effects, lack of awareness, and limited knowledge about the health risks render disaster survivors more vulnerable to infectious diseases. Close collaboration among the local community and student Field Study and Community Service KKN-PPM UGM ensured that dengue cases were detected early and targeted responses were quickly implemented, thus successfully minimizing widespread cases of dengue in Labuan, Pandeglang, Banten after Sunda Strait Tsunami (SST). Community participation and awareness in assessing household activities to eliminate breeding vector dengue virus sites were high.

Integrated health education and promotion in school-based or community-based disaster risk reduction can contribute to general understanding and raise awareness of the risk of post-disaster diseases. In this era of disaster, infectious diseases have become a trans-national threat to the survival of people living in our global village. Through further study and investigation of the risks and countermeasures of infectious diseases after disasters.

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