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Preparedness for Preventing Drowning in Children During the Flood Disaster

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ABSTRACT

Floods are natural disaster which often occurs in various regions. In the last five years, more than 2,000 floods have been recorded throughout Indonesia. Disaster risk assessment data in West Sumatra in 2022 stated that Padang City has a high risk of incidents, especially floods. Banuaran village, which is located in Lubuk Begalung, is one of the areas that recorded four flood incidents in the last year with the highest damage in the city of Padang. The study revealed that the majority of subjects were predominantly female and were in the adult age range. In terms of knowledge, the majority of respondents considered that not having life jackets is the main reason why children drown. During a flood children must be placed on high ground. The most appropriate way to prevent drowning is not to let children play around the river, the right age to teach swimming is 6 years old, by means of swimming lesson. Most of them already knew the evacuation places if there was a flood disaster. The best way to prevent drowning is to create a barrier with water.

The most important factor in avoiding drowning during a disaster flooding is not letting children play near rivers, education about safety during floods. Some of the results of these respondents are consistent with WHO guidelines, every family member should have an emergency kit, an emergency plan, and immediately save themselves when a flood occurs, and feel very confident to save themselves during a flood disaster. Efforts to prevent drowning in children during floods require a comprehensive approach involving multi-sectoral approach. The role of pediatricians in efforts to prevent includes identifying high-risk groups for incidents of drowning, special needs children, and working with policymakers, etc. These efforts are hoped will minimize the risk of child death due to drowning.

Keywords: Drowning, Prevention, Children, Readiness.

INTRODUCTION

Floods are a natural disaster which often occurs in various regions. Indonesian territory. Based on data from the National Disaster Management Agency, in the last five years, more than 2,000 incidents of floods have been recorded throughout Indonesia. Disaster risk assessment data in West Sumatra in 2022 stated that city of Padang has a high risk of incidents, especially floods.[1] This is influenced by the geographical location of the city. Padang is located on the west coast of Sumatra Island and surrounded by several large rivers so it has a high vulnerability to flood risk especially during the rainy season. Banuaran Village, which is located in Lubuk Begalung, is one of the areas that often

experiences flooding due to overflowing rivers, Batang Arau River during high rainfall. In the past year, this area recorded four flood incidents with the highest damage in the city Padang, where around 70 houses were damaged due to the flood.[2]

Flood disasters not only cause material losses but can also threaten the safety of lives, especially vulnerable groups such as children. The main cause of death in children during floods is drowning.[3] According to WHO in 2019, approximately 236,000 people died from drowning with most of them under 18 years old. In 2017 an estimated 8,700 children under the age of 20 years were hospitalized due to drowning incident with 25% of them experiencing serious injuries and requiring further treatment.[4] Most drowning incidents occurred in developing countries, especially in Southeast Asia (35%).[5] Data from the Ministry of Health shows that the majority of flood deaths in Indonesia are children under the age of 15, with 65% of these being caused by drowning.[1] The Padang City Regional Disaster Management Agency shows that drowning in children during floods has become one of the main causes of death in recent years.[2]

WHO has compiled 10 prevention implementations in 2019 to prevent incidents of drowning in children during floods. This includes collecting data on flood risk factors, providing safe places for children, providing barriers to limit access to water, teaching swimming for children under 4 years of age, disaster risk and hazard management flood, basic life support training for rescuers, providing boats, rafts and ferries for evacuation, multi-sectoral collaboration, raising awareness communities, and establish a national water safety plan for prevention drowning. Implementation of this prevention is only 10% implemented in developing countries.[4,6]

Efforts to prevent drowning in children during floods require a comprehensive approach involving multi-sectoral, starting from the government, educational institutions, community institutions, health services including pediatricians, families, and individuals.[7] The role of pediatricians in prevention includes identifying high-risk groups for incidents of drowning, children with special needs, and co-working with local policy makers.[8] Prevention of drowning in children during flood disasters can be managed through strengthening individual capacity and community, such as flood disaster preparedness training. It is hoped to minimize the risk of child death due to drowning during a flood disaster.[6,8] Therefore, the author is interested in conducting a study situation analysis regarding readiness to prevent drowning incidents in children at the moment flood disaster in Banuaran Village, Padang City.

MATERIALS & METHODS

This study was conducted by a survey method with a questionnaire containing 14 questions which included aspects of community knowledge and behavior regarding prevention of drowning incidents in children. This questionnaire is based on the drowning prevention guideline compiled by the WHO in 2022. This research was conducted in Banuaran Village, Lubuk Begalung District, taking into consideration the location of the settlement close to the Batang Arau River.

Based on the sample calculation using the Slovin formula, the number obtained was minimum of 60 respondents from the total population of the sub-district of Banuaran, Lubuk Begalung. This study was done by consecutive methods on the population aged above 10 years of age.

Data were collected by personal interviews. Univariate analysis was performed to examine respondent characteristics, respondent knowledge, and behavior, presented as percentages and narratives.

RESULT

Most subjects were in the range of 18 age to 59 years old (67%). There were more female than male subjects with a percentage of 57% and 43%.

Table 1. Characteristics of Respondents

Characteristics	n (%)
Age	
10-18 years	8 (13)
18-59 years	40 (67)
> 60 years	12 (20)
Gender	
Male	26 (43)
Female	34 (57)

Based on the survey, the majority of respondents thought that it was not having a life jacket was the main reason of drowning in children (50%), followed by strong current of water (23%), stuck in the rubble (17%), and hole covered with water (10%. In terms of knowledge, it was found that the majority of respondents (83%) thought that children should be placed in the evacuation place when flood occurs. However, they are still 7% of respondents who assume that children should remain with their parents. Others decided to leave the children with neighbors or placed the children in the daycare.

Most of the respondents (57%) thought that not allowing children to play near the river was the most appropriate way to prevent drowning in children. Most adults also believe that children should be taught to swim at the age of 6 years old with an instructor at the swimming pool. About 80% of respondents already knew the evacuation area, which is located about 50 meters from the residential area and higher surface than the residents' housing.

The majority of the respondents also said that it is important to have an education about flood safety while they never had any educational program regarding this case. Most respondents (97%) did not have a life jacket and emergency equipment at home. Also, about 80% of the respondents do not have any emergency plan in the face of a flood disaster.

Based on the survey, it was found that only 4% of respondents were certain to save themselves in the event of a flood, with 19% not confident in being able to save themselves in the event of a flood. From the interview, it was discovered that this was caused by a lack of equipment such as life jackets, and limited swimming ability.

DISCUSSION

Drowning incidents during floods are influenced by many factors, including strong water currents, holes or culverts covered in water, and stuck in debris. Based on the survey, it was found that most respondents considered not having a life jacket to be the cause of drowning in children, followed by strong water currents. This is in accordance by the prevention guidelines drowning in children according to the WHO guideline which states life jackets for children can reduce the risk of drowning by as much as 1.8 times compared to children without life jackets.[4] This is also in line with *Public Health Guidelines for Flood Events* in India which states that providing life jackets of a size appropriate to the child's age is one of the preventive measures that can be taken to prevent drowning during floods.[9]

There are 3 types of floods in Padang City, includes water floods, tidal floods, and flash floods. Water flood is the most common flood which occurrs in most of Padang City. This is due to population density and inadequate drainage systems. This area has a low and flat topography, with an inadequate development system that pays attention to good drainage. Both of these things occur when heavy rain, water exceeds the capacity of existing drainage channels, floods settlements, and overflows due to inadequate water drainage flow.[10]

In terms of knowledge, most people think that children should be placed in a high place when a flood occurs. This is in accordance following the drowning prevention guideline which states that the child must be placed in a safe place or evacuation area when a disaster occurs. Evacuation site development programs for toddlers are different in every country. One of the recommended efforts is to create a child care. This is in line with the Philippine government's program to provide childcare

for children aged 2 years or older before school age. The daycare must be within comfortable walking distance from home, with a ratio of children to trained caregivers (2:5, maximum 1:5). The daycare must have good lighting and ventilation. Entrances and exits must be controlled using door barriers (can be made from readily available materials) local such as bamboo or wood so that children, especially younger ones, cannot leave the room without being accompanied. The environment also must be clean with good water and sanitation.[8]

How to prevent drowning in children based on survey showed that most parents do not allow their children to play near the river. It was found that children in the age range of 4 to 17 years play and swim in the river. In addition, from the interview it was found that some parents considered bathing children at an early age in the river can train children to get used to water and make it easier for children to practice swimming, also reducing the risk of drowning during flood disasters. According to the WHO guideline in 2022 the best way to prevent the occurrence of drowning in children is by installing barriers to water. Closing or fencing open waters may be impractical, especially in places with lots of water bodies nearby. In this situation, installing door barriers at home, using a play area, or fencing off a safe play are in or around the family home can be a simple and affordable alternative, and helps with supervision.[11]

Although there is no standard definition for a door barrier, in some high-income countries, commercially available safety barriers used to prevent injury to children. Barriers about 1.4 to 1.5 m high is effective for children under 6 years old. Barriers should be difficult to climb, strong, and inspected regularly for damage. Door barriers had been proven effective and are implemented in various countries to prevent drowning, including the Philippines and Bangladesh.[12] According to WHO, the right age to teach swimming in high-risk areas of flood is in the age of 4 years. At this age, children are considered to be able to teach independence and swimming practice. Based on a survey, most adults believe that children should be taught to swim at the age of 6, but only 37% of them consider it at the age of 4 years. Most respondents said that swimming lessons are the best way to improve swimming skills in children. This is in accordance with WHO guidelines which stated that one of the efforts which can be made to prevent drowning incidents when a flood disaster occurs in high-risk areas is by adding swimming lessons at the local school.[4]

The Swim Safe cohort trial showed a marked reduction in drowning incidents among school children in rural Bangladesh. High-income countries have developed formal programs to teach children to swim. This is supported by the government, implemented in schools, certified by appropriate bodies, taught by trained and accredited instructors, evaluated for effectiveness learning and tested for safety. In general, children above 6 years of age are taught in clean, clear water, shallow with very visible boundaries. Swimming is one of the programs which includes water safety and rescue method, knowledge, and attitudes towards water. Therefore, preventing drowning among children under 6 years of age is a must. Other strategies such as water barriers and surveillance can be available. It can also be seen that most respondents already knew the evacuation sites in case of disaster, especially floods. The evacuation site is very necessary in disaster risk areas. Evacuation site criteria are adjusted to the potential disaster area for. In the potential area for flooding, evacuation sites should be in high places, sturdy and flood-resistant building construction, accessible to residents on walking, and provide basic necessities.[6,11]

The way to prevent incidents of drowning during a flood disaster is not to let the children play near the river, followed by making a strong and durable house construction. Based on the WHO 2019 drowning prevention guidelines, strong and flood-resistant building construction is the

most important thing in preventing drowning incidents in children during floods. Children are at higher risk during floods due to several factors. Smaller and lighter bodies are easily swept away by water currents, limited swimming ability, lack of understanding about water hazards, high curiosity, and dependence on adults for evacuation. [13]

A life jacket to prevent drowning in children during floods is a tool safety is very important. The type of life jacket for children is a vest, especially designed for children. It must fit the child's body size, be easy to use, and be practical for children. Most of the respondents in this study did not have a life jacket. According to WHO guidelines for flood prevention, every house in a high flood risk area must have a minimum life jacket for each high-risk member (elderly or child) in the family. An emergency plan is needed by every family in a high-risk area. An emergency plan is an agreement that includes danger signs, meeting locations, and individual responsibilities for each family member. Most respondents do not have an emergency plan in the face of disaster.[4]

Emergency equipment during a disaster includes personal protective equipment (child life jacket, strong safety rope, life jacket raincoat, water boots), communication and signaling equipment (whistle, waterproof flashlight, emergency lights, cell phones, power banks), evacuation equipment (rubber boats portable, waterproof backpack), basic needs (clean drinking water, ready-to-eat food, basic medicines and first aid, thermal blanket, dry change of clothes).[14,15] In this survey, it was found that 80% did not have an emergency equipment. People's actions when water first enters the house during a flood show that some respondents admitted that they would save their valuable belongings, followed by a call for help to parents or other adults. In this case, education is needed regarding the importance of equipment preparation.

This survey also assessed people's behavioral patterns when they see drowning incidents. It was found that almost all the respondents decided to call other people for help, with among less of them who chose to jump to help the victim. Factors which influenced a person's self-confidence when a flood occurs included swimming ability, knowledge of floods, previous experience, physical preparation (health and fitness conditions), mental preparation such as not panicking and staying calm in emergency situations.[16,17] Based on a survey conducted it is known that only 4% of respondents are very confident that they can save themselves in the event of a flood, with 19% not confident they can save themselves during a flood. From the interview, this was due to the lack of equipment such as life jackets, and limited swimming ability possessed by most respondents.

CONCLUSION

The study revealed that the majority of subjects were predominantly female and are in the adult age range. In terms of knowledge, the majority of respondents considered that not having life jackets is the main reason why children drown. During a flood children must be placed on high ground. The most appropriate way to prevent drowning is not to let children play around the river, the right age to teach swimming is 6 years old, by means of swimming lesson. Most of them already knew the evacuation places if there was a flood disaster. The best way to prevent drowning is to create a barrier with water.

The most important factor in avoiding drowning during a disaster flooding is not letting children play near rivers, education about safety during floods. Some of the results of these respondents are in accordance with WHO guidelines, every family member should have an emergency kit, an emergency plan, immediately save themselves when a flood occurs, and feel very confident to save yourself during a flood disaster. Pediatricians as providers of child health services have a central role in

preventing drowning incidents in children before a disaster, during a disaster, and after a flood disaster. Identification of risk factors, collaboration with local governmental, such as the local village head and Regional Disaster Management Agency are very important to optimize prevention efforts.

Declaration by Authors

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