



Management of Pregnant Women's Nutrition in Disaster Emergencies in Indonesia: A Systematic Review

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Abstract

Background: Indonesia is an archipelagic country that has a high potential for disaster. This is due to Indonesia's position at the equator and its wide geographic area and diverse demographics. Pregnant women are priority group because they are susceptible to nutritional problems during disasters. Pregnant women who are malnourished have a high potential for premature delivery, giving birth to babies with low birth weight and even death for mothers and children so that they become a real health threat. This research focuses on the nutritional needs of pregnant women in disaster. **Methods:** The method used is a cross sectional method. This research was carried out by a literature study that published about pregnant women's during disaster in Indonesia databases. Inclusion criteria are research that focuses on the management of nutrition for pregnant women in disaster emergencies. **Results:** Health problems frequently occurs in pregnant women, namely not being aware of the increased nutritional needs during pregnancy, especially during a disaster, so there is a risk of decreasing in maternal nutritional status. There are several nutritional treatments for pregnant women that can be carried out during disaster such as measuring nutritional status, managing needs and food for pregnant women, as well as providing additional food and supplements for pregnant women such as blood-added tablets, folic acid, calcium, etc. **Conclusion:** Management of nutrition during disaster emergency can help to maintain nutritional control in pregnant women and ensure the health of both the mother and the fetus.

Keywords: Pregnant women, Disasters, Nutrition management

Introduction

The geographical, demographic, sociological and historical conditions of Indonesia make Indonesia's territory prone to disasters (natural, non-natural, and social) (Wardyaningrum, 2014). This is because the Indonesian region is at the confluence of three active tectonic plates, namely the Indo-Australian Plate in the south, the Eurasian Plate in the north and the Pacific Plate in the east. The three plates move and collide with each other so that the Indo-Australian Plate plunges down the Eurasian plate and causes earthquakes, volcanic paths, and faults or faults (BNPB, 2017).

Disaster is an event or series of events that threaten and disrupt people's lives caused, by natural factors and/ or non-natural factors or human factors, resulting in the emergence of human casualties, environmental damage, property losses, and psychological impacts (Law Number 24 of 2007 concerning Disaster Management). For example, earthquake events that occur in several

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parts of Indonesia, whether accompanied by tsunami events or not, show that natural disasters are a real threat faced by the Indonesian nation. (Kemhan, 2015).

Hadi Purnomo & Ronny Sugiantoro (2010), stated that 87% of Indonesia's territory is prone to natural disasters, as many as 383 districts or intermediate cities are natural disaster-prone areas from 440 regencies or intermediate cities throughout Indonesia. Based on infographic data from the National Disaster Management Agency (BNBP, 2020), the total number of disasters in Indonesia throughout 2020 reached 2,952 disaster cases.

One of the highest risks of health problems in society and needs to get special attention is the vulnerable groups. Vulnerable groups are high-risk community groups, because they are in situations and conditions that lack the ability to prepare themselves to face disaster risks or disaster threats (Siregar, 2019). Based on Law Number 24 of 2007 Indonesian Health Ministry, it is stated that one of the implementation of disaster management during emergency response is the protection of vulnerable groups. Disaster vulnerable groups under this law are infants, toddlers, and children, mothers who are pregnant or breastfeeding, people with disabilities and the elderly.

Natural disasters can cause the destruction of health infrastructure and the loss of capacity of the health system in responding to the health needs of the people in the surrounding areas affected by the disaster (Wardyaningrum, 2014). The destruction of health facilities, the reduction in the number of health workers due to being victims of disasters, and because their families are victims, the paralysis of communication and coordination facilities are the causes of disruption to the local health system. In addition, the health needs of the people in the disaster area increased drastically, because they experienced physical and psychic trauma as a direct impact of the disaster. The destruction of living facilities and infrastructure such as houses, clean water facilities, sanitation facilities, and disruption of food supplies have also worsened their health status. The main health problems that arise as a result of disasters are nutritional problems and infectious diseases (Hidayati et al 2011).

Nutrition management is essential, especially during the initial emergency response period with the hope that people will not experience a hunger situation and there is a decrease in nutritional status, especially in pregnant women as one of the vulnerable groups. In pregnant women, nutritional intervention is very important, especially in the process of fetal growth and the growth of various organs of their body as a support for the pregnancy process. Pregnant women need additional energy, protein, vitamins and minerals to support fetal growth and metabolic processes of the body (Dian handayani, 2014). Pregnant women who lack intake during disasters cause potential events of infection, stunting and malnutrition in infants and children in the future. In malnourished pregnant women, it has a high potential for premature delivery, giving birth to babies with low birth weight and even death for mother and child so that it becomes a real health threat.

Method

The method used in this study is literature review (literature review, literature research) is a study that examines or critically reviews knowledge, ideas, or findings in journals with the criteria for nutritional keywords for pregnant women during disasters.

Result and Discussion

Nutritional Problems in Pregnant Women

The decrease in health status derived from the presence of infectious diseases and the decline in nutritional status are the main problems that occur in disaster emergency conditions. The impact of these health problems can change the function and quality of life of people affected by disasters. Nutrition preparedness in disaster situations and health crises is one of the keys in efforts to reduce disaster risks and health crises. Nutrition management in disaster situations is part of efforts to overcome the health crisis regulated in PMK no. 75 of 2019. Effective nutrition

management in disaster situations needs to be carried out collaboratively with stakeholders from various circles, both government and non-government in disaster management efforts.

Based on data from Lalasz R (2005) around 150 000 women in several countries experienced the impact of the Tsunami, including Indonesia, Thailand, Sri Lanka, Indian The Maldives. Where there are approximately 50000 pregnant women who are in the 3rd Trimester (Carballo, 2005).

Based on research on nutritional status assessments in pregnant women living in relief camps after the tsunami in Sri Lanka by Jayatissa, 2006 it was found that from the measurement of LILA (Upper Arm Circumference) in 168 pregnant women there were about 12% of mothers suffering from severe acute malnutrition and 25% of moderate malnutrition.

The emergence of health and nutritional impacts during disasters is the destruction of various public and health service facilities and infrastructure. The disconnection of food distribution channels and limited food availability, poor environmental sanitation and the destruction of clean water facilities are the main factors for health problems due to disasters. Fast and proper nutrition management will certainly make health problems such as lack of nutritional intake or infections can be controlled properly, so as not to cause a continuous effect of severe disease.

The continuation of high health risks in pregnant and lactating women is not only caused by inadequate and/or unbalanced diets, but also due to disease outbreaks that can occur in disaster areas, especially in densely populated evacuation/evacuation areas. Poor sanitation and hygiene make the incidence of infection increase. Some examples of diseases that can occur are diarrhea, vomiting, respiratory infections, infectious infections (measles, tuberculosis, malaria, HIV / AIDS) or leptospirosis (Siti H (2018), Pierre-Louis (2008)).

Based on research conducted by (Qadri F et al 2005) The existence of disturbances in access to clean water during natural disasters can increase the risk of diarrheal disease outbreaks, due to contaminated drinking water. An outbreak of diarrheal diseases after floods in Bangladesh in 2004 involved >17,000 cases; *Vibrio cholerae* (O1 Ogawa and O1 Inaba) and enterotoxigenic *Escherichia* were isolated. In addition research conducted by (Sur D 2000) A large cholera epidemic (>16,000 cases) (O1 Ogawa) in West Bengal in 1998 was associated with previous floods having occurred, and floods in Mozambique in January-March 2000 led to an increase in the incidence of diarrhea (Kondo H, 2002)

In a study conducted in Indonesia in 1992-1993, flooding was identified as a risk factor that significantly influenced the occurrence of diarrheal diseases caused by *Salmonella enterica* serotype Paratyphi A (paratyphoid fever) (Vollaard AM, 2004). In Aceh Province, Indonesia, a rapid health assessment in the city of Calang, which was 2 weeks after the tsunami disaster in December 2004, found that out of 100% of the people who drank from unprotected well water, 85% of the population contracted diarrhea (Brennan RJ 2005).

Based on (Aggarwal R, 2000) infectious diseases such as Hepatitis A and E are also transmitted by the fecal-oral route, in relation to lack of access to water and safe sanitation. Hepatitis A is endemic in most developing countries, and most children are exposed to and develop immunity at an early age. As a result, the risk of a large outbreak is usually low in this setting. In areas of E-endemic hepatitis, it often occurs during heavy rains and floods; in pregnant women the mortality rate of cases can reach 25% (24). Hepatitis A and hepatitis E clusters were recorded in Aceh after the December 2004 tsunami (World Health Organization, 2006).

Disaster Phase

The disaster phase (emergency response phase) is an activity that ensures that the needs of disaster-affected communities are met and minimizes losses due to disasters. In this phase, health problems during the refuge such as hunger, infectious infections, decreased nutritional status, hygiene problems, availability of water and medicines began to appear.

Nutritional deficiencies and an increased risk of infection in pregnant women due to disasters cause disruptions in the development of the baby in the future. Babies born to malnourished mothers tend to have a risk of being born with less conditions and development, for example low birth weight, stunting or mental delay (Siti H (2000), WHO (2004). The lack of supplementation for pregnant women at the time of a disaster, for example folic acid tablets can increase the risk of neurological disorders in babies (Public Health England, 2017)

Based on the journal The study established that malnourished pregnant women are at higher risk of having babies with low birth weight (LBW) [Lechtig A (1975), Thame M (1997)]. Several studies have reported an association between infants with low birth weight (LBW) with malnutrition, poor growth and development, as well as a risk of increased morbidity and mortality in children (Black RE ,2013, Rahman MS , 2016), Rai R,2016, Valente A, 2016)

The need for micronutrients throughout the population during a disaster will increase. Inadequate intake combined with dietary diversity tends to increase micronutrient deficiencies. The three most common micronutrient deficiencies in disasters are vitamin A, iron, and iodine deficiencies. Based on WHO data, pregnant women as a group at risk of vitamin A deficiency based on the prevalence of night blindness occur in 5% of pregnant women. Vitamin A supplementation is highly recommended for pregnant women in developing countries. (WHO,2000)

In addition to vitamin A deficiency, Iron anemia is most common in children (aged 6-24 months) and women of childbearing age (especially pregnant women). Based on the results of basic health research (Risikesdas) 2018, 48.9% of pregnant women experience anemia. A total of 84.6% of pregnant women who experience anemia are in the age group of 15-24 years. Anemia in pregnant women is mostly the result of iron deficiency, so iron supplementation is important, especially during the fertile period and pregnancy. According to data from Risikesdas 2018, the coverage rate for iron administration to pregnant women is 73.2%. Based on this number, only 24% of pregnant women get the number of tablets added to iron in accordance with the recommendations, namely a number of 90 tablets. This anemia condition is certainly a special concern, especially in the field of disaster nutrition.

Iodine deficiency is one of the geographical diseases, which occurs in most developing countries. This occurs mainly in areas where the soil is poor in iodine and the iodistic content of the diet is low, resulting in low iodine intake in the population. Young children and pregnant women are the most susceptible to iodine deficiency. One of the efforts that has been made to overcome deficiencies due to iodization or the addition / fortification of iodine to all salts (Universal Salt Iodization / USI) of households. The achievement of the coverage of iodized salt in Indonesia in 2013 reached 77.1%. This coverage is still below the USI standard set by WHO, which is 90% (Lathifah N, 2018).

Iodine deficiency can cause stillbirths and miscarriages in pregnant women as well as varying degrees of mental retardation and of course goiter disease (Pierre-Louis J, 2008) Other diseases that can arise due to micronutrient deficiencies are skurvi (vitamin C), pellagra (niacin) and beriberi (thiamine) (WHO, 2004). The need for micronutrients sometimes goes unnoticed, even though this situation will contribute well to the level of health of the population affected by the disaster, especially in pregnant women who need adequate intake of micronutrients.

Based on the journal (Afifi R 2013) malnutrition conditions during pregnancy, especially deficiencies in certain vitamins and minerals, have been associated with negative pregnancy outcomes for mothers and babies. One is that severe iron deficiency anemia has been linked to premature childbirth.

Surveilans

During nutritional emergencies, especially in the early phases of emergencies, there will be a shortage of food assistance. This can be caused by the distribution of aid that has not been able

to run optimally, so that in the early phase of the disaster food assistance needs to be targeted at the people who need it most in accordance with the initial nutritional status assessment in accordance with the initial survey conducted.

Various indicators can be used to assess the nutritional status of the pregnant women population, namely the Upper Arm Circumference (LiLA) can be used as an alternative method of initial screening. This method can mainly be used in the population of pregnant women. Pregnant women with a < LiLA of 23.5 cm indicated an incidence of protein lack of energy in the population. All affected by the disaster in this situation received rations, the entire vulnerable group, especially toddlers and pregnant women were given additional food.

The upper-middle arm circumference (MUAC) is often used to screen pregnant women at risk of malnutrition. The SPHERE guidelines also recommend the use of MUAC for screening pregnant women into feeding programs. According to these guidelines, MUAC values that increase the risk of malnutrition in pregnant women, usually range from 21 cm to 23 cm. The value of < 21 cm can be used to identify and target pregnant women who are at risk of fetal growth retardation (Sphere T, 2011). The Ethiopian Emergency Nutrition Coordination Unit (ENCU) suggests the same limit (< 21 cm) for the entry of mothers into additional feeding programs in emergencies (DPPC, 2004).

Management of nutrition programs in disasters in Indonesia

The management of nutritional activities during disasters must be carried out effectively and efficiently, and coordination from various parties is needed to:

- Preparation of menus for the needs of vulnerable groups.
- Calculation of ration needs: preparation of a ration menu of 2,100 kcal with a composition of 50 g of protein and 40 g of fat.
- Administration of micronutrient supplementation, examples of iron tablets in pregnant women and vitamin capsules for toddlers and pregnant women.
- Implementation, assistance, logistical supervision starting from preparation to distribution including formula milk assistance from outside parties.
- Implementation, monitoring and follow-up of nutritional surveillance.
- Procurement of nutrition counseling, especially nutrition counseling
- In the population of pregnant women, an additional energy of 285 kcal and 17 g of protein per day is required for pregnant women. In nursing mothers, an additional amount of energy of 500 kcal and 17 g of protein per day is required. Blood-added tablets are given to pregnant women for 90 days (iron tablets 60 mg / day, folic acid 400 mg / day).
- Administration of 2 capsules of vitamin A (1 capsule on the first day and 1 capsule on the next day) at a dose of 200,000 IU in puerperal mothers (0-42 days) (WHO (2004) Indonesian Health Ministry (2012)).

Conclusion

Nutrition management during disasters is an important part that helps maintain and improve the degree of public health in the event of a disaster. Nutritional problems such as decreased nutritional status, macronutrient deficiencies, micronutrients and infectious infections can be prevented with proper nutritional management. Pregnant women as a vulnerable group need special attention, one of which is that pregnant women as a vulnerable group who are malnourished will give birth to a small baby with a low birth weight (BBLR) and have a higher mortality rate either for the baby or when the delivery process is at high risk of exposure to more severe diseases and ultimately increases the risk of death. Meanwhile, BBLR babies tend to

experience stunting, grow thin (wasted) or experience neurodevelopmental disorders in the future.

The limited knowledge about nutrition disaster, especially for pregnant women in the community, makes it a challenge in nutrition management, especially in providing proper nutrition when disasters occur. This is coupled with the lack of information, pre-disaster nutrition management training that has not been evenly distributed in each region. Food-related problems such as distribution, processing and availability of food are often problems in disaster nutrition management. It is necessary to involve nutritionists in writing policy programs and guidelines for nutrition management in disasters. Coordination and participation from various parties are needed so that disaster management activities can be carried out properly.

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Conflict of Interest

The authors declare that they have no conflict of interest

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