

## Reports

# Infant feeding concerns in times of natural disaster: lessons learned from the 2014 flood in Kelantan, Malaysia

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The flood that hit Kelantan in December 2014 was the worst in Malaysian history. Women and their infants accounted for a large proportion of the people at risk who were badly affected, as almost half of the population in Kelantan was in the reproductive age group. This report serves to raise awareness that breastfeeding mothers and infants are a special population with unique needs during a disaster. Four of their concerns were identified during this massive flood: first, the negative impact of flood on infant nutritional status and their health; second, open space and lack of privacy for the mothers to breastfeed their babies comfortably at temporary shelters for flood victims; third, uncontrolled donations of infant formula, teats, and feeding bottles that are often received from many sources to promote formula feeding; and lastly, misconceptions related to breastfeeding production and quality that may be affected by the disaster. The susceptibility of women and their infant in a natural disaster enhances the benefits of promoting the breastfeeding rights of women. Women have the right to be supported which enables them to breastfeed. These can be achieved through monitoring the distribution of formula feeding, providing water, electricity and medical care for breastfeeding mothers and their infants. A multifaceted rescue mission team involving various agencies comprising of local government, including the health and nutrition departments, private or non-governmental organizations and individual volunteers have the potential to improve a satisfactory condition of women and infants affected by floods and other potential natural disasters.

**Key Words:** concerns, disaster, flood, infant feeding, Kelantan

## INTRODUCTION

Floods are regular natural disasters in Malaysia that happen almost every year during the monsoon season. Given Malaysia's geographical location, most floods that occur are a natural result of cyclical monsoons during the local tropical wet season, which is characterized by heavy and regular rainfall from roughly October to March. However, the flood that hit Kelantan in December 2014 was the worst in the history of the state and Malaysia. The National Security Council (NSC) of Malaysia confirmed that the water levels of the recent floods superseded the flood in 1967.<sup>1</sup> Eight states in the country were affected, especially Kelantan, Terengganu, and Pahang, with more than 200,000 flood victims evacuated to relief centers. Many houses were damaged or lost, leaving the household members homeless.<sup>1</sup>

The first wave started on the December 18, 2014, and affected only 155 of the victims, and the second wave started on the December 24, 2014, and caused extensive flooding in most areas in Kelantan.<sup>2</sup> At least 86,733 families (329,441 persons) were transferred to 469 shelters, while 43,433 families (143,434 persons) stayed in their home surrounded by water or moved to their relative's

house, as documented in the 2014/2015 flood report by the Community Welfare Department, Kelantan.

In a disaster such as the one caused by the recent flood in Kelantan, women and young children account for a large proportion of people affected. They need nutritious food, clean water, proper shelter, clothing and medicine, which are usually insufficient during disaster.<sup>3</sup> Facilitate women to initiate and maintain breastfeeding their infants during a disaster should be prioritized and may save lives.<sup>4</sup> Unlike infant formula, which needs to be mixed with water, human milk provides adequate hydration and protects infants from exposure to water contamination during the destruction caused by natural disasters. Thus,

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maintaining breastfeeding could reduce the exposure of infants to diseases related to bottles and nipples prepared using unclean water.

Our mother and infant Psychological First Aid (PFA) team members have been involved directly in various rescue missions in the recent flood. We observed massive destruction of public and private facilities. Thousands of houses were submerged, and people had to evacuate their residences to a safer temporary shelter. The damage caused was insurmountable, requiring a long-term plan for a full recovery. We managed to reach some mothers with infants during the acute phase and early post flood. At that time, the food supply and supplies for basic needs were scarce. Some of the mothers had difficulty in continuing to breastfeed, while others had been on formula feeding even before the flood started. Some women with young children received donated infant formula, but their access to a clean water supply was restricted, and the formula preparation was therefore non-hygienic.

This report serves to raise awareness about the fact that breastfeeding mothers and infants are a special population with unique needs during a disaster. This report covers the topic of breastfeeding mothers and infants as a population at risk during a flood or other disaster and deals with concerns and implications related to their health and wellbeing in such circumstances.

#### POPULATION AT RISK

In 2010, the total population residing in the 10 districts in Kelantan was 1,470,696, with an almost equal distribution of males and females.<sup>5</sup> The recent flood affected almost all districts in Kelantan, with the rural areas of Kuala Krai and Gua Musang among the worst-hit areas, with more than 90% affected. Almost half the population in Kelantan, as well as in Kuala Krai and Gua Musang districts, was in the reproductive age group (15 to 49 years old). Table 1 shows the distribution of adults in the reproductive age group and children below five years old in Kelantan and the two districts.

The health indicators of Malaysian infants show that their health status has improved in recent years. In 2012, the neonatal mortality rate and infant mortality rate in Kelantan were 5.2 per 1,000 live births and 8.1 per 1,000 live births, respectively.<sup>6</sup> Even though mortality rates have improved, infection and respiratory causes have contributed to almost 30% of infant deaths in Malaysian governmental hospitals.<sup>7</sup> During the recent flood in Kelantan, notifications of food poisoning, cholera, typhoid, leptospirosis, and melioidosis cases represented an increasing trend, which was likely related to contaminated food and drink from the surrounding flood area as well as a limited supply of safe water.

Breastfeeding has been shown to protect infants against various infections, including pneumonia, gastroenteritis, and otitis media.<sup>8</sup> Despite global recommendations and the national breastfeeding policy, many mothers do not practice optimal breastfeeding. A study conducted in two districts in Kelantan found that almost half the mothers had discontinued exclusive breastfeeding at one month after delivery and 30% of them had given water to their infants. At six months after delivery, the percentage of exclusive breastfeeding was 13%, and 21% had discon-

tinued any breastfeeding.<sup>9</sup> The suboptimal breastfeeding practices might put the population at a higher risk of infection and other illnesses, especially during floods and other disasters.

Prior to the flood, the coverage of infants attending governmental health clinics in Kelantan was 73.8%, with an average visits per infant of seven visits.<sup>10</sup> There were a total of 258 health and community clinics, with a health clinic-to-population ratio of 1:6,457.<sup>6</sup> The services related to breastfeeding include antenatal breastfeeding education at health clinics, distribution of pamphlets on breastfeeding during clinic visits, advice on breastfeeding while in the postnatal ward and during postnatal home visits, and breastfeeding talks during immunization follow-ups.<sup>11</sup>

More than half the health care facilities, clinics, and hospitals were affected by the flood, and their operations were minimized.<sup>12</sup> Those services were very much affected during the flood, which interrupted the physical communication between the community and health service facilities. A total of 16 roads in six districts were closed, and four hospitals were affected due to the rising water levels from the three main rivers.<sup>13,14</sup> The health staffs were unable to reach the mothers and infants, and those who were facing breastfeeding difficulties were more likely to discontinue breastfeeding during this period.

#### FEEDING CONCERNS AND RESPONSES DURING THE RECENT FLOOD

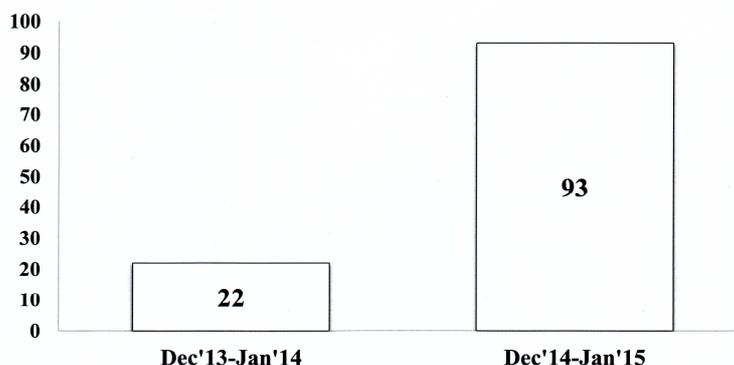
There were four infant feeding concerns that were identified during the flood that occurred in Kelantan, Malaysia, in December 2014. The first concern was the negative impact of the flood on infant nutritional status and their health, as they were the most vulnerable group to experience infectious disease, malnutrition, and death.<sup>15</sup> The incidence of diarrhea cases was observed during the flood that occurred in Kelantan in December 2014 and rose tremendously after the flood. Based on the admission record to the pediatric ward at the Hospital Universiti Sains Malaysia, Kelantan, 93 patients with an age of less than two years old were admitted for diarrhea between December 2014 and February 2015, as compared to the same period during the previous year, when only 22 patients were admitted (Figure 1). The increment was about 4.22 times or 422%, as documented in the pediatric ward admission database. In emergency situations, diarrhea was the most common cause of death, with more than 70% of deaths associated with diarrhea.<sup>16</sup> Fortunately, during the flood that occurred recently, there was no mortality reported secondary to diarrhea.

In any disaster, safe drinking water may be limited, and in a polluted environment, it may be impossible to ensure cleanliness and sterilization of feeding utensils to prepare infant formula.<sup>17</sup> It is unlike breast milk, which is always sterile and does not require any water, fuel, or feeding utensils to prepare it. Furthermore, antibodies in human milk prevent bacteria and pathogens from attaching to an infant's intestines. Breast milk can significantly lower the rates of diarrhea and other infectious disease.<sup>4</sup>

Second, during a disaster, mothers usually stay in temporary shelters or camps with other flood victims. These places are usually an open space and lack privacy for mothers to breastfeed their babies comfortably, which

**Table 1.** Distribution of children below five years old and people in reproductive age group in Kuala Krai and Gua Musang districts, Kelantan in 2010

	Frequency (%)	
	People in reproductive age group	Children below five years old
Kelantan	734,049 (49.9)	134,287 (9.10)
Kuala Krai	50,564 (48.5)	10,039 (9.60)
Gua Musang	44,363 (51.5)	9,758 (11.3)



**Figure 1.** Number of admissions for infant age less than two to Pediatric Ward, Hospital USM due to diarrhea from December 2013 and January 2014 and from December 2014 and January 2015

may subsequently increase the mother’s stress level and undermine breastfeeding. In order to overcome this issue, suitable or private areas for mothers to breastfeed their babies should be prepared. Accommodations can be prepared by creating separate rooms through portable partitions or by putting a curtain to close off certain areas so that mothers can breastfeed their babies comfortably. Apart from that, mothers can be provided with a shawl or a sling to wrap their babies close to them, so the baby can breastfeed without any disturbance.<sup>4</sup>

Third, a concern is that in times of crisis, large donations of infant formula, teats, and feeding bottles are often received from many sources. Although the intentions are generally good, there is a lack of awareness that such donations can do more harm than good, as the basic infrastructure, and utensils may be inadequate to reduce the risks associated with the preparation of infant formula and other breast milk substitutes.<sup>18</sup> When a crisis site has contaminated water, this means that the donations of infant formula do more harm than good and increase infant mortality and morbidity,<sup>4</sup> as the uncontrolled distribution of infant formula exacerbates the risk of diarrhea among infants and young children in emergencies.<sup>19</sup> Therefore, these donations should be avoided.<sup>18,20</sup> Apart from that, the unregulated distribution of breast milk substitutes (BMS), which include powdered milk provided in food rations, may reduce women’s efforts to breastfeed, and they may subsequently stop breastfeeding.<sup>20</sup>

From our observations during shelter visits after the flood in Kelantan, the large donation of infant formula to the mothers caused mothers to become hesitate in continuing to breastfeed their babies. Sadly, some of the mothers stopped breastfeeding because of the availability of free infant formula, and some of them started to mix feeding with infant formula. They felt that it would be a waste if they did not use the free formula milk that was given to

them. If possible, we should try to prevent this from occurring during any disaster. Exclusive breastfeeding in the first six months and continued breastfeeding for two years, as recommended by WHO, need to be protected, promoted, and supported for child health and survival.<sup>18</sup> However, if mothers have already stopped breastfeeding, they can resume breastfeeding through a process of relactation. Relactation is not a simple or easy job under stress and difficult situations. However, in a disaster, it could be a good choice and a life-saving decision for infants, provided that mothers are motivated and intend to breastfeed their baby again.<sup>4</sup>

A fourth concern is about the breastfeeding misconceptions of mothers, family members, community members, health care workers, and those involved in volunteer work during a disaster. Some breastfeeding mothers believe that they should stop breastfeeding when they are malnourished or when their babies develop diarrhea.<sup>4</sup> Moderate malnutrition has no or very little effect on breast milk production, as the mother will continue to produce milk from her own body’s supply. Breast milk is needed more when babies have diarrhea because breast milk already contains enough water, minerals, and vitamins to prevent dehydration. Apart from that, proteins from breast milk may help to strengthen the immune system of the baby. Therefore, breastfeeding should be continued as usual.<sup>4</sup>

During this critical time, mothers need strong support from family members, community members, volunteers, and trained breastfeeding peer counselors to encourage mothers to continue breastfeeding exclusively. Mothers also can be helped by providing them access to health care providers who can assist them with medical issues related to breastfeeding. Other than that, mothers can connect with other mothers to share their experience in breastfeeding problems while facing the disaster, and this can be a mother-to-mother support source.<sup>4</sup>

One rule needs to be followed: feed the mother, so she can feed her baby.<sup>4</sup> A disaster may affect breast milk production and result in reducing a mother's confidence in her ability to breastfeed.<sup>20</sup> During this period, support from trained breastfeeding peer counselors is very important so that they can explain the importance of breastfeeding during a disaster; this strategy has been used effectively to help mothers feel reassured about breastfeeding their babies in the midst of their fears.<sup>4</sup> However, in fact, stress is not likely to have a large impact on breast milk production. What mothers need to do is to relax in a supportive environment to help her milk flow freely. Mothers also need to monitor their babies' urinary output and feed their babies frequently by putting their babies to breast eight to 12 times every 24 hours (with effective suckling).<sup>4</sup>

### **SUPPORTING THE BREASTFEEDING RIGHTS OF WOMEN IN DISASTERS**

Women, infants, and young children have unique health concerns in the aftermath of a natural disaster, as in the recent heavy flood in Kelantan. They were displaced and became homeless and were exposed to an unhygienic environment. This problem is reflected in the rate of admission due to diarrhea-related illnesses, which rose tremendously to more than 400% compared to the same duration the prior year.

Some women may have concerns about breastfeeding their infant after exposure to contaminated flood water, when experiencing diarrhea, food-borne or water-borne illness. However, the benefits of breastfeeding outweigh the risks of exposure to contaminated flood water through breast milk.<sup>21</sup> We observed mothers preparing formula for their babies non-hygienically (using water that was untreated) or delivering it with an unsterile bottle or teat; thus, the babies were at risk of becoming very sick. Fortunately, no cases of death were reported, but the families and communities were left incapacitated.

Since the depth of the damage from the recent flood is overwhelming, rescue efforts were not well prepared, and the volunteers and health care workers were not well trained in dealing with breastfeeding mothers during a disaster. Therefore, the response was inappropriate in terms of promoting and protecting exclusive breastfeeding during the disaster, and the concerns were not fully addressed.

During a natural disaster, it is important to regulate the circulation of infant formula, provide favorable atmosphere and strengthen health care support in order to fulfill the breastfeeding rights of mothers. Previous event revealed that where uncontrolled distribution of infant formula feeding took place rampantly, the rates of associated morbidities and mortalities rose.<sup>22</sup>

Despite the price, the belief that formula feeding is a complete nutrition for infants make it a precious product and difficult to abandon mainly during a disaster. Hence, it is expected that mothers may have the potential to supplement their infants with formula milk that are donated by the disaster volunteers. This belief is a result of excessive harmful marketing of formula milk towards the benefit of infant's health.<sup>23</sup> Generally, mothers tend to believe that the nutritional content of formula milk is far better as

compared to the natural content of breast milk.<sup>24</sup>

If mothers were provided with donated formula milk as a precautionary action when they had insufficient breast milk, their confidence to breastfeed could also be affected. Therefore, it is important to regulate the distribution of donated formula milk during disaster.<sup>25</sup> Rather, unbranded infant formula in the quantity required should be obtained by local agencies.<sup>25</sup> The infant formula has to be combined with local staple food before distribution in order to avoid confusion with formula substitute. Furthermore, placement of trained breastfeeding counselors in disaster affected areas may prohibit the widespread distribution of infant formula unnecessarily. Exclusive breastfeeding were noted more commonly practiced among women who were supported by peer counselors despite receiving infant formula distributed freely by disaster volunteers.<sup>26</sup>

Health professionals can facilitate relactation among mothers who have disengaged breastfeeding as a strategy to prevent food-borne and water-borne diseases,<sup>27</sup> and support mothers to sustain breast milk production if they are separated from their infants due to illnesses. Providing practical support to mothers during disasters is important, as they are the main carer for their infants and family members at large. Thus, by supplying the women and their families with basic needs such as nutritious food, clean water and supportive environment, their role as a carer can be well accomplished. Tsuboyama-Kasaoka and Purba also recommended that providing supplementary rations before the disaster season for vulnerable groups, would also be beneficial for their nutritional needs.<sup>3</sup>

### **CONCLUSION**

During disasters, mothers and infants are vulnerable, thus their breastfeeding rights need to be supported and protected. All stakeholders in the disaster management team need to ensure their plan of action would not undermine breastfeeding practice. A multi-team collaboration involving various rescue missions comprising of local government agencies, including the health and nutrition departments, private voluntary organizations or non-governmental organizations either nationally or internationally and individual volunteers have the potential to be favorable to improve a satisfactory condition of women and infants affected by floods and other natural disasters.

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### ***Declaration of originality and personal contribution***

This article is an original manuscript and all the listed authors contribute in the writing.

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# Infant feeding concerns in times of natural disaster: lessons learned from the 2014 flood in Kelantan, Malaysia

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## 自然灾害时期的婴儿喂养问题：吉兰丹马来西亚 2014 年洪水的经验教训

2014 年 12 月，吉兰丹发生了史上最严重的洪水灾害。占人口总数大多数的妇女和她们的婴儿受到最严重的影响，吉兰丹约一半人口是处于生殖年龄的人群。该研究旨在报道提高处于灾难中有独特需求的哺乳母亲及婴儿特殊人群的认知水平。洪水期间需关注四个方面：第一，洪水对婴幼儿营养和健康状况的负面影响；第二，母亲在洪灾临时避难所受室外缺乏隐私的环境中进行母乳喂养的舒适度；第三，许多来源的婴幼儿奶粉、奶嘴和奶瓶的捐赠无法控制，促进配方奶粉喂养；最后，对母乳的产生和质量可能受水灾影响的误解。自然灾害中妇女及其婴儿易受影响，提高了促进妇女母乳喂养权利的益处。妇女有权得到支持，使她们能够母乳喂养。这些可以通过监测配方奶喂养的分布情况，为母乳喂养的母亲和婴儿提供水、电和医疗服务来实现。一个涉及各个部门，包括地方政府(包括健康和营养部门)、私营或非政府组织、个体志愿者组成的多方面的救援任务团队，有可能使受洪水和其它潜在自然灾害影响的妇女和婴儿达到一个满意的状态。

**关键词：**关注、灾害、洪水、婴儿喂养、吉兰丹