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Ethical Issues in Infant Feeding after Disasters

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In 2007 the Asia Pacific Journal of Public Health published a special issue on disasters with an introduction entitled “Listening to the silence: Doing better at responding to disasters”. This special issue was in response to the 2004 Asian Tsunami and other tragedies. But the title is not always correct. In many disasters the silence is punctuated by the crying of infants, hungry infants. Crying infants are usually hungry infants who need to be fed. Infant feeding is one of the rare public health issues about which there is almost universal agreement on the appropriate recommendation. WHO, UNICEF and almost all national health authorities recommends exclusive breastfeeding until six months of age. These principles are a key part of the Baby Friendly Hospital initiative. There is a high level of risk attached to the use of infant formula and other breastmilk substitutes, particularly in countries where there are not universal supplies of clean water and refrigerators of storage.

Some of the disadvantages of not breastfeeding include:

- Higher death rates – risk ratio of 7 for infectious causes (WHO Collaborative Study Team on the Role of Breastfeeding on the Prevention of Infant Mortality 2000)
- Higher rates of infections, including diarrhoeal disease and otitis media (Horta, Bahl et al. 2007; Ip, Chung et al. 2007)
- Higher rates of sudden infant death syndrome
- Increased risk of obesity and a number of chronic diseases and risk factors
- Lower IQ

The aim of this paper is to discuss the appropriate and ethical way feeding of infants after disasters. Three case studies will first be presented followed by a discussion of the difficult
ethical implications confronting those attempting to provide food and nutrition for infants in disaster situations.

**The Jogjakarta Earthquake**

Many Asian countries are prone to disaster because of their location, geology and large populations. Indonesia has a large number of active volcanoes and many parts are prone to earthquakes and tsunamis. Hipgrave has documented one disaster and its aftermath in Jogjakarta Indonesia (Hipgrave, Assefa et al. 2011). “On 27 May 2006, an earthquake measuring 6.2 on the Richter scale devastated the provinces of Yogyakarta and Central Java, killing about 6000 people and injuring another 40 000–60 000.” In addition hundreds of thousands lost their homes and employment. One month after the earthquake UNICEF undertook at survey to monitor the distribution of emergency supplies and the nutritional impact on the affected children.

“Contrary to the relevant operational guidelines(4) that provide detailed instructions on the procurement, handling and use of donated breast milk substitutes (BMS) such as infant formula, powdered milk and complementary foods, such commodities were widely distributed to families with infants and young children. Many of these products were supplied in bulk, with no instructions to relief workers on targeting, their safe use or screening of recipient families’ needs. The channels of distribution included their inclusion in the general ration given to affected households, and handouts at temporary and fixed health facilities and temporary shelters. The donated breast milk substitutes were described by donors, distributors and the media as providing essential nutrition for infants. The mothers in the earthquake area were considered less likely to breastfeed “because of stress, injury, pre-occupation with damage to property and loss of privacy”. In the survey undertaken by UNICEF it was found that 75% of households with an infant aged 0–5 months and 80% of all households surveyed received donated infant formula; 76% of all households received commercial porridge and 49% received powdered milk. Only 32% of the 0–5-month-old infants living in the area had consumed formula before the earthquake, but 43% had in the 24 hours preceding the survey (P<0.001). Consumption of all types of donated breast milk substitutes was significantly higher among those who received donated commodities, regardless of age (P,0<01). The one-week diarrhoea incidence among those who received donated infant formula (25.4%) was higher than among those who did not (11.5%); (relative risk = 2.12, 95% CI 1.34, 3.35). The rate of diarrhoea among those aged 12–23 months was around five times the pre-earthquake rate.”

There were strong associations between receipt of BMS and changes in feeding practices, and between receipt of infant formula and diarrhoea. The authors concluded that the uncontrolled distribution of infant formula exacerbates the risk of diarrhoea among infants and young children in emergencies.

**2008 Wenchuan Earthquake (Sichuan Province)**
The People’s Republic of China has a land of approximately 9.6 million sq km with a population of 1.33 billion (Ministry of Health 2009). In 2005, the average life expectancy was 73.0 years which is an improvement of eight years in the past two decades (Ministry of Health 2009). The mortality of children under five years was 18.5 per thousand, but was lower in urban areas (7.9 per thousand) than in rural areas (22.7 per thousand) (Ministry of Health 2009). Sichuan Province is a predominantly agricultural province in the west of China, known as the ‘Province of Abundance’. Sichuan is famous for its natural beauty and historical places and an abundance of plants and animals. The iconic panda lives in the mountains of Sichuan Province. At the end of 2007, the population of Sichuan Province was 87 million and its per capita income was $US 1550 per year (Statistics 2008). The majority of residents (about 95 percent) are from the Han ethnic group, with a population of 4.22 million from another 55 ethnic groups. Chengdu (population 11 million), located in the central of Sichuan Province, is the capital city of Sichuan and has a recorded history of over 2500 years (Statistics 2008).

In May 2008, an 8.0 Richter magnitude scale earthquake hit Sichuan Province, killing at least 69,000 and leaving over 18,000 missing. More than 5 million buildings and houses collapsed, resulting in millions of people becoming homeless. The area of destruction in the Wenchuan region extended along a 300 km long surface rupture that occurred in the Longmen Mountains along its margin with the Sichuan Basin (Svirchev, Li et al. 2011).

The large human toll of this disaster was caused by the location of towns built on or in proximity to fault lines, the low earthquake-resistance of residences, schools and hospitals, and other buildings, and the concentration of population distributed along rivers lying below steep-sloped mountains. Mortality and injury were increased by post-earthquake landslides. The response of the Chinese government was immediate and most impressive with 20000 troops and rescue workers deployed within 48 hours. But even more remarkable was the number of volunteers who came from all over China to assist, numbering up to 10 million (Svirchev, Li et al. 2011). As a component of the rescue efforts large quantities of infant formula were donated by infant formula companies for distribution through hospitals and clinics.

Two years after the earthquake, infant nutrition studies were undertaken in Chengdu and Jiangyou. The city of Jiangyou itself is relatively small (approx 250000 people) and is surrounded by mountainous areas which suffered extensive earthquake damage. In Jiangyou, nearly 400 people died, 10000 were injured and over 100 people are still missing following the earthquake. Many buildings collapsed in Jiangyou or became too dangerous to inhabit making 350000 people in the city and surrounding area homeless. While the construction of new housing and civic buildings in the earthquake area has proceeded at a remarkable rate, thousands of people in Jiangyou are still living in prefabricated and other temporary housing. One year after the earthquake UNICEF estimated that assistance was reaching nearly 4,000 villages and towns, covering a total population of 5 million, including 300,000 infants and young children under the age of five.
In Jiangyou a cohort of 695 mothers and in Chengdu were interviewed soon after birth. The results are shown in Table One. Of the sample of 1516 mothers, 91% were given something other than breastmilk as their first feed. There was no published data available of prelacteal feed rates in Chengdu or Jianjou prior to the earthquake. It is not possible to say if the extraordinary high rate of prelacteal feeds is of recent origin. However staff at the local hospitals note that large quantities of infant formula were provided to the hospitals after the earthquake and that supplies have continued to be supplied. In a city of relatively similar size to Chengdu, Hangzhou in Zhejiang Province the rate of prelacteal feeds was 26% (Qiu, Xie et al. 2007). However because of the lack of pre-disaster data no conclusion can be reached whether the suggestive evidence of a change in prelacteal feeding patterns is correct.

The 2009 NE Japan Earthquake and Tsunami

On 11 March 2011, a huge earthquake (9.0 on the Richter Scale) occurred off the north east of Japan. A tsunami warning was issued and was soon followed by a massive tsunami engulfed the coast of eastern Japan including parts of Iwate, Miyagi and Fukushima Prefectures. The flooding engulfed homes, schools and public buildings and devastated infrastructure. Most notably the Fukushima Nuclear Power Plants were severely damaged by the tsunami and were further damaged on March 12th by a hydrogen gas explosion. Radioactive discharge from the damaged nuclear plants contaminated the surrounding land and sea. After-shocks caused additional damage to cities and industrial complexes hindering recovery from the initial earthquake. The earthquake and tsunami caused 15741 deaths with another 4467 missing and destroyed 271957 houses (National Police Agency 2011). Approximately 450,000 people were evacuated to safer areas. The Japanese Government immediately activated its emergency response system and established Disaster Management Headquarters (DMH) and Nuclear Power Disaster Management Headquarters. The (DMH) gathered information, coordinated relief and re-established public services in conjunction with the prefectures, NGOs and international agencies.

The Miyagi, Iwate and Fukushima prefectures requested support for infant nutrition, and three Japanese major formula milk production companies responding to the request and donated more than 50000 cans of infant formula milk through the Japanese Daily Industry Association (Japan Dairy Industry Association 2011). Infant formula was categorized differently from other general foods among the emergency supplies. During acute phase, it was difficult to send emergency supplies due to severe damage to the transportation system. The donated infant formula was sent by alternate methods using the ships of the Fisheries Agency and Self Defense Force Helicopters. Health sections of municipalities were advised by the Health, Labour and Welfare Ministry that in distributing infant formula they should follow the guidelines that support infants and mothers. In the recovery phase, the survivors and evacuees have returned gradually to their home areas where municipalities and supporters are providing them with living facilities.

In late March radioactive iodine levels higher than the safety standards was detected in the water supplies in the Fukushima prefecture (Ministry of Health 2011). The affected municipal
government recommended that infants not drink tap water and commenced distributing bottled water to households with infants. Mothers in the stricken area were concerned about continuing breastfeeding because of maternal exposure to radiation. The Ministry of Health, Labour and Welfare measured concentrations of radioactive iodine and cesium in breastmilk samples from 23 mothers from the Tohoku and Kanto regions in April (Ministry of Health 2011). The concentrations of radio isotopes were under detectable levels or were present in amounts too small to influence the health of recipient infants. NGOs and academic associations with an interest in infant nutrition, including the Japanese Associations of Obstetrics and Pediatrics, the UNICEF Tokyo office and the Japan Association of Lactation Consultant and the Japanese Council for Breastfeeding have promoted breastfeeding in the stricken area through websites, declarations and the actions of their members. However the effect of distributing large amounts of infant formula in the relief areas on immediate and future breastfeeding rates is unknown. There is now a need for follow up monitoring of the nutritional impact on the affected mother and children to ensure that these public health measures to protect breastfeeding were successful.

Discussion

While these three earthquakes extracted huge human tolls, the magnitudes of the Wenchuan and NE Japan earthquakes were similar and yet the death and injury rates in China were considerably larger. This reflects not only geographical location and population densities, but also the level of disaster preparedness. The strict construction codes in Japan meant that relatively fewer were killed by the earthquake in Japan.

Breastfeeding is the normal way to feed all infants. Ideally, the aim is for exclusive breastfeeding until around six months of age and continued breastfeeding for 12 months and beyond. There is convincing evidence that being breastfed in infancy is associated with optimal lifetime health (Owen, Martin et al. 2005; Horta, Bahl et al. 2007; Ip, Chung et al. 2007; Monasta, Batty et al. 2010). The principles of the Baby friendly Hospital The joint WHO–UNICEF Baby-friendly Hospital Initiative (BFHI), launched in 1991, seeks to eliminate hospital practices that may interfere with successful initiation and maintenance of breastfeeding (Perez-Escamilla 2007). One of the Ten Steps of the BFHI states “give newborn infants no food or drink other than breastmilk, unless medically indicated”. This principle is reiterated in the WHO guidelines on the use of infant formula (WHO 2009). WHO and UNICEF both emphasise the importance of initiating breastfeeding as soon as possible after birth with no other feeds. There are a number of guidelines available for the feeding of infants after natural disasters (2011; 2011; UNICEF 2011). All of the guidelines emphasise the importance of preserving and promoting breastfeeding and the precautions that need to be followed in the distribution of infant formula after disasters.
Both the Jogjakarta earthquake and the Sichuan earthquakes were the subject of UNICEF reports (UNICEF 2010; Hipgrave, Assefa et al. 2011). However while the Jogjakarta report emphasized infants and the adverse effects of infant formula distribution, the China report makes no mention of infant formula distribution and its effects. A search of the literature found that there had been 194 papers published in the health/medical literature relating to the Sichuan earthquake to August 2011. Not one paper documents the infant feeding arrangements after the earthquake.

After a disaster there is a need for immediate action. The time for planning and discussion of ethical issues is now – before the next major disaster occurs. The Asia Pacific region has 45 per cent of the reported natural disasters and while it generates 25 per cent of the world’s GDP, it has suffered 42 per cent of the economic losses due to disasters. The region has 61 per cent of the world’s population, but has 86 per cent of the total population affected by disasters.

There is no longer any doubt about the inevitability of climate change. Climate change over the next 30 years is going to have a serious impact on food production, by decreasing food production in some regions and increasing it in other areas. Particularly after 2050, food production will move further north and south and many populations closer to the equator will be vulnerable to food shortages, public health impacts and population displacements. The poorer populations in the developing world will suffer most from climate change, food shortages, and population displacement. This is likely to increase malnutrition in some areas and increase the potential for conflicts over resources. The public health impact of disasters will continue to increase due to the increased frequency of disasters due to climate change and the increased concentrations of populations including in areas prone to damage from natural disasters. There will be increasing numbers of cities in earthquake zones or in areas close to tsunami prone coasts.

In most natural disasters, mothers and infants will both suffer, but in some disasters, such as earthquakes and building collapses, infants may be able to survive in small spaces. Infants separated from their mothers require a wet nurse (rarely available) or feeding with infant formula and sterile water. Formula companies are often prepared to donate or discount supplies of infant formula. The distribution of these supplies should be done in an ethical way. Mothers who are injured or short of food, can usually still continue breastfeeding and formula should not be given. The mothers should be supported instead. Where formula must be used, health workers and suppliers need to follow the highest ethical standards to avoid promoting infant formula to vulnerable communities in the post recovery phase. The best option would be if required infant formula supplies were distributed by UNICEF or international aid agencies in plain label cans. But in reality the major international companies have better logistics management. For example after Hurricane Katrina, Walmart began to restock its supermarkets in New Orleans before the official US government agencies were able to begin their relief efforts. Usually companies want recognition and publicity for their aid work creating an ethical dilemma during an emergency when there is no time for debate.
This is a need for the promotion of a strong ethical basis for infant nutrition in the immediate and longer term management of disaster recovery. One of the ethical principles for the care of children proposed by the World Medical Association states “nutrition for proper growth, development and long-term health” (World Medical Association 2009). Article 24 of the UN Rights of the Child convention includes the following statement:

“States Parties shall pursue full implementation of this right and, in particular, shall take appropriate measures:
(a) To diminish infant and child mortality;
(b) To ensure the provision of necessary medical assistance and health care to all children with emphasis on the development of primary health care;
(c) To combat disease and malnutrition, including within the framework of primary health care, through, inter alia, the application of readily available technology and through the provision of adequate nutritious foods and clean drinking-water, taking into consideration the dangers and risks of environmental pollution; (UNICEF 1990)

These statements emphasise the importance of promoting health and nutrition for all children and this means preserving breastfeeding if at all possible.

Countries should prepare for disaster relief including arrangements for infant formula supplies. Infant formula should be distributed in ways that do not increase the promotion of artificial feeding at the expense of breastfeeding, such as in plain packaging and only by health professionals. More emphasis should be placed on the support of breastfeeding mothers. After the acute phase of disaster management excess supplies of infant formula should be withdrawn.

Courses on disasters and disaster management have become more common in US universities and are increasing in the Asia Pacific region (2011). In the USA this surge of interest in emergency management and disaster response followed the 9/11 disaster and Hurricane Katrina and internationally the Indonesian/Indian Ocean tsunami. In the Asia Pacific region the massive damage caused by the Sichuan earthquake and the Japanese tsunami causing the nuclear disaster and other disasters means that disaster planning and management should be a part of every public health program in our region. Part of the course should be how to manage the difficult ethical issues in infant feeding.

Guidelines should include:

For infants under six months who are breastfed – make sure that the mother has adequate nutritional support

Infant formula should be distributed in “plain packaging” without any company advertising

Where infant formula is distributed it should be accompanied by supplies of clean (sterile) water

Infant formula should not be part of general distribution of foods, but should be targeted to infants who need it
The Baby Friendly Hospital Initiative principles should be preserved and leftover infant formula supplies should not be distributed as samples to mothers in any health facility.

**Conclusion**

Breastfeeding, exclusive to six months and continuing thereafter, is important for growth and development and for the health of the infant in the short term and later in life. Every effort should be made to continue the public health benefits of breastfeeding in the community. In particular study of the Jogjakarta disaster has documented the danger of inappropriate distribution of infant formula in a post disaster situation. Relief efforts for earthquakes in Japan and China that involved the distribution of large quantities of infant formula require further studies to document short and longer term effects on breastfeeding. There is a need for widespread recognition of the importance of ethical principle in the distribution of infant formula in disaster situations.

**References:**


**Table One. Infants’ first feed in Sichuan Province 2010**

<table>
<thead>
<tr>
<th></th>
<th>Breastmilk</th>
<th>Plain water</th>
<th>Formula</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jiangjou</td>
<td>47 (7%)</td>
<td>158 (23%)</td>
<td>472 (68%)</td>
<td>18 (3%)</td>
<td>695</td>
</tr>
<tr>
<td>Chengdu</td>
<td>111 (21%)</td>
<td>8 (2%)</td>
<td>395 (76%)</td>
<td>7 (1%)</td>
<td>520</td>
</tr>
</tbody>
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