

Chapter 38

Disasters and Public Health

Field of expertise: Disaster and Public Health

Shinichi Kuriyama

Translated by Catherine Sachi Kikuchi

Summary

The Great East Japan Earthquake highlighted the following major issues for disaster public health: 1) the psychology of not escaping immediately, 2) countermeasures immediately after the disaster, and 3) clarification of and countermeasures for medium- and long-term health issues. It is necessary to intervene in the entire population, develop measures that will increase the possibility of saving lives even if people are swallowed by the tsunami, as well as to take measures against many mental and physical challenges in the medium and long term.

Keywords: public health, population strategy, float pack, health survey, medium- to long-term health effects

Introduction

The study of public health in disaster management aims to mitigate disasters at the pre-disaster, immediate post-disaster, and mid- to long-term post-disaster stages using the methods of public health as preventive medicine.

1: Problems Revealed by the Great East Japan Earthquake

What happened?

At 2:46 p.m. on Friday, March 11, 2011, the Great East Japan Earthquake occurred with its epicenter off the coast of Miyagi Prefecture. This earthquake generated a huge tsunami that was over 10 meters high in some places, causing devastating damage to the Pacific coast of the Tohoku and Kanto regions. This massive disaster was named the Great East Japan Earthquake.

The reality of the damage

The Great East Japan Earthquake left 15,899 people dead and 2,529 people missing (National Police Agency, March 7, 2020). Most of the victims of the Great East Japan Earthquake died from drowning, but there were also many other causes, such as respiratory distress from

swallowing toxic substances, injuries from debris, hypothermia, and death by fire. After the Great East Japan Earthquake, earthquake-related deaths caused by the worsening of injuries have emerged. In addition, most of the physical and mental health issues that surfaced as a result of the Great East Japan Earthquake remain unknown.

2: Paradigms Destroyed by the Earthquake

Conventional wisdom and necessary responses

Many people died, and there are concerns about medium- to long-term health issues. There are at least three possible causes for this.

(1) The psychology of not escaping immediately:

Why did so many people drown? One of the main reasons is that people did not evacuate immediately. Believing the tsunami would not reach them, or having a false sense of security may have prevented people from evacuating early.

(2) Countermeasures immediately after the disaster:

It is necessary to take measures to reduce the risk of death even in the event of being swallowed by a tsunami.

(3) Clarification of and countermeasures for medium- and long-term health issues:

In addition to earthquake-related deaths, it is necessary to understand the actual situation of what health problems will emerge after a major disaster, and to plan and implement countermeasures accordingly.

3: A New Approach

1) The psychology of not escaping immediately

In public health and preventive medicine, the goal is to prevent infectious and lifestyle-related diseases such as cancer and cardiovascular diseases. We have achieved smoking cessation and salt reduction for those who have no pain or itch. One of the most important findings of public health is that people do not change their behavior easily even if you tell them that smoking causes lung cancer. So what measures have been taken? One summary is shown in Figure 38-1. The term "population strategy" is used here in contrast to "high-risk strategy," which is a strategy of intervening in entire populations, regardless of their risk level, without limiting the target audience. The same applies to disasters. It is important for *everyone* to be aware of the importance of disaster prevention and mitigation on a regular basis, and to conduct drills, regardless of the level of risk.

(1) Public relations activities and environmental improvement

(e.g., public relations activities through the media, nonsmoking/completely separate nonsmoking areas in facilities, promenade/park maintenance, healthy menus at restaurants, etc.)

(2) Utilize municipal health projects to intervene widely

(e.g., encourage participants to participate in health education)

(3) Cooperation with compulsory education

(e.g., outreach to students and parents in elementary and middle schools)

(4) Tax and economic guidance, incentives, and corporate initiatives

(e.g., increases in tobacco taxes, differentiated health insurance premiums, and sales of nonsmoker insurance and smoking-cessation products)

(5) Formation of socially accepted ideas through laws and regulations

(e.g., wearing seat belts, no smoking or drinking by minors, vending machine removal ordinances, etc.)

(Living Environment Article [Chiyoda Ward], Health Promotion Law, Shokuiku Basic Act)

Figure 38-1. Public health has transformed the behavior of people not experiencing pain. Raising health and disaster prevention awareness: An example of a population strategy

(2) Countermeasures immediately after the disaster

When a disaster occurs, we must evacuate as necessary. When evacuating, people often have an emergency bag or emergency evacuation kit. Equipping these bags with a life jacket function can increase the possibility of saving lives in the event of a tsunami. We have devised a life jacket within an emergency bag, as shown in Figure 38-2, and named it the Float Pack.

In the event of a Tokai, Tonankai, or Nankai earthquake, a tsunami of 34 meters is expected to hit some areas within two minutes of the earthquake. In addition, heavy rains in recent years may cause sudden flooding, and it is necessary to take concrete measures, including the use of float packs.



Figure 38-2. The Float Pack

(3) Clarification of and countermeasures for medium- and long-term health issues

What kind of health problems will emerge after a major disaster? We have conducted several large-scale health surveys to identify health issues, and plan and implement necessary measures. We have published 24 original papers in English related to the Great East Japan Earthquake so far.

(1) Research on child health in areas affected by the Great East Japan Earthquake (Ministry of Health, Labor, and Welfare Research Grant)

In order to clarify the effects of the Great East Japan Earthquake on children's development, we collected physical measurement data that had been conducted and stored at nursery schools nationwide. Questionnaires were returned from 3,624 day-care centers nationwide, totaling 69,004 questionnaires.

The results of the survey showed that a large proportion of children who experienced the earthquake at the age of 4 to 5 years were overweight about 6 months after the disaster, and that the disaster tended to be significantly associated with atopic dermatitis, especially in boys, and with asthma, especially in girls (Ishikuro et al., 2017).

(2) Child Long-Term Regional Health Survey

The Community Long-Term Health Survey for Children was conducted from 2012 to 2015 for parents of elementary and junior high school students in 28 cities, towns, and villages in Miyagi Prefecture, and a total of 17,043 people participated over the four-year period. As a result, we found that the percentage of children with symptoms of atopic dermatitis and the percentage of children who struggle with their mental health tended to be larger among children who experienced the tsunami and changes in their living environment compared to children who did not experience the tsunami (Kuniyoshi et al., 2019). The results of the survey have been sent to municipalities and local boards of education.

(3) Three-generation cohort survey

The three-generation cohort survey began on July 19, 2013, at a medical institution in the southern part of the prefecture (Figure 38-3). It is the first in the world to use a three-generation birth design, and more than 70,000 people have participated (Kuriyama et al., 2020).

From the three-generation cohort, pregnant women who experienced damage to the home they were living in at the time of the earthquake tended to have a higher percentage of smoking by their husbands/partners than those who didn't experience damage to the home. The rate of smoking by the pregnant women themselves was also higher. The results were similar when adjusted for age and region. In response to these findings, Ishinomaki City established a new smoking cessation outpatient clinic at Ishinomaki City Hospital in January 2019 (Figure 38-4).

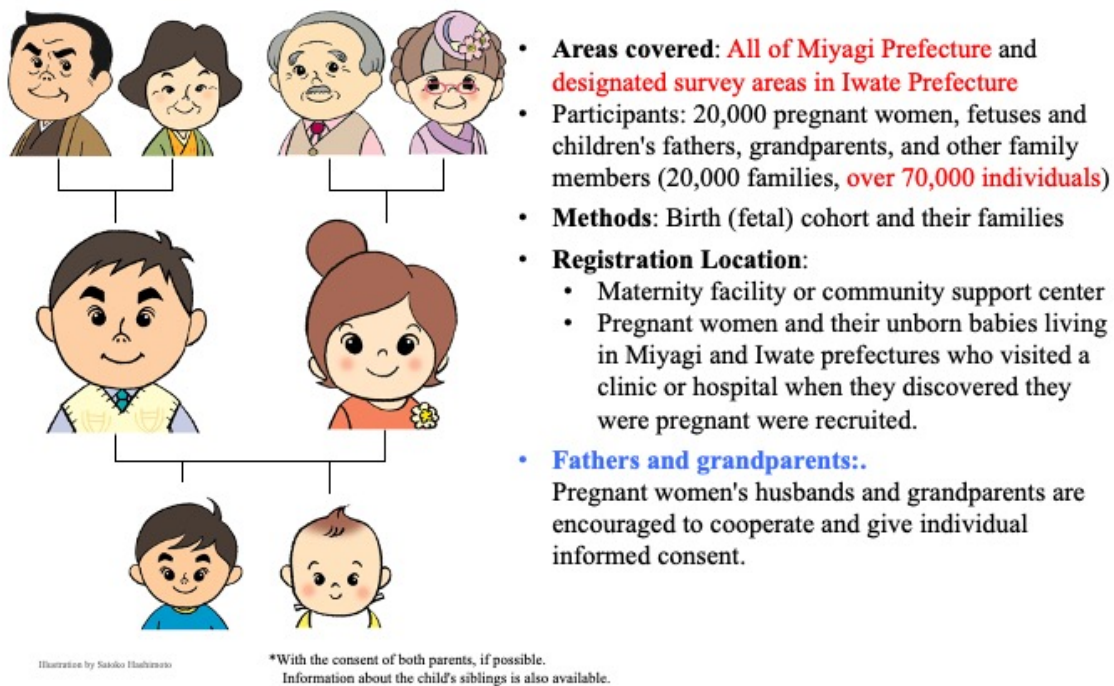


Figure 38-3. Three-generation cohort survey

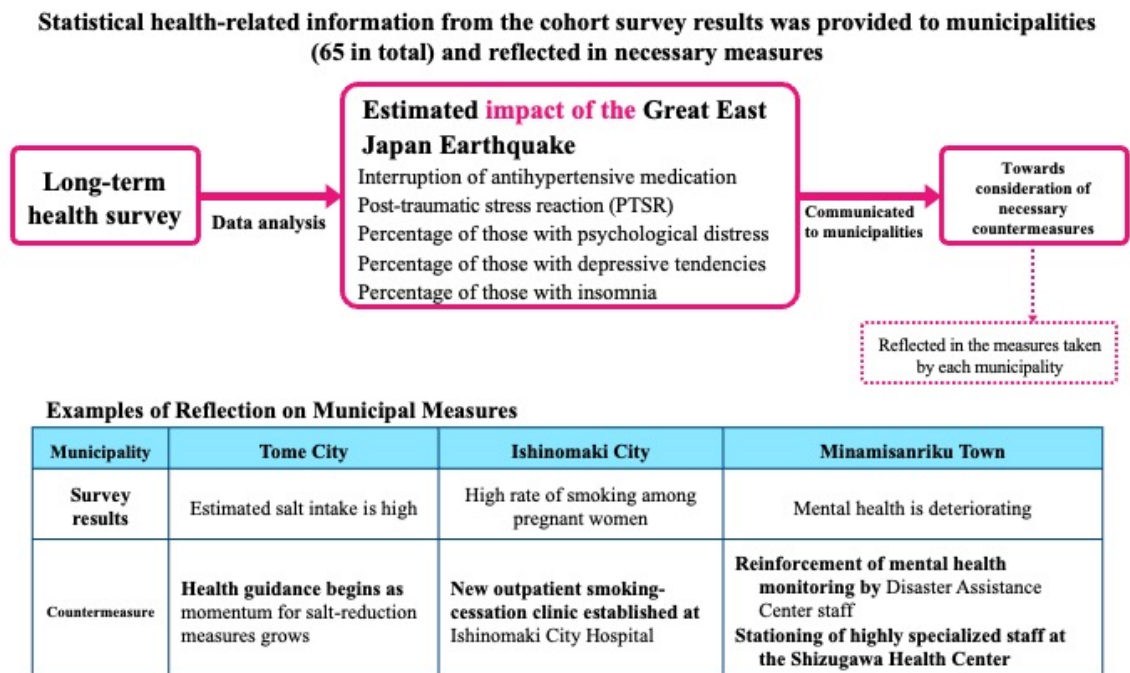


Figure 38-4: Long-term health survey and subsequent measures

Conclusion - from the author

“Preserve the lessons, leave no root problem.”

The health effects of the Great East Japan Earthquake may leave a large negative health legacy for the next generation of people living in the affected areas, namely the children. The lessons from the disaster must be preserved, but we do not want to keep the root problem, such as an increase in illnesses.

References

Ishikuro, M., Matsubara, H., Kikuya, M., et al. (2017). Disease prevalence among nursery school children after the Great East Japan earthquake. *BMJ Glob Health*, 27;2(2):e000127. <https://doi.org/10.1136/bmjgh-2016-000127>. eCollection 2017. PMID: 28589008

Kuniyoshi, Y., Kikuya, M., Miyashita, M., et al. (2019). Prefabricated Temporary Housing and Eczema or Respiratory Symptoms in Schoolchildren after the Great East Japan Earthquake: The ToMMo Child Health Study. *Disaster Med Public Health Prep*, 13(5-6):905-911. <https://doi.org/10.1017/dmp.2019.8>. PMID: 31156072

Kuriyama, S., Metoki, H., Kikuya, M., et al. (2020). Cohort Profile: Tohoku Medical Megabank Project Birth and Three-Generation Cohort Study (TMM BirThree Cohort Study): rationale, progress and perspective. *International journal of epidemiology*, 49(1), 18–19m. <https://doi.org/10.1093/ije/dyz169>. PMID: 31504573