

# Epidemiological Characteristics of Disaster-related Suicides in the 3–4 Years since the Great East Japan Earthquake

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The Great East Japan Earthquake struck Japan with a magnitude of 9.0 at 2:46 PM on March 11, 2011. Five years have passed since the earthquake and subsequent tsunami struck, but the mental and physical care of the victims, the livelihoods of those affected, and the economic impact of the disaster continue to cause social concern (Orui, Harada, & Hayashi, 2014; Tokuzu, Ouchi, Kikuchi & Konno, et al., 2015; Yabuki, Ouchi, Kikuchi & Konno, 2015; Hara, 2015). Over the past few years, research has examined the effects of the disaster on the cognitive function of the elderly (Ishiki et al., 2016), and one study suggested that oxidative stress may be associated with disaster-related hypertension (DRH) in individuals exhibiting effects of the Great East Japan Earthquake (Shiraishi et al., 2016). In the past, we reported several characteristics of disaster-related suicides in the two years after the Great East Japan Earthquake (Inoue et al., 2015): “in the year of the disaster, the majority of disaster-related suicides were by men, but 2 years later the proportion of disaster-related suicides by women increased”, and “in the year of the disaster, motives for disaster-related suicides were primarily ‘health problems’ and ‘economic and life problems’, but after the disaster ‘health problems’ were more often cited as the motive for disaster-related suicide”. A research of Liaw et al showed that the number of suicide increased after the large earthquake in Nantou County (Liaw et al., 2008). However, a study of Shoaf et al described that the suicide rates did not increase after the Northridge earthquake (Shoaf et al., 2004). There was a report that suicide rates among females increased immediately after the large earthquake in Nantou County in 1999; the report showed that the rates among males increased slightly in the year, and those rates increased further in 2000 and 2001 (Yip., 2009). Since another earthquake will probably strike Japan in the future, ascertaining the characteristics of subsequent disaster-related suicides and identifying trends in those suicides may help in the development of medium to long-term measures to prevent other disaster-related suicides. With this in mind, the current study examined trends in disaster-related suicides in the three to four years since the Great East Japan Earthquake, and we discussed as descriptive epidemiology.

This study (1) examined the number of suicides by men and women in Japan in 2014 and 2015 based on a report by the National

Police Agency (National Police Agency., 2016) and also calculated the ratio of female/male suicides.

This study also (2) examined the number of suicides by men and women related to the Great East Japan Earthquake in 2014 and 2015 based on a report by the Cabinet Office (Cabinet Office., 2016) and calculated the ratio of female/male suicides in relation to that disaster.

Finally, this study (3) examined the motives for suicide related to the Great East Japan Earthquake in 2014 and 2015 based on a report by the Cabinet Office (Cabinet Office., 2016) and calculated the proportion of suicides due to a specific motive. The motives for suicide were classified as “family problems”, “health problems”, “economic and life problems”, “work problems”, “problems of relations between the sexes”, “problems in school”, “other,” and “unknown”. Suicide could be due to multiple motives, so multiple motives could be cited.

The findings suggested trends in disaster-related suicides in the three to four years since the Great East Japan Earthquake, and these trends were examined in order to devise measures to prevent those suicides. This study used only numerical data without individual information.

## Suicide Trends in Japan

There were 17,386 suicides by men in Japan in 2014 and 8,041 suicides by women. There were 16,681 suicides by men in Japan in 2015 and 7,344 suicides by women. The ratio of female/male suicides in Japan was 0.46 in 2014 and 0.44 in 2015.

## Suicides Related to the Great East Japan Earthquake

There were 11 suicides by men and 11 by women related to the Great East Japan Earthquake in 2014. There were 13 suicides by men and 10 by women related to the Great East Japan Earthquake in 2015. The ratio of female/male suicides related to the Great East Japan Earthquake was 1 in 2014 and 0.77 in 2015.

## Motives for Suicide Related to the Great East Japan Earthquake

The detailed motives for suicides related to the Great East Japan Earthquake in 2014 and 2015 are shown in Table 1. In 2014, the most

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**Table 1.**  
Motives for suicide related to the Great East Japan Earthquake in 2014 and 2015

Year	2014	2015
Family problems	17.2%	18.8%
Health problems	37.9%	40.6%
Economic and life problems	10.3%	6.3%
Work problems	6.9%	0.0%
Problems of relations between the sexes	3.4%	3.1%
Problems in school	0.0%	0.0%
Other	3.4%	6.3%
Unknown	20.7%	25.0%

frequently cited motive for suicide was “health problems” (37.9%), followed by “unknown” (20.7%) and “family problems” (17.2%). In 2015, the most frequently cited motive for suicide was “health problems” (40.6%), followed by “unknown” (25.0%) and “family problems” (18.8%) (Table 1).

The ratio of female/male suicides in Japan was 0.46 in 2011. The female/male ratio of suicides related to the Great East Japan Earthquake was 0.31 in 2011 (the male/female ratio was 3.23), and the female/male ratio of such suicides was 0.65 in 2013 (the male/female ratio was 1.53). The biggest causes of suicide were “health problems”, “economic and life problems”, and “unknown” (20.8%) in 2011 (Inoue et al., 2015). Although the female/male ratio of suicides in Japan remained roughly constant in 2011, 2014, and 2015, the proportion of suicides by women in related to the Great East Japan Earthquake increased in 2014 and 2015 in comparison to 2011. The same trend was noted in 2014 and 2015 in comparison to 2013. In other words, the proportion of suicides by women in the three to four years after the Great East Japan Earthquake has increased from the proportion observed two years after the disaster. The proportion of suicides due to “health problems” in relation to the Great East Japan Earthquake increased about two-fold in 2014 and 2015 in comparison to 2011, but the proportion of suicides due to “economic and life problems” decreased by about one-half to one-third.

A study by Kukihara et al. found that depression and post-traumatic stress disorder (PTSD) were prevalent among the survivors of massive earthquakes, tsunamis, and accidents at nuclear power plants (Kukihara et al., 2014). Another study examined patients with cardiovascular disease (CVD) after the Great East Japan Earthquake (Onose et al., 2015). That study found that being female, having experienced the tsunami, having suffered property loss, being poor, and the medication use of insomnia were related to PTSD, and the study also found that PTSD was prevalent after the earthquake in patients with CVD (Onose et al., 2015). There were some reports that PTSD prevention measure after disaster was important item (Jiang et al., 2014; Hu et al., 2016). Therefore, measures specifically addressing “women” and individuals with “health problems” (both physical and mental disorders) must be implemented over a prolonged period after a disaster. In terms of prevention and treatment, experts in clinical medicine and social medicine, administrative bodies, private organizations, and the public together need to understand the key aspects of a long-term follow-up after a disaster, and medical experts, administrators, and organizations need to implement that follow-up.

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