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Living environment, health status, and perceived lack of social support among people living in temporary housing in Rikuzentakata City, Iwate, Japan, after the Great East Japan Earthquake and tsunami: A cross-sectional study

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ABSTRACT

The Great East Japan Earthquake and tsunami hit a wide area of East Japan in 2011. We aimed to describe the living environment and health status of those living in temporary housing in Rikuzentakata, Iwate, as well as to identify the factors associated with perceived lack of social support. We therefore conducted a cross-sectional study using a self-administered, structured questionnaire distributed to all households living in temporary housing in Rikuzentakata in August 2013. More than one-third of the respondents said that their physical (34.2%) or mental (34.0%) health had deteriorated over the previous year. Younger people with more health complaints and living with more people had higher levels of distress. The major factors associated with a perceived lack of social support were having trouble with neighbours (AOR 3.68, p=0.002), difficulties providing care for a family member (AOR 3.28, p=0.036), higher levels of distress regarding living conditions (AOR 2.62, $p < 0.0001$), being younger(AOR 2.32, p=0.003), and being male (AOR 1.77, p=0.019). These findings suggest that life in temporary housing is quite stressful and could lead to deterioration in physical and mental health. The total level of QOL, however, was only slightly lower than the standard average. Focusing on the most vulnerable people placed in temporary housing after a major disaster is particularly important.

1. Introduction

On 11 March 2011, a huge earthquake and tsunami hit a large area of East Japan. This claimed approximately 18,000 lives [1], the majority through drowning. The Great East Japan Earthquake and Tsunami (GEJET) affected an area with a large population of older people and fewer young workers. After several months, the surviving victims were moved from shelters to temporary housing.

Rikuzentakata City, Iwate Prefecture, is in northern Japan, near the border with Miyagi Prefecture. The city had a population of approximately 24,000 in January 2011 [2]. The tsunami claimed approximately 7.5% of the city's population, and the total population in

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February 2016 was about 19,000 [2,3].

The tsunami hit Rikuzentakata at about 15:30 on 11 March, when many offices and shops were open and people were actively working across the city. The tsunami even hit the designated evacuation centres, such as the city hall and gymnasium, causing many deaths. The highest tsunami wave measured more than 19 m above sea level, and it destroyed the four-storey city hall. In total, around 1600 residents were killed and about 200 people are still missing [3–6].

Rikuzentakata provided approximately 2200 prefabricated temporary houses in 53 clusters throughout eight areas of the city [7]. Residents of this temporary housing came from various tsunami-affected areas. Drawing on lessons learned from the 1995 Great Hanshin Earthquake, the local authorities tried to allocate people from the same community to the same temporary housing zone or to a neighbouring area. For example, the temporary housing area known as 'Takata 1st Middle High School' housed a large group from the Takata area. Temporary housing in Yahagi had more from Kesen, a neighbouring town than from Takata, which was the most severely devastated area in Rikuzentakata [7].

Each victim's situation varies. People have had to accept strangers as new neighbours. Existing studies have reported that disasters have negatively affected victims' physical health [8–16], psychological or mental health [17–22], and even caused suicides [23–25].

To mitigate or relieve the suffering of victims of the GEJET, several interventions have been tried [26,27]. Previous studies indicated that social capital or social support might positively affect the health, behaviour, and living environment in post-disaster communities [28,29].

Social support is one of the most important functions of social relationships [30]. It is intended by the provider to be helpful, distinguishing it from intentionally negative interactions (such as criticism or undermining). Social support is commonly categorized into the following four types [30]. Emotional support is expressions of empathy, love, trust, and caring. Instrumental support is tangible aid or services, such as childcare. Informational support is the provision of advice, suggestions, and information. Appraisal support is information that is useful for self-evaluation [31]. Existing studies have shown that social support has a positive effect on disaster victims' mental health, particularly emotional support [32].

Some studies have measured quality of life (QOL) of disaster victims [33–40]. QOL is a broad multidimensional concept that usually includes subjective evaluations of both positive and negative aspects of life [33]. At the individual level, QOL includes perceptions of physical and mental health, health risks and conditions, functional status, social support, and socioeconomic status [34].

In previous study that measured the QOL of victims of major disasters, psychiatric disorders such as depression reduced overall QOL [35]. One study also found that deterioration of psychological and physical health, and lower levels of social support, negatively affected QOL [36]. The psychological elements of QOL changed over time and also varied by gender and age of those involved [37]. Other studies found that major disasters were associated with an increase in the prevalence of atrial fibrillation [38], diabetes [39], polycythemia [40], and deterioration of physical health status [16].

There is, however, little evidence about the effect of temporary housing, although the subjective accounts of disaster victims from other situations might be useful.

We therefore sought to (1) describe and measure living conditions, social support and health status, including QOL, of tsunami victims living in temporary housing, and (2) identify factors associated with their perceived social support and health status.

2. Materials and methods

2.1. Study design

We used a cross-sectional study with a self-administered, structured questionnaire, including open questions.

2.2. Participants

We targeted all households living in temporary housing in Rikuzentakata, Iwate Prefecture. We recruited either the head of household or that person's spouse.

2.3. Study area

The temporary housing in Rikuzentakata was in clusters throughout all eight areas or towns: Takata, Yonezaki, Takekoma, Otomo, Yokota, Kesen (Osabe and Imaizumi), Yahagi, and Hirota. The number of households in each cluster varied from fewer than 10 to more than 200. All the temporary housing was prefabricated, and the majority was terrace-style housing.

2.4. Ethical approval

We obtained ethical approval from the ethical committee of Hosei Graduate School of.

Human Society Studies, Tokyo, Japan (July 2013, No. 0004).

We obtained written consent from the president of each cluster of temporary housing. We also documented and explained the study protocol and all ethical considerations verbally to the head of each household and to all respondents.

2.5. Measurements

2.5.1. Assessment of life in temporary housing

We developed a self-administered questionnaire to explore the sociodemographic characteristics, living conditions, social capital, and health status of the respondents. Their satisfaction level with the living conditions in their temporary housing was measured across six aspects: 'Security, peacefulness', 'Level of comfort', 'Older people-friendly', 'Child-friendly', 'Concerned about neighbours', and 'Communication with neighbours'. The questionnaire used a Likert-type scale with five response levels ranging from 'strongly agree' (5) to 'strongly disagree' (1). The total score for assessment of living conditions therefore ranged from 6 to 30, which we treated as a continuous variable. A high score was interpreted as a high level of distress about the temporary housing.

2.5.2. Perceived social support and confidence in neighbours

We used four questions to measure the participants' perceived emotional and social support as well as their confidence in their neighbours. The first two questions measured the participants' perceived social support. They were, 'I have neighbours who help me when I have problems or am in trouble' and 'I have neighbours whom I can talk to and consult on personal matters'. The next two questions measured the respondents' confidence in their neighbours. They were, 'I have neighbours with whom I can casually chat when I meet them' and 'I have neighbours to whom I say hello'. The answers were divided into three levels with one to three points. Respondents were asked to say whether they had 'enough neighbours' (1 point), 'someone' (2 points), or 'no-one' (3 points). Cronbach's alpha coefficient for these questions was 0.819, which is sufficiently high that we treated these variables as reliable continuous variables [41]. A high score indicates low levels of social support.

2.5.3. Quality of life (QOL) index

We also asked about respondents' QOL, across four domains. These