Mental Health Impact of the Fukushima Nuclear Disaster: Post-Traumatic Stress and Psycho-Socio-Economic Factors

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This working paper is an output of the FGC research workshop “Understanding and Communicating Risks Post Fukushima”, held in Tokyo on 12–13 November 2015. The workshop brought together international experts to explore the specific challenges of understanding and discussing risks related to nuclear accidents, and identify appropriate and effective forms of risk communication.

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ABSTRACT

The Great East Japan Earthquake, GEJE, and subsequent Fukushima nuclear disaster forced 150,000 citizens to evacuate from radioactive contaminated area after March, 2011. Although 80% of the evacuees did not have accurate information and most of them thought the evacuation would last only for several days, more than 60,000 residents are still in evacuation status.

The authors performed the multi-method studies from the early stages; anthropological field work study, semi-structured interview study, and large-scale questionnaire survey. All these studies were conducted as a "response" to the "call" from the evacuees, victims, parties concerned, supporters, and administrators.

Focusing the results of the five large-scale questionnaire survey jointed with private support group "Shinsai-Shien-Net work Saitama (SSN)" and "Nihon-Housou-Kyokai (NHK)", we determined a high-risk presence of probable Post-Traumatic Stress Disorder (PTSD) in evacuated residents. By the result of multiple logistic regression analysis, the significant predictors of probable PTSD were loss of employment, economic difficulty, concerns about compensation, and lost social ties.

The serious consequences of the nuclear disaster, especially many of the socio-economic factors, were linked to psychological distress and suffering. It is known that the prevalence of PTSD from a human-made or technological disaster is often higher than the rates of PTSD from a natural disaster. Further, it is suggested that the prolonged uncertainty regarding the salvation of the deceased after the event might partially account for the prolonged PTSD that is often found. Therefore, the high levels of probable PTSD in our results are possibility related to the disaster being a human-made disaster.

According to the results of our comprehensive study, the current major issues encountered by the evacuees are; the split up of families, the disintegration of communities, and disparities in compensation among evacuation zones. Therefore, it can be determined that “structural violence” (Johan Galtung, 1969) has had a major impact afflicting victims’ lives. The main structural violence affecting the victims of the Fukushima disaster stems from the government policy on “reparation” and “repatriation (returning plan)”. The evacuees’ psychological and social sufferings simultaneously involve health, welfare, legal, political, economic, and moral issues. It is apparent that, they were injured and inflicted by the social forces. The mental health problems reported by the evacuees are not individual or personal in origin, but rather, they should be understood as a context of social responsibility to the disaster. Therefore, it is most important to resolve the various social issues caused by structural violence in order to decrease the various psychological stresses impacting the health and mental health of the victims.
Introduction

As a result of the Great East Japan Earthquake (GEJE) on March 11th, 2011, the Fukushima nuclear disaster occurred. The magnitude 9.0 earthquake and major Tsunami hit the Pacific coast of northeastern Japan causing the meltdown of four reactors of Fukushima Daiichi Nuclear Power Plant from March 12th to 15th with the subsequent distribution of radioactive substances within the exposed area. This disaster has been compared to the Chernobyl Nuclear disaster in 1986 which also measured level 7 on the International Nuclear Event Scale.

The government of Japan declared a nuclear emergency on March 11th, forcing the evacuation of citizens within a 20km radio of the disaster zone on March 12th, and those living between 20 and 30km were urged to evacuate on March 25th. At the time of the evacuation, 80% of the evacuees did not have accurate information regarding the degree of severity of the nuclear accident [Kurokawa, 2012] [1]. Most of them thought the evacuation would last only for several days, and therefore they only took personal belongings and necessities with them. Later, most of the evacuees learned the details of the disaster from television news, which repeatedly showed the explosion of the first nuclear reactor. This news caused intense fear, horror or helplessness.

The termination declaration of this accident was issued by the Prime Minister of Japan on December 2011. Nonetheless, the radioactive substances were still continuously leaking into the air and the Pacific Ocean [New York Times, 2013.09.04][2]. Out of 150,000 evacuees from Fukushima prefecture, 90,000 are relocated to another region within Fukushima prefecture, and about 60,000 residents were relocated to other prefectures, such as, Yamagata, Tokyo, Niigata and Saitama. Fukushima prefecture, and about 60,000 residents were relocated to other prefectures, such as, Yamagata, Tokyo, Niigata and Saitama.

The Impact of Great East Japan Earthquake and Fukushima Nuclear Disaster [3,4,5]

- Died: 15,882 (Miyagi:9,536, Iwate:4,673, Fukushima:1,660)
- Missing: 2,668 (Miyagi:1,302, Iwate:1,151, Fukushima:211)
- Disaster Related Death (Jun 30, 2015): 3,331 (Fukushima:1,914, Miyagi:910, Iwate:452, Ibaraki:41)

Our Research on Evacuees and Victims

The authors performed the multi-method studies from the early stages; anthropological field work study, semi-structural interview study, and large-scale questionnaire survey. All these studies are conducted as a “response” to the “call” from the evacuees, victims, parties concerned, supporters, and administrators.


One week after the earthquake, the Saitama Super Arena, which was normally used as a multipurpose hall for concerts and shows, was converted into a large temporary shelter. More than 2,500 evacuated people lived for about two weeks in the Arena. “Shinsai-Shien-Network Saitama (SSN)”, one of the unofficial support groups, conducted a questionnaire survey in order to evaluate the needs of the evacuees. By the analysis of this survey, we determined the target of the support; child-caring generation mother and child and elderly generation.

Study 2 [May, 2011]: Qualitative analysis of the free-answer questionnaire by Futaba town [7]

Futaba Town in Fukushima Prefecture is located on the coast of the Pacific Ocean called “Hama Avenue”, with a population of about 7,000. Two of the six reactors of the failed Fukushima No.1 nuclear power plant are located in Futaba town, and almost all the regions are within 10km of the nuclear plant. On the next day of the earthquake, 2,200 inhabitants of the town were evacuated to Kawamata town, 40km away from the nuclear plant. But as the radiation levels were also ascending at Kawamata, 1,200 inhabitants were evacuated again to Saitama Prefecture which is 200km from the nuclear plant. The functions of the Futaba town were also moved to Saitama Prefecture. Two months after the disaster, the board of education of Futaba Town conducted an opinion survey, and our team was asked to analyze it. The analysis of free-answer questions shows a great number of issues such as “no place to resettle in”, “no information about schoolmates”, “family members separated”, “difficulty in finding employment”, “economic matters”, and “radioactive contamination”. After this survey, the Futaba local government implemented a great number of measures, such as, school children’s summer meetings, mail magazine information, and many Futaba’s elementary and junior high school teachers got additional posts in Saitama and Fukushima prefectures.


Seven months after the earthquake, most of the evacuated people left their temporary shelters and settled-in on a long term basis as refugees in their new local community.
However, (1) lack of information and lack of social support, and (2) lack of understanding by the local population were problems. Because these two problems were found by several support groups, it was necessary to make public-private cooperative systems to support the evacuated people. As the public groups have personal information and the private groups have the know-how of concrete support, a new support system must be created by the concepts of social inclusion. In Saitama Prefecture, several local governments, professional associations and private support groups gathered by calling from Saitama Bar Association established a liaison committee on earthquake disaster countermeasures.

Study4 [Nov, 2011 to Sep, 2014]: Semi-structural interview study of “Trauma Story” narratives [7]

This study was planned from an idea of a disaster victim who said to us “memories of the disaster must not fade away and it is important to remember in the future of Japan”. Fifteen informants have been interviewed already and we are planning to continue this study to follow up their life and community regeneration. The “trauma story” narratives of evacuees demonstrated the overwhelming trauma and dreadful absurdity of running for shelter. The condition of evacuation was absolutely disastrous which is similar to reports of experiences by refugees from wars or other large global disasters.

Study5 [April, 2011 still continuing]: Anthropological field work study as a member of private support group [8]

I have been working as one of the committee members of the private support group, Shinsai-Shien Network Saitama (SSN). I participate by observing several events and social support actions, and I also visit temporary shelters and temporary housings. Our group has been conducting the following five support actions. One, holding a regular consultation program with specialty collaborating psychologists and lawyers, whom victims can consult regarding any kind of trouble and difficulty in daily life. Second, organizing small social community parties and a community coffee room to encourage talking freely over sweets and coffee. Third, making a social solution list, which includes the contact address of local government, public welfare service, free consulting social support groups, medical clinics and hospital, and the address of regional community parties. Forth, publishing a community flyer called “Fukushima’s evacuated residents, is pushing them to hide their real origin within neighborhood. Second large scale survey was conducted by our research team jointed with Nihon-Housou-Kyokai (NHK) Japan Broadcasting Corporation two year after the disaster. 2,425 households living at temporary housings within Fukushima prefecture were asked to answer the Impact of Event Scale-Revised (IES-R) and the self-report questionnaires that we generated in order to evaluate the damage by the disaster in relation to several bio-psycho-social factors in refugee lives. There were 745 replies, the cooperation rate was 30.7%. High level PTS symptoms were found. The mean score of IES-R was 34.20±20.56, and 62.56% were over the cut-off point determined as broadly defined PTSD which means high-risk presence of probable PTSD.

The first large-scale questionnaire survey was held one year after the disaster by our research team in Waseda University and Shinsai-Shien-Network Saitama (SSN). The questionnaires were distributed to 2011 households evacuated to Saitama Prefecture by the cooperation in disaster response headquarters in Fukushima Prefecture. The response rates were 24.4%. Extremely high-level Post Traumatic Stress Symptoms were evaluated. By the Impact of Event Scale-Revised (IES-R) which is the most internationally used measure in the disaster field, and the psychometric validation studies were shown in different cultural contexts. The mean score is 36.3±21.5, and about 67% evacuees are over 24/25 cut-off point determined as broadly defined PTSD

Our study makes it statistically clear the considerable influence of the social factors, on chronic physical and mental diseases rise by the nuclear disaster as well as on the stress and the PTSD found. The first one was “worries about livelihood sustainability” (OR:2.27), the second was “concerns about yet unsolved issues of compensation and reparation” (OR:3.74), and the third was “loss of their jobs” (OR:1.71). The main cause of unemployment was due to displacement and transmigration. Moreover, the subsequent delays of the monetary compensation for the nuclear accident made the economic future uncertain, keeping the stress and social factors related unsolved. The fourth factor is a “shrinking of human networks and social ties” (OR:2.27) due to being evacuated and its stigma. The evacuation events destroyed the sustaining bonds between individual and community. Several narratives recorded on free description questions included in our surveys revealed what amount harassment, discrimination and stigma suffered by Fukushima’s evacuated residents, is pushing them to hide their real origin within neighborhood.

Second large scale survey was conducted by our research team jointed with Nihon-Housou-Kyokai (NHK) Japan Broadcasting Corporation two year after the disaster. 2,425 households living at temporary housings within Fukushima prefecture were asked to answer the Impact of Event Scale-Revised (IES-R) and the self-report questionnaires that we generated in order to evaluate the damage by the disaster in relation to several bio-psycho-social factors in refugee lives. There were 745 replies, the cooperation rate was 30.7%. High level PTS symptoms were found. The mean score of IES-R was 34.20±20.56, and 62.56% were over the cut-off point. By the result of multiple logistic regression analysis, the significant predictors of PTSD possibility were economic difficulty (OR:2.34), concerns about compensation (OR:4.16), aggravation of chronic disease (OR:2.94), affection of new disease (OR:2.20), and lack of acquaintance support (OR:1.92).

Table 1 shows the results of our five large scale questionnaire surveys. All the mean score of the Impact of Event...
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Scale-Revised (IES-R) were over 24/25 cut-off point, and probable PTSD were around 50% to 70%.

Discussions

About four years after the Great Hanshin Earthquake in 1995, the mean rate of IES-R was 22.5 and PTSD possibility was 40% [Kato et al., 2000] [9], and about one year after the Niigata Chuetsu Earthquake in 2004 was IES-R 14.3 and PTSD possibility; 21% [Naoi, 2009] [10]. Compared with these historical disasters in Japan, our data following the Fukushima disaster shows severe psychological distress among the victims.

According to the official report by the National Diet of Japan [1] the disaster of Fukushima is determined to be a human-made disaster. It is known that the prevalence of PTSD from a natural disaster is often lower than the rates of PTSD from human-made or technological disasters, and that the prevalence of PTSD following technological disasters ranged from 15% to 75% [11]. Therefore, the high levels of probable PTSD in our results are possibility related to the disaster being a human-made disaster.

It is reported that the worst rates of PTSD were from the Piper Alpha oil rig disaster in 1988. Ten years after exposure, 73% of the survivors still showed PTSD, and a complex psycho-social interrelationship was described in the study [12]. The sinking of a car-ferry in the Baltic Sea in 1994, the MS Estonia, is another tragic human-made disaster. Arnberg F., et al. [13] performed a prospective longitudinal study and found prolonged PTSD remained 14 years after the disaster with the mean IES-R score was 33 and probable-PTSD was 27%. In this sea accident, they suggested the prolonged uncertainty regarding the salva-

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<td>Place</td>
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<td>Collecting size</td>
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<td>761</td>
<td>2,862 (448)</td>
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<td>12.4%</td>
<td>23.9%</td>
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<td>Probable PTSD</td>
<td>67.3%</td>
<td>64.6%</td>
<td>59.6%</td>
<td>57.7%</td>
<td>52.5%*</td>
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※In order to compare other four surveys, this number and rate were only calculated by the data of 448 evacuees from “restricted area that the residents have difficulties in returning for a long time”.

From our studies, many socio-economic factors were linked to the psychological distress and suffering. Loss of employment, economic difficulty, concerns about compensation, and lost social ties are all serious consequences of the nuclear disaster. As one of the victims recorded his narrative in free writing section of our survey “If there was no nuclear accident, I would be living a normal life. Seems to be I am in a bad dream, to this day. By evacuation, our family was scattered and our relationship messed up”, the victims would have never gotten into such a cruel situation without the nuclear disaster. If the damages were limited to only earthquake and tsunami, most of them could have lived in their own houses and would not have lost their home land.

Regarding the Fukushima nuclear disaster, the new classification of the evacuation area after 2012 indicates the residents in the so called “evacuation order release preparation area” are able to come back to designated as contaminated below 20mSv per year. The evacuation order of this “preparation area” by the government is scheduled to be lifted on March, 2017. The result of our recent study in 2015 shows the scores of probable PTSD were significantly different between each evacuation areas. The highest group were the people who were evacuated from the areas where it is expected that the residents will have difficulties returning to their home land for a very long time. The second highest group was the people who evacuated without
government evacuation order; which were called “voluntary evacuees” and therefore they did not receive compensation from TEPCO.

According to the results of our multi-method studies (anthropological field work study, semi-structural interview, and large-scale questionnaire survey), the current major issues encountered by the evacuees are; the split up of families, the disintegration of communities, and disparities in compensation among evacuation zones. Therefore, it can be determined that “structural violence” has had a major impact afflicting victims’ lives. (The term ‘structural violence’ was proposed by peace researcher Johan Galtung in 1969). Structural violence refers to a form of violence wherein some social structure or social institution may harm people by preventing them from meeting their basic needs. This concept was used to assess health disparities and poverty in Haiti by Paul Farmer (2005), a medical anthropologist. The main structural violence affecting the victims of the Fukushima disaster stems from the government policy on “reparation” and “repatriation (returning plan)”. That is, the victims’ lives are at the mercy of political decisions.

Conclusions and Policy Recommendations

The Japan Times reported that the leaders of the electric company and government were not prosecuted in criminal suit [Japan Times, 2013][14]. The responsibility of the disaster is still uncertain. The evacuees’ psychological and social sufferings simultaneously involve health, welfare, legal, political, economic, and moral issues. It is apparent that, they were injured and inflicted by the social forces, because the Fukushima nuclear disaster was human-made. The mental health problems reported by the victims are not individual or personal in their origin, but rather, they should be understood as a context of social responsibility to the disaster; thus fitting the description of post-traumatic stress disorder.

Our findings suggest that it is most important to resolve the various social issues caused by structural violence in order to decrease the psychological stresses impacting the health and mental health of the victims.

Acknowledgement

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References


Mental Health Impact of the Fukushima Nuclear Disaster: Post-Traumatic Stress and Psycho-Socio-Economic Factors

The Prime Minister of Japan and His Cabinet, on May 26, 2013 (http://www.kantei.go.jp/saigai/pdf/201303261700jsin.pdf)


Naoi K: Local mental health activity after the Niigata-ken Chuetsu Earthquake: Findings of investigations performed three and half months and thirteen months after the earthquake, and analysis about the risk factor of PTSD. JPN Bull Soc Psychiat 2009; 18:52-62


Arnberg FK, Eriksson NG, Hultman CM, Lundin T: Traumatic bereavement, acute dissociation, and posttraumatic stress: 14 years after the MS Estonia disaster. J Traum Stress 2011; 24:183-190