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Post-traumatic stress due to structural violence after Fukushima Disaster

TAKUYA TSUJIUCHI

Abstract: This study analyses the psychological impacts on victims of the Fukushima Disaster four years after it occurred, using a large-scale survey covering 16,686 families living in and evacuated from Fukushima prefecture. A high level of stress, including signs of Post-Traumatic Stress Disorder (PTSD), was found in more than 40 per cent of the respondents. We analyze, using multiple logistic regression analysis, the relationship between post-traumatic stress and several socio-economic and political issues. The psycho-social and economic distress of ‘compulsory’ and ‘voluntary evacuees’ appears broadly similar, and strikingly different from ‘tsunami evacuees’. Distinct from ‘compulsory evacuees’, ‘voluntary evacuees’ are mainly 30s to 40s young women who felt in danger of radiation exposure, now struggling with tense family relationships and economic difficulties. Based on our quantitative and qualitative data, the collective suffering of the victims is argued to be the result of ‘structural violence’. The structural violence destroyed the living environment and was exacerbated by government policies of return and compensation. Traumatic experiences at the evacuation places and the need to hide their evacuee status hindered victims from integrating into social activism, leading to neglect isolation and social exclusion. Chronic post-traumatic stress due to structural violence is demonstrated in case studies.

Keywords: Fukushima, structural violence, post-traumatic stress disorder, social abuse, compulsory evacuees, voluntary evacuees

Introduction

Paul Farmer (2011), physician and medical anthropologist, coined the medical term ‘acute-on-chronic’ to describe the effect of the 2011 Haiti earthquake on social conditions. He read the earthquake as an acute exacerbation of a chronic

pathological state of social and economic inequality and injustice, running historically from the colonial period through the distorted process of modernization. Similarly, the Great East Japan Earthquake and the Fukushima nuclear disaster can be understood as ‘an acute exacerbation of a chronic state’. The pathological chronic social structure created by the modernization of Japan and its economic policies is emerging in several places, exacerbating the suffering of victims.

As the result of the Great East Japan Earthquake on 11 March 2011, the Fukushima nuclear disaster occurred: the meltdown of four reactors at the Fukushima Daiichi nuclear power plant with the subsequent distribution of radioactive substances. Overall, 15,894 people were killed directly by the tsunami and earthquake in the Tohoku area, including 1,613 people who died in Fukushima prefecture. No one was killed directly by the nuclear disaster, but out of 150,000 evacuees from Fukushima prefecture, about 90,000 were relocated to another region within Fukushima prefecture, and 60,000 residents were evacuated to other prefectures in Japan.

Since the nuclear disaster at Fukushima I have been part of a team conducting annual large-scale surveys on the psychological impact on the affected population, from a medical anthropology and psychiatric perspective. My research group has worked in cooperation with a private support group, Shinsai-Shien Network Saitama (SSN), along with the Sendai and Fukushima bureaus of NHK (Nihon-Hōsou-Kyōkai; Japan Broadcasting Corporation), and has sought to generate quantitative and qualitative data measuring degrees of psychological stress stemming from the nuclear disaster in relation to social and economic factors. Several publications (Tsujiuchi et al. 2016a, 2016b; Tsujiuchi 2016; Yamaguchi et al. 2016; Iwagaki et al. 2017) have already emerged from this project.

This article analyzes the impacts on victims of the Fukushima Disaster through a large-scale survey conducted in 2015, especially evaluating the distinction between so-called ‘compulsory evacuees’, ‘voluntary evacuees’ and ‘tsunami evacuees’. Based on quantitative and qualitative data, we also analyze the relationship between post-traumatic stress and socio-economic and political issues facing Fukushima victims. The collective miserable condition of the victims is argued to be the result of structural violence (Galtung 1969). The structural violence which Galtung (1969) defined is indirect violence and there is no one subject perpetrating the violence. Galtung (1969) wrote ‘There may not be any person who directly harms another person in the structure. The violence is built into the structure and shows up as unequal power and consequently as unequal life chances’.

Farmer’s (2003) ethnography in Haiti found that political and economic forces had structured risk for several diseases, extreme suffering, hunger, torture and rape. Similarities of social phenomena are found between Haiti and

Table 1 Four-year trend of stress levels (Tsujiuchi 2016, 247)

Date of survey	March 2012	February 2013	March 2013	March 2014	Feb–March 2015
Evacuation prefecture	Saitama	Fukushima	Saitama, Tokyo	Saitama, Tokyo	All
Collaborator	SSN	NHK	SSN	SSN	NHK
Sample size	2,011	2,425	4,268	3,599	16,686
Collecting size	490	745	530	761	2,862 (448)
Response rate	24.4%	30.7%	12.4%	23.9%	17.2%
IES-R Mean \pm SD	36.3 \pm 21.5	34.2 \pm 20.6	31.9 \pm 21.1	31.1 \pm 21.6	25.9 \pm 19.4
PTSD possibility	67.3%	64.6%	59.6%	57.7%	52.5%

Fukushima. Our study indicates the structure of deprivation, disparity, inequality and discrimination diffused into Fukushima victims.

A four-year transition of psychological stress

Table 1 lists the outcomes of our research over the past four years. On a yearly basis our research in cooperation with SSN gathered all registered evacuees in Saitama and Tokyo. This allows an annual comparison, though in a strict sense it is not a cohort study.

In order to facilitate comparison with the other four surveys, this number and rate were only calculated for data of 448 evacuees from ‘hard-to-return districts’ (*kikan konnan kuiki*): those found to have an annual atmospheric radiation dose in excess of 50 mSv when the different zones were defined in the summer of 2012.

Our surveys have used the internationally validated Impact of Event Scale-Revised (IES-R) to measure the degree of Post-Traumatic Stress Disorder (PTSD). A score of 25 points or more indicates that PTSD is a clinical possibility, and 30 or more is seen as warranting a clinical diagnosis of PTSD.

PTSD is a concept added to the DSM-III psychiatric diagnostic classification by the American Psychiatry Association in 1980. It considers the stress disability that arises from life threatening events such as disasters, accidents, war, disputes, and assaults. The concept states ‘(1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others. (2) The person’s response involved intense fear, helplessness, or horror’. In Japan this concept became better known after the Great Hanshin Earthquake of 1995.

PTSD has three types of symptoms. First there are intrusion symptoms such as flashbacks that repeatedly invade one’s consciousness, making the body re-experience the symptoms. For example, suddenly in the middle of work, house duties or childcare, victims re-experience the fear they experienced at the time of the tsunami or nuclear disaster. Second there are avoidance symptoms,

consisting of conscious or unconscious evasion of thoughts, feelings and attitudes regarding the events that caused the psychological shock. For example, it may involve evading news and information on the nuclear disaster and the radiation, seeking to dissipate the memory of the disaster. Thirdly there are increased arousal symptoms, such as persistent sleeping disorder, frustration and anger, excessive alertness and nervousness. Someone who has experienced a life-threatening event is likely to unconsciously develop an alertness and body preparedness to confront a similar life-threatening event. The majority generally recover after three months. Recovery, however, requires an environment of safety and security.

In [Table 1](#), the possibility of PTSD was found among 67 per cent of affected people and respondents exhibited 36.3 of mean IES-R score (2012, Saitama survey), 65 per cent, 34.2 (2013, Fukushima survey), 60 per cent, 31.9 (2013, Saitama and Tokyo survey), 58 per cent, 31.1 (2014, Saitama and Tokyo survey), and 53 per cent, 25.9 (2015, evacuation places all over Japan). Thus, although the percentages have been gradually declining, we find that PTSD was still an issue for more than 50 per cent of evacuees, four years on from the disaster.

By contrast, about four years after the Kobe Earthquake of 1995, which killed 6,434 people, possible PTSD was found in about 39.5 per cent of temporary housing residents and the mean score of IES-R was 22.5 (Kato and Keiji 2000). In the 2004 Niigata Chuetsu Earthquake, which killed 68 people, the corresponding level of PTSD at 13 months was about 21 per cent (Naoi 2009) and the mean score of IES-R was 14.3. The level of PTSD is thus noticeably higher for the Fukushima disaster than was found after the two other disasters. In a previous study (Tsujiuchi et al. 2016a) we compiled IES-R scores for all the earthquake and tsunami studies carried out in the last twenty years. For example, Cetin et al. (2005) reported a mean IES-R score of 27.7 for volunteer rescue workers in the Turkey earthquake of 1999, Wang et al. (2011) reported a mean IES-R score of 26.7 for refugees attending a psychological relief workstation and local general hospital in the Wenchuan Earthquake in China, 2008. Compared with these other disasters around the world, our results, showing the mean IES-R scores ranging from 25.9 to 36.3, indicate higher presence of post-traumatic stress symptoms after the Fukushima disaster.

Although there have been few studies evaluated by IES-R since the Fukushima nuclear disaster, Shigemura et al. (2012) found that 30 per cent of workers at the Fukushima No. 1 nuclear power plant, where the meltdowns occurred, had IES-R over 25 points when tested two to three months after the disaster, along with 19 per cent of workers at the nearby No. 2 plant. Evacuees of Hirono Town at Fukushima Prefecture showed a 54 per cent rate of possible PTSD nine months after the disaster (Kukihara et al. 2014). This result is

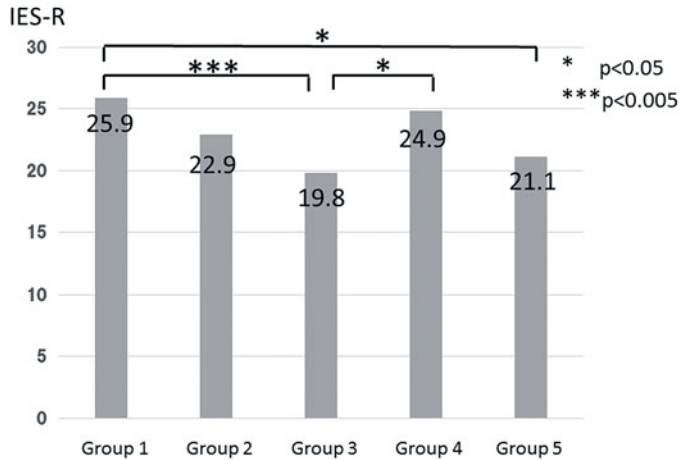


Figure 1 Stress level comparison by reorganized evacuation order area (Tsujuchi2016, 247)

broadly similar to that found in our study. A systematic review of the PTSD research by Neria, Arijit, and Sandro (2007) shows the incidence of PTSD after natural disasters ranging from 4 to 60 per cent, and after human-made disasters from 5 to 75 per cent, showing that human-made disasters tend to carry higher rates of PTSD. Our research on this nuclear disaster, being a human-made disaster, appears to confirm this characteristic trend.

Polarization of victims

The authors conducted a survey in 2015, covering 16,686 families in Fukushima from the eight municipalities of Futaba, Katsurao, Naraha, Hirono, Iwaki, Soma, Koriyama, and Fukushima city, getting 2,862 responses for a response rate of 17.1 per cent. The responses were divided into five groups for stress level comparison. Group 1 consists of 588 families evacuated from *kiikan konnan kuiki* or ‘hard-to-return districts’. Group 2 is composed of 1,002 families that lived in areas that were scheduled for reopening in the next few years (*hinan shiji kaijo junbi kuiki*), in many of which evacuation orders have subsequently been lifted. Group 3 has 280 families evacuated from areas declared uninhabitable in 2011 but reopened to habitation at the time of the survey. Group 4 consists of 622 families of ‘voluntary evacuees’, who decided to evacuate from areas not declared hazardous. Group 5 consists of 298 families of former dwellers of Soma and Iwaki City living in temporary shelters due to the tsunami rather than the nuclear disaster. Therefore, groups 1, 2 and 3 consist of compulsory nuclear evacuees.

Figure 1 shows the IES-R scale average for each group. Group 1 has 25.9 points, group 2 has 22.9 points, group 3 has 19.8 points, group 4 has 24.9 points and group 5 has 21.1 points. The average of IES-R scale point comparison

Table 2 Age structure

Age group (years)	Compulsory evacuees		Voluntary evacuees		Tsunami evacuees	
	Responses	%	Responses	%	Responses	%
1. Under 19	4	0.2	1	0.2	1	0.3
2. 20~29	29	1.6	19	3.1	4	1.3
3. 30~39	122	6.5	152	24.4 ^a	20	6.7
4. 40~49	170	9.1	192	30.9 ^a	28	9.4
5. 50~59	296	15.8	81	13.0	63	21.1 ^a
6. 60~69	550	29.4 ^a	68	10.9	134	45.0 ^a
7. 70~79	420	22.5 ^a	66	10.6	35	11.7
8. Over 80	244	13.0	26	4.2	13	4.4
No answer	35	1.9	17	2.7	0	0.0
Total	1870	100.0	622	100.0	298	100.0

^aItems discussed in this paper.

of these five groups by one-way layout ANOVA, $F(4, 2424) = 6.291$, $p = 0.00005$, shows a statistically significant difference. By Sheffe multiple comparison, significant differences were found from groups 1 to 3, groups 1 to 5, and groups 3 to 4. That is to say, group 1, consisting of those who lived in hazardous areas to which they cannot return, showed the highest value, followed by group 4, consisting of voluntary evacuees. These two groups, at the opposite ends of the radiation spectrum, showed statistically significant higher levels of stress.

In the first three years, our survey found no significant differences in stress level by evacuation area. Differences emerged after four years. Differences may be attributed partly to the dilemma over the possibility of returning to the homeland and partly to differences in compensation payments. Reparations for psychological distress came to ¥14,500,000 for group 1, ¥4,800,000 for group 2, ¥2,150,000 for under-18s and ¥1,800,000 for adults in group 3. For people in Groups 4 and 5 from the twenty-three districts outside the evacuation zone in Fukushima prefecture, children and pregnant women received ¥520,000 and all the others ¥120,000.

The lines used to establish boundaries between evacuation order areas are mostly roads, sometimes even narrow roads dividing residential towns, which naturally provoked division among close neighbors. The residents in group 1 have no hope of returning to their homeland but instead received compensation, whereas group 4 'voluntary evacuees' received almost no compensation.

Psychological, social and economic situation of compulsory evacuees and voluntary evacuees

The following is a comparison of the psychological, social and economic situation between 'compulsory evacuees', 'voluntary evacuees' and 'tsunami

Table 3 Gender distribution of sample

	Compulsory evacuees		Voluntary evacuees		Tsunami evacuees	
	Responses	%	Responses	%	Responses	%
1. Male	1192	63.7 ^a	234	37.6	166	55.7 ^a
2. Female	649	34.7	374	60.1 ^a	130	43.6
No answer	29	1.6	14	2.3	2	0.7
Total	1870	100.0	622	100.0	298	100.0

^aItems discussed in the paper.

evacuees'. In Table 2, groups 1, 2 and 3 totaled 1,870 families considered 'compulsory evacuees', group 4 had 622 families considered 'voluntary evacuees', and group 5 had 298 'tsunami evacuees'.

Participants' characteristics

Table 2 shows the age structure of the sample. The respondents' age group was as follows. Among compulsory evacuees, 29.4 per cent were in their 60s and 22.5 per cent in their 70s. Among voluntary evacuees, 30.9 per cent were in their 40s and 24.4 per cent in their 30s. Among tsunami evacuees, 45.0 per cent were in their 60s and 21.1 per cent in their 50s. For compulsory and tsunami evacuees, respondents' age averaged around 60 years old, in sharp contrast to the 30–40 years old mean of voluntary evacuee respondents' age.

Table 3 shows the groups by gender distribution: 63.7 per cent of compulsory evacuees were male, 60.1 per cent of voluntary evacuees were female, and 55.7 per cent of tsunami evacuees were male. Compulsory and tsunami evacuee respondents were mainly male, whereas voluntary evacuees were mainly women.

There are no reliable official data on the number of voluntary evacuees, but, generally speaking, mothers and their children are prominent among voluntary evacuees. Our data on age and gender show that the core members of the voluntary evacuees are 30–40-year-old females, of child-rearing age.

Psychological circumstances

Table 4 describes experiences of the nuclear disaster disaggregated into sixteen items. Among the compulsory evacuees, more than 40 per cent experienced No. 12, 'I didn't know what was happening' (51.8 per cent), No. 13, 'I suddenly became frightened after seeing news reports (48.3 per cent)', No. 7, 'I was very scared of radiation' (43.3 per cent), No. 9, 'I felt in physical danger' (43.0 per cent). More than 40 per cent of the voluntary evacuees experienced No. 7, 'I was very scared of radiation (60.9 per cent)', No. 9, 'I felt in physical danger' (54.7 per cent), No. 13 'I suddenly became frightened after seeing

Table 4 Experiences of the nuclear disaster

	Compulsory evacuees		Voluntary evacuees		Tsunami evacuees	
	Responses	%	Responses	%	Responses	%
1. Ashes of the explosion fell over me.	32	1.7	3	0.5	1	0.3
2. I witnessed the explosion.	76	4.1	15	2.4	5	1.7
3. I heard the explosion.	204	10.9	19	3.1	7	2.3
4. I desperately fled.	647	34.6 ^a	116	18.6	41	13.8
5. I thought I couldn't flee.	139	7.4	67	10.8	29	9.7
6. I thought it was the end.	353	18.9	150	24.1	54	18.1
7. I was very scared of radiation.	810	43.3 ^a	379	60.9 ^a	119	39.9
8. I thought I was exposed to radiation.	541	28.9	292	46.9 ^a	69	23.2
9. I felt in physical danger.	804	43.0 ^a	340	54.7 ^a	122	40.9 ^a
10. I was afraid I might die.	233	12.5	122	19.6	28	9.4
11. I was trapped in the shelter.	474	25.3 ^a	14	2.3	37	12.4
12. I didn't know what was happening.	969	51.8 ^a	306	49.2 ^a	133	44.6 ^a
13. I suddenly became frightened after seeing news reports.	903	48.3 ^a	340	54.7 ^a	165	55.4 ^a
14. I don't remember.	20	1.1	14	2.3	5	1.7
15. I don't want to remember.	345	18.4	113	18.2	48	16.1
16. I have no scary remembrances.	158	8.4	23	3.7	18	6.0
Total	1870	100.0	622	100.0	298	100.0

^aItems discussed in this paper.

news reports' (54.7 per cent), No. 12, 'I didn't know what was happening' (49.2 per cent), and No. 8, 'I thought I was exposed to radiation' (46.9 per cent). More than 40 per cent of the tsunami evacuees experienced No. 13, 'I suddenly became frightened after seeing news reports' (55.4 per cent), No. 12, 'I didn't know what was happening' (44.6 per cent), and No. 9 'I felt in physical danger' (43.0 per cent).

In comparison with voluntary and tsunami evacuees, what compulsory evacuees mostly experienced was No. 4, 'I desperately fled' (34.6 per cent) and No. 11, 'I was trapped in the shelter' (25.3 per cent). After the hydrogen explosions at the nuclear plant, compulsory evacuees desperately followed the immediate

Table 5 Sorrow for hometown loss

	Compulsory evacuees		Voluntary evacuees		Tsunami evacuees	
	Responses	%	Responses	%	Responses	%
1. Very painful	941	50.3 ^a	238	38.3 ^a	66	22.1
2. Painful	450	24.1	142	22.8 ^a	47	15.8
3. Gray area	305	16.3	178	28.6	65	21.8
4. Not painful	33	1.8	22	3.5	5	1.7
5. Not painful at all	19	1.0	19	3.1	6	2.0
No answer	122	6.5	23	3.7	109	36.6 ^a
Total	1870	100.0	622	100.0	298	100.0

^aItems discussed in this paper.

evacuation orders and afterwards they were trapped in temporary shelters due to the surrounding high contamination levels. On the other hand, in comparison with compulsory and tsunami evacuees, voluntary evacuees mostly experienced the following items: No. 7, 'I was very scared of radiation', No. 8. 'I thought I was exposed to radiation', No. 9 'I felt in physical danger'. From these results we can see that voluntary evacuees were prompted by the physical danger and threat of being contaminated by radiation.

The repetition of tsunami scenes in the news left a psychological trauma even in those who didn't experience the tsunami, a fact that may help us to imagine the severity of the tsunami experience. Yet, there has been no research until now to clarify the effects of the scenes of the explosion of the nuclear disaster and the fear of looming radiation. In this research, for the first time, compulsory evacuees and voluntary evacuees' traumatic experiences are revealed.

In Table 5, the sorrow due to loss of one's hometown is shown. Around 50 per cent of compulsory evacuees answered 'it is very painful', and about 24 per cent 'it is painful'. Also, for voluntary evacuees, almost 38 per cent answered 'it is very painful', and about 23 per cent 'it is painful'. Meanwhile, almost 37 per cent of tsunami evacuees responded with no answer. This may be because tsunami evacuees only evacuated from one part of their town to another and hence did not feel they were losing their hometown.

It is easy to understand that compulsory evacuees felt an extreme sense of hometown loss, whereas in common discourse the voluntary evacuees are often accused of casually discarding their hometown. But the fact is that the majority of voluntary evacuees felt compelled to leave their hometown under extreme anguish.

Table 6 breaks down the type of loss endured in leaving one's hometown. More than 40 per cent of the compulsory evacuees considered they lost the following ten items: No. 1 'Household goods', No. 2 'House', No. 4 'Land', No. 9 'Nature and climate', No. 10 'The land of our ancestors', No. 14 'Place of everyday life', No. 15 'Family relationships', No. 16 'Neighborhood

Table 6 Losses entailed in leaving hometown

Experience of hometown	Compulsory evacuees		Voluntary evacuees		Tsunami evacuees	
	Responses	%	Responses	%	Responses	%
1. Household goods	1013	54.2 ^a	153	24.6	146	49.0 ^a
2. House	1052	56.3 ^a	200	32.2	169	56.7 ^a
3. Shopping and commerce centers	380	20.3	52	8.4	29	9.7
4. Land	844	45.1 ^a	151	24.3	105	35.2
5. Farmland	736	39.4	140	22.5	67	22.5
6. Pasture	121	6.5	63	10.1	15	5.0
7. Fishery	210	11.2	110	17.7	95	31.9
8. Forest	616	32.9	163	26.2	47	15.8
9. Nature and climate	1000	53.5 ^a	337	54.2 ^a	112	37.6
10. The land of our ancestors	803	42.9 ^a	152	24.4	78	26.2
11. Traditions and culture	629	33.6	111	17.8	39	13.1
12. Cemetery	546	29.2	103	16.6	21	7.0
13. Work	676	36.1	216	34.7	65	21.8
14. Place of everyday life	913	48.8 ^a	308	49.5 ^a	92	30.9
15. Family relationships	835	44.7 ^a	254	40.8 ^a	68	22.8
16. Neighborhood relationships	1214	64.9 ^a	276	44.4 ^a	119	39.9
17. Friends and acquaintances	1176	62.9 ^a	398	64.0 ^a	80	26.8
18. One's life	680	36.4	213	34.2	56	18.8
19. Dreams for the future	657	35.1	204	32.8	53	17.8
20. Purpose and meaning in life	942	50.4 ^a	215	34.6	68	22.8
Total	1870	100.0	622	100.0	298	100.0

^aItems discussed in this paper.

relationships', No. 17 'Friends and acquaintances', and No. 20 'Purpose and meaning in life'. The items lost for more than 40 per cent of the voluntary evacuees were five, fewer than for compulsory evacuees: No. 9 'Nature and climate', No. 14 'Place of everyday life', No. 15 'Family relationships', No. 16 'Neighborhood relationships', and No. 17 'Friends and acquaintances'. Only two items were listed as lost by more than 40 per cent of the tsunami evacuees: No. 1 'Household goods' and No. 2 'House'.

The losses of 'Household goods' and 'House' are common to compulsory and tsunami evacuees. For tsunami evacuees, their houses were destroyed and all their household goods were swept away by the tsunami. For compulsory evacuees, they also lost houses and household goods due to severe radiation contamination. Their houses were deserted for several years and almost destroyed. There are restrictions on bringing out household goods from their homes because of radiation exposure.

The losses of 'Nature and climate', 'Place of everyday life', 'Family relationships', 'Neighborhood relationships', and 'Friends and acquaintances' are common between compulsory and voluntary evacuees. Compared with tsunami

Table 7 Unpleasant experiences due to being evacuees

	Compulsory evacuees		Voluntary evacuees		Tsunami evacuees	
	Responses	%	Responses	%	Responses	%
1. Frequent	202	10.8 ^a	62	10.0 ^a	9	3.0 ^a
2. Rather frequent	724	38.7 ^a	195	31.4 ^a	63	21.1 ^a
3. Not very frequent	551	29.5	185	29.7	89	29.9
4. Never	316	16.9	162	26.0	98	32.9
No answer	77	4.1	18	2.9	39	13.1
Total	1870	100.0	622	100.0	298	100.0

^aItems discussed in this paper.

Table 8 Reluctance to disclose evacuee status to others

	Compulsory evacuees		Voluntary evacuees		Tsunami evacuees	
	Responses	%	Responses	%	Responses	%
1. Not reluctant	584	31.2	186	29.9	155	52.0
2. Not very reluctant	247	13.2	114	18.3	41	13.8
3. Somewhat reluctant	587	31.4 ^a	189	30.4 ^a	41	13.8 ^a
4. Reluctant	362	19.4 ^a	112	18.0 ^a	21	7.0 ^a
No answer	90	4.8	21	3.4	40	13.4
Total	1870	100.0	622	100.0	298	100.0

^aItems discussed in this paper.

evacuees, victims of the nuclear disaster were deprived of nature, social relationships and daily lives. This is one of the typical distinctions between the tsunami and the nuclear disaster.

Social situation

In Table 7, I tabulate responses to the question of whether or not refugees had suffered unpleasant experiences as a result of being a refugee. Unpleasant experiences were described as ‘frequent’ or ‘rather frequent’ by about 50 per cent of compulsory evacuees, 41 per cent of voluntary evacuees, and 24 per cent of tsunami evacuees. Therefore, it is clear that the victims of the nuclear disaster are far more likely than tsunami victims to state that they have had unpleasant experiences.

In relation to the unpleasant experiences we set the following question: ‘Are you reluctant to disclose your evacuee status to others?’. The answers are shown in Table 8. ‘Somewhat reluctant’ and ‘Reluctant’ add up to 51 per cent for compulsory evacuees, 48 per cent for voluntary evacuees, and 21 per cent for tsunami evacuees. This phenomenon of reluctance may be a characteristic feature of radiation contamination from the nuclear disaster. To the inevitable

Table 9 Level of satisfaction with family relationships

	Compulsory evacuees		Voluntary evacuees		Tsunami evacuees	
	Responses	%	Responses	%	Responses	%
1. I am fully satisfied	543	29.0	183	29.4	109	36.6
2. I am somewhat satisfied	697	37.3	211	33.9	95	31.9
3. I am somewhat dissatisfied	312	16.7 ^a	123	19.8 ^a	48	16.1 ^a
4. I am very dissatisfied	169	9.0 ^a	77	12.4 ^a	14	4.7 ^a
No answer	149	8.0	28	4.5	32	10.7
Total	1870	100.0	622	100.0	298	100.0

^aItems discussed in this paper.

Table 10 Worries about livelihood

	Compulsory evacuees		Voluntary evacuees		Tsunami evacuees	
	Responses	%	Responses	%	Responses	%
1. Worried	1059	56.6% ^a	464	74.6% ^a	193	64.8% ^a
2. Not worried	604	32.3%	122	19.6%	73	24.5%
3. Don't know	188	10.1%	36	5.8%	30	10.1%
No answer	19	1.0%	0	0.0%	2	0.7%
Total	1870	100.0%	622	100.0%	298	100.0%

^aItems discussed in this paper.

stress of evacuation to remote and distant places is added the stigma of being labeled 'radioactive', adding not only a psychological burden but also a barrier for building interpersonal and social relationships in the place of evacuation.

Table 9 displays responses to a question on 'Level of satisfaction with family relationships'. The combined total for 'somewhat dissatisfied' and 'very dissatisfied' was about 26 per cent for compulsory evacuees, about 32 per cent for voluntary evacuees, and about 21 per cent for tsunami evacuees. These data show that difficulties in family relationships are slightly more common among voluntary evacuees. The following is an illustrative case from the column for free writing: 'My parents and husband remained in Fukushima. They say my worries about radioactivity were excessive. They say that since the government says that now it is safe, I should come back soon to Fukushima'. Families of voluntary evacuees have value discrepancy problems with family members remaining in Fukushima. Detailed case studies will be shown later in this paper.

Economic situation

Finally, shown in Table 10 are responses to a question about living conditions and economic situation. Regarding 'Worries about livelihood', compulsory

Table 11 Worries about real estate

	Compulsory evacuees		Voluntary evacuees		Tsunami evacuees	
	Responses	%	Responses	%	Responses	%
1. Worried	1280	68.4 ^a	225	36.2 ^a	88	29.5 ^a
2. Not worried	486	26.0	372	59.8	180	60.4
3. No answer	104	5.6	25	4.0	30	10.1
Total	1870	100.0	622	100.0	298	100.0

^aItems discussed in this paper.

evacuees registered about 57 per cent positive responses, voluntary evacuees about 75 per cent, and tsunami evacuees about 65 per cent. A very high rate of people with economic difficulties is identified. As voluntary evacuees and tsunami evacuees did not receive either compensation or indemnity, they are more likely than compulsory evacuees to have economic troubles.

Table 11 shows responses to questions about real estate worries regarding the properties that evacuees lived in before the disaster. About 69 per cent of compulsory evacuees have worries about real estate, about 36 per cent of voluntary evacuees, and about 30 per cent of tsunami evacuees. Talking about compulsory evacuees, their own house and land is contaminated by heavy radiation, and it is difficult to identify when they can return to their own hometowns, and when their real estate will really be compensated for by the government or TEPCO (Tokyo Electronic Power Company).

In summary, the psychological, social and economic distress situations of compulsory and voluntary evacuees appear broadly similar, and strikingly different from those of tsunami evacuees. The distinguishing features of nuclear disaster evacuees are a painful sense of 'hometown loss', a sense of losing 'nature, social relationships and daily lives', unpleasant experiences due to evacuation caused by the nuclear disaster, and reluctance to disclose evacuee status to others.

Yet voluntary evacuees do have certain identifiable characteristics distinguishing them from compulsory evacuees. They are mainly young women in their 30s to 40s who felt in danger of being exposed to radiation, now struggling with tense family relationships and economic difficulties. Aya Hirata Kimura (2016) described some cases of women engaged in these struggles.

Psychological, social and economic factors in post-traumatic stress

Next, to clarify the influence of psychological, social and economic factors on post-traumatic stress a multiple logistic regression with IES-R as the objective variable was performed. From the responses of the questionnaire thought to be related to stress, the presence or absence of the following thirteen factors were

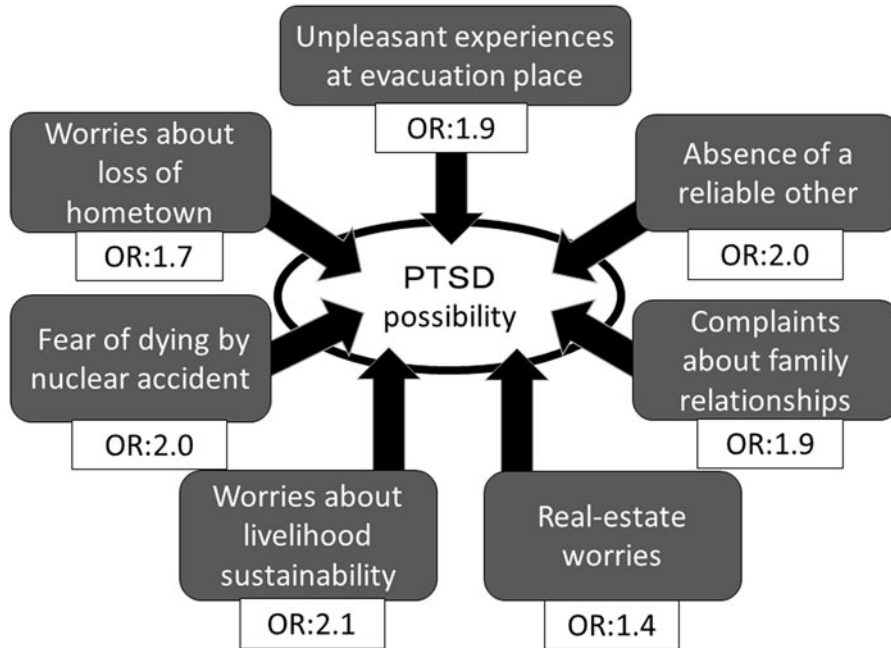


Figure 2 Psychological, social and economic factors affecting the possibility of post-traumatic stress disorder (Tsujiuchi2016, 248)

selected as explanatory variables: ‘fear of dying felt in the first week after the nuclear accident’, ‘death of any relative’, ‘worries about livelihood sustainability’, ‘discomfort at work’, ‘total valuation of living environment’, ‘worries about compensation’, ‘real estate worries’, ‘worries about loss of hometown’, ‘approval/disapproval of nuclear plant reactivation’, ‘presence or absence of a reliable other’, ‘complaints about neighborhood interaction’, ‘unpleasant experiences at evacuation place’, and ‘complaints about family relationships’. After adjustment for age and gender, the step-wise multiple logistic regression demonstrated the seven items shown in Figure 2 influencing stress levels. In Figure 2, the number OR denotes the odds ratio. As an example, ‘worries about livelihood’ implies a 2.1 times higher risk of having PTSD over those not worried about livelihood.

In general, the experiences that tend to cause PTSD are direct violence by war, terrorism, disaster, serious accident, torture, abduction, being taken hostage, physical assault, rape, abuse, or domestic violence (American Psychiatric Association 2013). But in the case of abuse, not only physical direct violence but also a repeated complex of psychological and socio-economic violence can become severe traumatic experiences (Herman 2015). Considering our results for the Fukushima disaster, which show a statistical relationship between several psycho-social economic factors and the possibility of PTSD, it is argued that indirect violence after human-made disaster may also induce PTSD.

Structural violence in Fukushima victims

My analysis of the treatment of nuclear disaster victims matches the concept of structural violence through injustice, inequity, disparity, and discrimination. ‘Structural violence’ is a term coined by Johan Galtung (1969), the founder of Peace Research. It is a well-known term in the field of global health. In contrast to direct violence exerted by an individual human being, ‘structural violence’ refers to the indirect violence wrought by the social system and social structure. Structural violence is integrated in the political, economic, social, and cultural structure, and shows up as inequity in power relationships, social injustice, and in daily life as instances of inequity, disparity, and discrimination. Paul Farmer (1997, 2003, 2011) analyzes in detail the abuse and structural violence in poverty and health inequality in Haiti. Farmer (1997) described AIDS and political violence as the two leading causes of death among young adults in Haiti. Bureaucrats and soldiers had unconstrained sway over the lives of the rural poor. These are determined by Farmer to be the victims of structural violence.

The violence of the nuclear disaster undermined deprivation of the roots of living conditions, life, and the environment. Moreover, the subsequent setting of government policies for returning to hometowns without consulting residents, and also disparities in levels of compensation, became a continuation of structural violence, as these phenomena directory damaged the daily lives of the victims. I will discuss these examples of structural violence after the case studies.

Next, I will discuss the dimension of mental wounding, or trauma and violence. The experience of trauma from various kinds of violence is the cause of PTSD. As mentioned before, generally PTSD is assumed to stem from physical violence, usually directly inflicted by individuals. Nonetheless, as our research clarifies, the possibility of PTSD has psychological, social and economic influences. Therefore, the concept of structural violence at the root of PTSD may be discerned.

Examples of abuse include physical abuse, sexual abuse, psychological abuse, neglect, economic abuse and social abuse. ‘Social abuse’ is usually used for being dismissed from society, neglected, isolated, and hindered from social participation and activities (Kassah, Kassah, and Agbota 2012). Social system abuse is the lack of access to public services such as medical and social services and pensions, due to neglect by the administration. Furthermore, in a broad sense, ‘social abuse’ includes all the poor conditions of life, such as discrimination, poverty and discord, due to faults in the prevalent ideology. Yamano (2009) used the phrase ‘social abuse’ in his pathological analysis of societies with sustained child abuse. Yamano criticized the tendentious emphasis of psychology over the pathology of families with child abuse. Rather he pointed to violations of children’s human rights due to inadequate budgets for family

social services; also due to inadequate social services and education for children, leading to isolation, fragmentation and delay in providing childcare.

After flare-ups of domestic violence, the perpetrators often express their regret. The victims, despite having been beaten and kicked, become dependent on this apologetic attitude and the accompanying words ‘I love you’. They cannot get out of this distorted dependent relationship, to the point where they come to blame themselves for angering the perpetrator. In this way, the authority, supremacy and power of the perpetrators exerts control over the life and living of victims. Victims subjected to repeated physical and psychological abuse with threats, intimidation, and actual violence, reach a state of resignation, which gradually leads to physical and mental exhaustion, followed in turn by social isolation.

The same applies, structurally speaking, to nuclear disaster damage. There are symbolic similarities between domestic violence and social abuse within the victims of the Fukushima disaster. The perpetrators pay consolation money as a symbolic apology and admission of blame. Many politicians, including Prime Minister Shinzō Abe, have stated: ‘There can be no revival of Japan without the recovery of Fukushima’.¹ These words mean symbolically ‘I love Fukushima’. But deep down, contrary to these words, issues such as radiation contamination and the continuing nuclear disaster remain segregated as ‘Fukushima problems’. These problems are not only limited to Fukushima but also to other regions.

Again, politicians and national government officials express apologies by saying ‘We regret the forced evacuation’, but will seek to break down the resistance of residents by cancelling the evacuation order. ‘It is safe, and secure, it is all clear’ – they repeat these sweet words along with the domestic discourse on the ‘myth of safety and security (*Anzen Anshin Shinwa*)’, pressurizing residents to return to areas whose safety is not yet assured. Meanwhile, due to their great economic losses, the victims cannot rebuild their lives. They need compensation money from TEPCO and the national government. Some of voluntary evacuees have come to blame their predicament on their own selfish refusal to return to Fukushima. Physically and mentally they have become exhausted. Owing to unpleasant experiences at their places of evacuation destination, they have hidden their identities as refugees, and have been driven into social isolation. In this way victims are been deprived of their right to make their own life decisions.

Case studies of social abuse

In this section, I will demonstrate five written statements from the free writing space provided in the 2015 questionnaire. From 563 respondents in the free writing section, forty-eight cases with rich narratives and full descriptions were selected by using the key words ‘death’ or ‘dying’ to evaluate seriousness, and five cases were determined to be typical cases of social abuse. One other purpose of presenting these cases is to illustrate collective psycho-social and

economic suffering, as described in the quantitative analysis section. At the top of each case report, the results of stress level (IES-R) and the seven items of psycho-social and economic factors thought to influence PTSD possibility are shown.

Case 1 (ID 445: compulsory evacuee)

IES-R = 47, fear of dying from the nuclear disaster (-), worries about loss of hometown (++) , unpleasant experiences at evacuation place (-), absence of a reliable other (+), complaints about family relationships (+), real estate worries (+), worries about livelihood sustainability (+).

A 67-year-old female, evacuated from Futaba town, Fukushima prefecture to Soka city, Saitama Prefecture; living in a very cramped room with her 90-year-old father and 85-year-old mother. She herself is compelled to provide her elderly parents' nursing care. Her father is used to sitting all day at the *kotatsu* (a Japanese low covered table with a heat source) and her mother after sweeping the apartment in the early morning sleeps inside it.

No one is expected to visit, there is no place to go, and we just eat three times a day and sleep. There is nothing to do.

Society has rejected and neglected them, isolated them, and their social participation and activities are disabled.

Actually this condition is as distressing as dying. We understand the feelings of those who committed suicide. But dying is easy. Those being released of pain by death may go in peace, yet for those who remain, without a clear future and without the possibility of dying, there is only pain. It is better to live and share the adversity together. However, the truth is that it is as hard as dying.

Moreover, although they are not permitted to return to their hometown, with their savings they cannot afford to buy land and a house, and are obliged to continue the desperate struggle of their evacuees' life.

We can't go back. My parents are 90 and 85. I feel awful, we don't have any permanent settlement; we are condemned to wait for death without any hope. Our actual savings don't allow us to buy a home. I wish we could live in a small apartment building but TEPCO does not cover the cost of buying a family home. It is better for families with elderly and disabled ones to live in apartment buildings near train and bus stations, near hospitals. My husband worked for TEPCO, that is why we don't like to complain to TEPCO. I have heard that those who moved to Iwaki city have built fine houses, yet they are not well considered by local people in Iwaki. Those were people who were already rich, and they quickly settled down in Iwaki. Common people like us can't do the same. Therefore, our future is uncertain.

This case study vividly illustrates how the policy of compensation and indemnity after the nuclear disaster itself works out as structural violence, dominating the life and living conditions of the victims.

Case 2 (ID 1274: compulsory evacuee)

IES-R = 61, fear of dying from the nuclear disaster (-), worries about loss of hometown (++) , unpleasant experiences at evacuation place (++) , absence of a reliable other (-), complaints about family relationships (-), real estate worries (+), worries about livelihood sustainability (+).

A 37-year-old female, evacuated from Futaba Town, Fukushima prefecture to Iwaki city, in the southern part of the same prefecture. She had divorced just before the disaster and became an evacuee with her daughter and son. Owing to deep psychological pressure, she had a suicidal desire. Several times she thought of returning to their hometown in Futaba and committing suicide there.

I would like to die. I would like to be killed. There is no sense of living in my life, rather I am thinking of organ donation. In any case I would like to disappear. I understand the feelings of longing for suicide. I myself thought of going back to Futaba and committing suicide... then my children's face appear... I can't... next year my elder daughter will be a high school student... it is enough, please allow me to die.

She cannot have her parents' support as her old mother is living alone elsewhere in Fukushima prefecture, far from Iwaki city. When she got divorced, her former husband gave her the family house in lieu of child support payments. However, the nuclear disaster and radioactive contamination made the house uninhabitable. Her former husband received financial compensation, and since then has been evading her.

I got divorced one month before the disaster. Instead of the monetary support for raising our children I remained living at the house, which was still in his name, because there were still loan payments to make that he said he would take care of. He promised that after the loan payment was completed he would formally transfer the property to our son. Since he received the compensation money I have not heard from him, he is evading me. I told this to TEPCO, to the lawyer, and they just said that sometimes this happens... I would like them to think about measures to deal with this.

My two children are much stressed. They stopped attending school. My oldest daughter kicked and broke down the wall of our rented house with her emotional instability. This rebellious age is very hard to cope with, due to her psychological state. For several reasons it is so uncomfortable, I feel too emotionally unstable to raise my children, nor can I go out to work... it hurts me psychologically. I don't want to go out.

As we see here, the stormy psychological state she had fallen into is set up originally by domestic violence from her divorced husband. The violence includes emotional abuse, economic abuse, using male privilege, using children, and isolation. The nuclear disaster greatly intensifies her damage from this violence.

She wrote about the harassment she gets from the neighborhood. It is not only harassment in their neighborhood but also at work. When they learned of her evacuee status it became such a poor work environment, that she is no longer able to work.

Before the disaster we lived in a detached house. Now it is difficult to adjust to the noisy living in an apartment. Moreover I dislike the word ‘evacuee’. It is easy to get harassment. I came here [Iwaki City], and worked nights, part-time at Family Mart. I did it so I could look after my children during the daytime. I do receive compensation money. Though I was struggling just to get by, they would say ‘Treat me to dinner!’ ‘You are getting rich!’ I got this kind of verbal harassment at work, countless stupid words, so I quit. Since then I’ve been afraid to work, I can’t work.

In addition to the physiological and economic violence from her former husband, the extremely hard social abuse she has experienced has put her in a very dangerous state.

Case 3 (ID 174: formerly compulsory evacuee, but now voluntary evacuee)

IES-R = 34, fear of dying from the nuclear disaster (-), worries about loss of hometown (-), unpleasant experiences at evacuation place (++), absence of a reliable other (+), complaints about family relationships (-), real estate worries (+), worries about livelihood sustainability (?).

A 67-year-old female, evacuated from Hirono town, Fukushima prefecture to Iwaki City in the same prefecture. She has high blood pressure and has had a cerebral infarction. The evacuation order for Hirono was lifted six months after the nuclear disaster; those not returning to their hometown were reclassified as ‘voluntary evacuees’. One year after the imposition of the evacuation order by the government, none of the Hirono residences had received compensation from TEPCO. Through the mere fact of becoming evacuees, they have received an intense, visible kind of social violence from the neighborhood. It is not difficult to imagine the psychological suffering resulting from these conditions.

I have been harassed many times by unknown neighbors. Dead snakes and toads are left at my front door. We notified the police and the patrol car came. Some old people shout insults to me: ‘Drop dead, you old hag!’ (*Shine, kusobaba*). There are a lot of lonely elderly people around here, and there are no social activities organized in the neighborhood. I am scared of anonymous strange men living next to me.

She feels afraid of her unfamiliar neighbors to the point where her life might be at risk, because she thinks no one is bothered about abusive acts, and if nothing is done these acts will increase. She is considered to be a rich evacuee compensated by TEPCO, and has become an object of envy to her neighbors. Social isolation is resulting from the insecure living conditions of evacuees.

Case 4 (ID 620: voluntary evacuee)

IES-R = 28, fear of dying from the nuclear disaster (-), worries about loss of hometown (++) , unpleasant experiences at evacuation place (-), absence of a reliable other (+), complaints about family relationships (+), real estate worries (-), worries about livelihood sustainability (+).

A 36-year-old male evacuated from Koriyama city, Fukushima prefecture to Aomori city, Aomori prefecture. He is a so-called ‘voluntary evacuee’. The following quotation is his account of the suffering of one of his relatives who committed suicide after getting divorced.

I understand very well the feelings of those who committed suicide. I’ve been one step away from doing the same thing. My cousin committed suicide one year and a few months ago. Like me, he became an evacuee because of the nuclear accident; later he got divorced and in the end, he committed suicide. His memorial photo reminds me of myself. We had no choice. Even now I hate TEPCO. TEPCO has committed manslaughter.

This statement shows the cruelty of the conditions of social violence leading a man to commit suicide. The narrator himself suffered from depression after the nuclear disaster, and is still undergoing treatment. ‘It is tough. Some days I feel down, some days I feel irritated,’ he complained. His irritation was prompted by the persistent propaganda of the central government and Fukushima Prefecture about the safety and security of districts having their evacuation orders lifted, in spite of lingering contamination levels that he sees as preventing the safe raising of children.

Again and again they say it is safe, it is secure, yet until the conditions for safely raising children are reached, their words are meaningless. I want to go back to a safe hometown.

Moreover ‘There is antagonism in my family over evacuation and the future. I feel helpless’. Finally, he expressed his concern over the future of his country.

Somehow or other we have to go back to the state before the nuclear accident. Therefore at least, we expect the authorities to take responsibility and provide compensation. Japan’s constitution assures preeminent respect for the human person, not for the business company or the country. Nonetheless, Japan is protecting TEPCO and the country above the human person. It is a deplorable situation; I am worried about the future of such a Japan.

Case 5 (ID 1427: voluntary evacuee)

IES-R = 62, fear of dying from the nuclear disaster (+), worries about loss of hometown (-), unpleasant experiences at evacuation place (-), absence of a reliable other (+), complaints about family relationships (++), real estate worries (-), worries about livelihood sustainability (+).

A 38-year-old female evacuated from Koriyama city, Fukushima prefecture to Hiroshima prefecture. She is a so-called 'voluntary evacuee'. Her husband remained in Fukushima prefecture in order not to lose his job and income. The following narrative is her account of suffering as a 'mother and child evacuee'.

I have a four-year-old son. When the earthquake and nuclear accident occurred, he was only one. From that time, it has been the same as having no father. She cannot remember her father's face. Really, it is too far from Hiroshima to Fukushima. So, coming and going is so tough. My husband is living alone in Fukushima and becoming nasty, dissolute and despondent. I don't know what his life is really like. Along with the long distance, it is difficult to communicate with each other. Love and affection have already gone.

This serious family split was caused by the nuclear disaster. This is not a special case. A lot of 'nuclear disaster divorce cases' (*genpatsu rikon*) have been reported by supporters of the victims. In the background to this division lie differing assessments of radiation risk. Most voluntary evacuees, particularly women, are acutely concerned about the danger of low-dose radiation contamination, especially for babies and children. Their decision to escape from Fukushima was often based on careful gathering of information on radiation and health issues. In contrast, many male or elderly people, already disinclined to leave their homeland due to economic concerns or wishing to maintain local human networks, believe the government's safety assurances – the so-called *anzen-anshin shinwa* or 'myth of safety and security'.

It is tough. I never rest. Every day, I have to work hard to get income and of course I have to take care of my child. My body is falling apart, I am on the verge of collapse. I fear I may not live to see my son grow up. The rent is expensive. I really don't have enough money. I heard that some of my acquaintances have been forced into working in the sex industry.

She is also troubled about her livelihood. Because of her double life between Fukushima and Hiroshima, she has to maintain two households.

Case discussion

The subjects of all these five cases may be understood as victims of structural violence. Galtung (1969) described that the structural violence is built into the

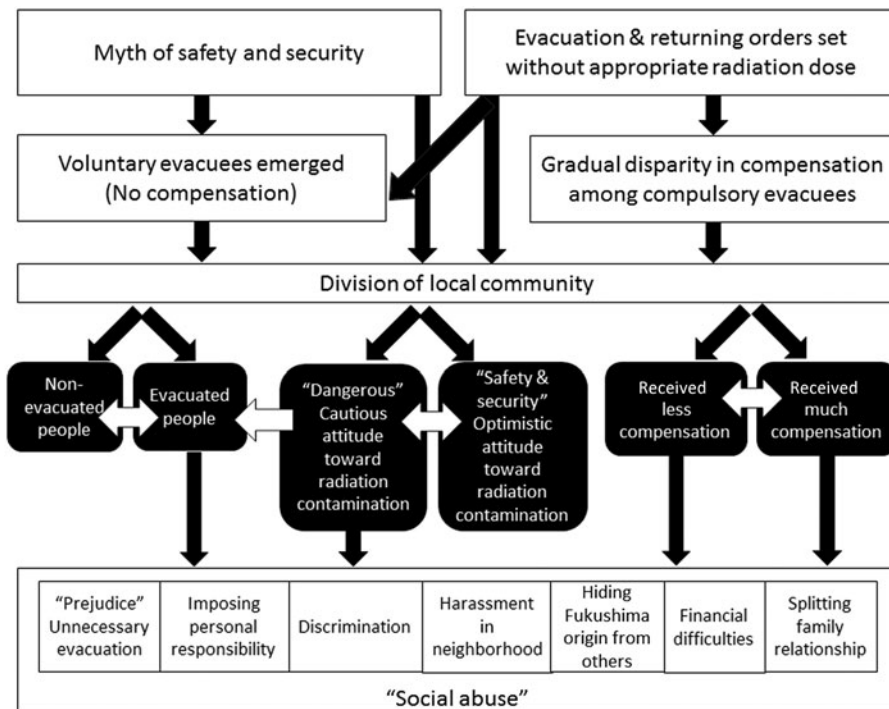


Figure 3 Multi-layer components of structural violence in Fukushima victims

structure and shows up as unequal power and consequently as unequal life chances. Indeed, all the people in the case studies were deprived of life chances and thrown into a tragic life. If there had been no nuclear accident, they could have continued their own normal lives and their fundamental human rights would not have been violated. Along with this definition by Galtung, it is necessary to evaluate the system or the structure of indirect violence. Farmer (2003) described the national or international mechanisms that create and deepen inequalities and which are part of the big system of structural violence.

In our Fukushima study, I evaluated the complex socio-economic and political system of structural violence (Figure 3). Two aspects of main structural violence are determined. One is the setting of evacuation and returning orders without reference to an appropriate radiation dose, and the second is the discourse known as the ‘myth of safety and security’ (*Anzen Anshin Shinwa*). From these kinds of violence, widening disparity in compensation between compulsory evacuees and voluntary evacuees, and the division of local communities have emerged.

The evacuation orders imposed and then sometimes lifted by the Japanese government may be read as a kind of main political violence. Anand Grover, special rapporteur to the United Nations Human Rights Council, called on the government of Japan to ‘formulate a national plan on evacuation zones and

dose limits of radiation by using current scientific evidence, based on human rights rather than on a risk-benefit analysis, and reduce the radiation dose to less than 1 mSv/year' (Grover 2012). The World Health Organization has also analyzed the health risk after the Fukushima Nuclear Accident using dose-response relationship scientific theory (WHO 2013). Without reference to these recommendations by an international agency, the Japanese government chose 20 mSv/year as the borderline dose for lifting evacuation orders. This governments' decision was not based on appropriate scientific evidence (CSRP 2016). Although the Japanese government is not the direct perpetrator of violence, it is part of the system which creates inequity, disparity, and discrimination affecting victims. Because of the government's evacuation order, voluntary evacuees emerged. If there had been different criteria such as 1 mSv/year, fewer voluntary evacuees would have appeared.

Since unequal compensation payments resulted from the enforcing and lifting of evacuation orders, the local community was divided into several groups experiencing different damages and benefits, leading to envy, discrimination and neighborhood feuds over who can return to their homeland and who can get more compensation. Even just among compulsory evacuees, there are obvious gaps in compensation payments. People who own land and housing have done relatively well, whereas people who don't have their own property have fallen into poverty. We can observe 'disparity in compensation' in cases 1 and 2, in which victims received less compensation and fell into 'financial difficulties'. In case 3, the invisible structural violence of prejudice, stemming from the misconception that all the evacuees got a lot of compensation, was manifested as direct harassment by people in the neighborhood.

Another kind of social violence stems from the 'myth of safety and security'. The Japanese government (the Cabinet Office, Reconstruction Agency, and the Ministry of Education, Culture, Sports, Science and Technology) insists that an annual dose of radiation under 20 mSv/year is safe. Believing this myth, people have come to view voluntary evacuation as unnecessary, wanting to impose personal responsibility on voluntary evacuees to make their own living. The 'cautious attitude toward radiation contamination' taken by voluntary evacuees is regarded as 'radiation phobia', resulting in serious cases of 'prejudice of unnecessary evacuation', 'discrimination' and 'harassment in neighborhoods' against voluntary evacuees, as seen in cases 4 and 5.

Farmer (1997) discussed multi-axial models of suffering. The axis of gender is one of the important issues of structural violence. He notes that men have dominated political, legal, and economic institutions to varying degrees in every society. Joshua M. Price (2012) also analyzed the hidden brutality in the lives of women. In cases 2 and 5, gender inequality is an evident factor. In case 2, the victim asked a lawyer to save the situation, but learned that there are no legal protection. Serious splits in family relationships led these victims into

‘nuclear power plant divorce’ (*genpatsu rikon*), and the stress of child care seems to have been a severe psychological stress factor. The results of the IES-R score are extremely high at over 60 points in these two cases.

As mentioned earlier, a score of 25 points or more in IES-R indicates that PTSD is a clinical possibility, and 30 or more is seen as warranting a clinical diagnosis of PTSD. The IES-R score of case 1 is 47, case 2 is 61, case 3 is 34, case 4 is 28, and case 5 is 62. Serious psychological problems are revealed by these scores. As indicated in the introduction to each case, more than three items of psycho-social and economic risks of quantitative data were found in every case. According to each case’s qualitative data, collective psycho-social and economic difficulties were also discovered, and multi-layer components of structural violence can be observed.

Acute-on-chronic: pathological social structure

From our quantitative and qualitative analysis, ‘evacuation and returning orders set without appropriate radiation dose’ and the ‘myth of safety and security’ (*Anzen Anshin Shinwa*) are analyzed as distinct cases of structural violence. However, these phenomena are only part of the superstructure. Farmer (2011), analyzing the acute social problems after the Haiti earthquake, realized that there are chronic social disabilities that have been engendered over five centuries by transnational social and economic forces with deep roots in the colonial enterprise. Following Farmer’s work, we can argue that a ‘pathological chronic state’, in other words ‘basic structural violence’, were also factors in the Fukushima disaster.

First, postwar economic policies promoting the development of nuclear generation of electricity, and postwar use of ‘national security’ as a justification for the peaceful use of nuclear energy are important. Fujigaki (2015) indicated the historical process through which nuclear power plants are embedded in the political, economic, and social context in Japan. Fujigaki also described the way of cultural acceptance of nuclear energy. Japan is the only country ever to have experienced atomic bombing, and people have a strong fear that nuclear energy may kill civilians. However, Fujigaki noticed various policies promoting ‘atoms for peace’ appealing to tropes of ‘autonomy’, ‘openness’ and ‘democratic control’. This history made the ‘myth of safety and security’ part of the superstructure of structural violence.

Second, the structure of social disparity based on competition led by neo-liberalism, the inequity of wealth distribution generated by preferential economic measures for large corporations, and the structural geopolitical exploitation of antagonism between ‘center’ and ‘countryside’, along with the rejection of social responsibility implied by the stress on self-responsibility (*jiko sekinin*) by the medical and social services, can be observed. Farmer (2005)

criticized this neoliberalism which generally refers to an ideology advocating the dominance of a competition-driven market model, without caring about the social and economic inequalities that distort real economies. Farmer pointed out that neoliberal policies and ideologies have generally called for the subjugation of political and social life in Latin America.

A similar phenomenon developed in postwar Japan. Takahashi (2012) analyzed the common factors between Fukushima and Okinawa, where US armed forces permanently stay for pan-Pacific and national security. Takahashi described this antagonism between the urban center and rural periphery as a 'sacrificial social system'. The central political system put priority on economic development and national security before rural sustainability. Takahashi analyzed this sacrificial system by the logic of historical colonialism. Local social systems and local people are always sacrificed by this colonial rule.

The above ideologies of neoliberalism also erode equality of medical and social services. Tsujiuchi (2012) reported social risk of the discourse on Metabolic Syndrome in Japan from the viewpoint of critical medical anthropology. The concept of Metabolic Syndrome is one of the major medical policies by the national government, which recommends self-control health care and finally demands to self-responsibility (*jiko sekinin*) for people's own health status. Thus, health disparity in Japan is formulated by the above ideologies and policies of neoliberalism.

Hence, these several forms of structural violence are the basis of the misfortune brought to the local population by the Fukushima nuclear disaster. Multi-layer components of social forces led directly and indirectly to personal distress.

Conclusion

This article has used large-scale survey results to demonstrate the serious psychological damage and extremely hard living conditions imposed on about 17,000 families from Fukushima prefecture as a result of the 2011 nuclear disaster.

A high level of stress, indicating PTSD possibility, was found in more than 40 per cent of the respondents. The statistical analysis found high levels of stress in evacuees linked to psychological factors such as 'trauma of nuclear disaster (fear of death)', 'loss of hometown', 'unpleasant experiences at place of evacuation', and also social factors such as 'absence of a reliable other' or 'complaints about family relationships', and economic factors such as 'worries over livelihood' and 'worries about real estate', therefore clarifying the complex interaction of factors.

The analysis of the circumstances of the victims of the nuclear accident indicates the presence of 'social abuse by structural violence'. Social abuse is

immersed in the political, economic, social and cultural structure and emerges as social inequity, unequal social opportunities, disparity and discrimination. The structural violence of the nuclear disaster destroyed the living environment and was exacerbated by government policies of return and compensation. Furthermore, traumatic experiences at the living evacuation places and the need to hide their evacuee status hindered victims from integrating into social activities, leading to neglect, isolation and social exclusion. This state of Fukushima evacuees may justifiably be called ‘social abuse’. Neglecting these psychological, social and economic problems is an affront to social justice.

To overcome the abuse of nuclear disaster victims through structural violence, it is necessary to unpack the ‘acute-on-chronic’ social pathology rooted in Japanese society. Violence must not be ignored as if it were somebody else’s problem; robust policies on such social and domestic violence and abuse are essential. The assessment of the situation of the victims in this survey finds structural violence on the surface of individual problems, and also in the background, imbuing a pathological social structure. The responsibility for this structural violence should be shared by all of us, since we are positioned as an important part of the social structure. Violence is not an issue of the other: it is a pathology nesting right under our feet, one that we dismiss at our peril.

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Note

1. For example, Abe made this statement in a speech on 10 March 2014. https://japan.kantei.go.jp/96_abe/statement/201403/press0310.html

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