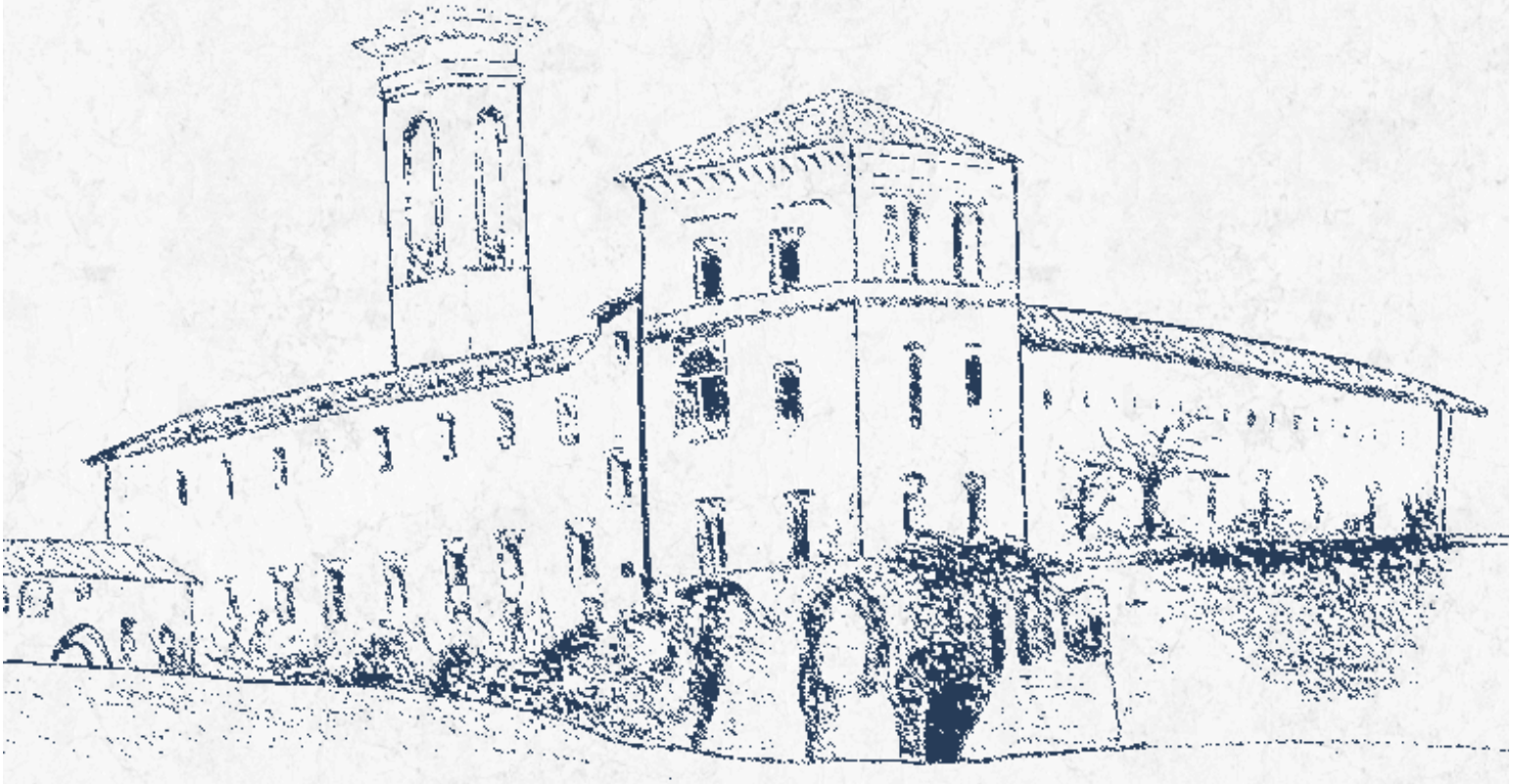
OPEN ACCESS
ISSN 2280-4056

E-Journal of International and Comparative

LABOUR STUDIES

Volume 3, No. 3 September-October 2014



ADAPT
www.adapt.it
UNIVERSITY PRESS

E-Journal of International and Comparative **LABOUR STUDIES**

ADAPT *International School of Higher Education in Labour and Industrial Relations*

E-Journal of International and Comparative

LABOUR STUDIES

Volume 3, No. 3 September-October 2014

ADAPT
www.adapt.it
UNIVERSITY PRESS

Online Publication of the ADAPT Series
Registration No. 1609, 11 November 2001, Court of Modena
www.adaptbulletin.eu

Results of an Analysis of Personal Questionnaire Surveys on the Great East Japan Earthquake: Income, Workplace, Daily Living, and Health[1]

Hiroshi Yoshida *

More than two and a half years following the Great East Japan Earthquake, it has become time to summarize "what the disaster brought to our society" as reconstruction continues. This paper considers lessons to be gleaned in preparation for a feared "massive earthquake of the future" from the results of questionnaire surveys of individuals living in areas afflicted by the recent disaster, the Tokyo metropolitan area, and throughout Japan that were conducted by Tohoku University's Yoshida Laboratory. Results here cover activities on the day of the earthquake,

[1] Research on study conducted based on this report (Study A) received a subsidy from the Ministry of Health, Labour and Welfare's Grant-in-Aid for Scientific Research scheme title "*Higashi Nihon Daishinsai-to ni Yoru Iryo-Hoken Bunya no Tokei Chosa no Eikyo ni kan-suru Kodo Bunseki to Hyoka-Suikei (H24-Tokei-Ippan-002 (Fukko))*" (advanced analysis and evaluation/estimates on the effects of the Great East Japan Earthquake, etc., on statistical surveys in the medical and health care fields). Study B received a subsidy from an East Asia project of Tohoku University's Graduate School of Economics and Management/Faculty of Economics.
(http://www.econ.tohoku.ac.jp/econ/strategy/RS/sub5/sub5.html, Higashi Ajia Choki Jizoku-teki Seicho no Keizai Shisutemu Kagaku Kenkyu Kyoten no Keisei to Tenkai [formation and development of bases for research on economic systems science for long-term sustainable growth in East Asia]).
* Professor (concurrent post), Graduate School of Economics and Management and International Research Institute of Disaster Science, Tohoku University hyoshida@econ.tohoku.ac.jp .

health, impact on daily living (housing, income, human relationships, etc.), expectations for government, awareness of radiation, changes in thinking vis-à-vis disaster management, and the people most depended upon.

1. Introduction

1.1. Motivation

In Yoshida (2013a), a research group that included the author accumulated official government statistics on medical care, health care, and welfare in areas afflicted by the Great East Japan Earthquake for the times before and after the disaster and compared them. This was done to ascertain the health status of residents in the afflicted areas given the passage of two years following the disaster. The results clearly showed a high probability that currently obtained official statistics cannot be directly linked with needs for medical and welfare services and the actual mental health circumstances of residents. Problems with official statistics that were identified from Yoshida (2013a) are as follows:

(1) Statistically, Medical Care Expenses, Numbers of Patients, and Demand for Nursing Care Insurance have been Decreasing In the Afflicted Areas since the Disaster.

Despite the fact that many people, including the elderly, in the afflicted areas suffered health issues at the time of the disaster, statistics calculated from actual figures for medical expenses and nursing care services in Iwate, Miyagi, and Fukushima Prefectures produce data showing that the medical expenses of residents and use of nursing care services by the elderly have declined since the disaster.

(2) Despite Post-Disaster Stress, Statistics Show that Suicide Rates in the Afflicted Regions are lower than the National Average.

There is research showing that suicide rates following major disasters in other countries rose by more than 10% (Etienne et al., 1998). However, statistics suggest that suicide rates in the afflicted areas have been below the national average in years since the disaster. Since the disaster, only Miyagi Prefecture has shown a reversed increasing trend in the second year following the disaster. Thus, there are concerns about possible delay in the psychological rebound of people who experienced the disaster.

(3) There are Losses and Distortions in Statistical Data that were Caused by the Disaster.

It can be pointed out that a reason for the existence of such statistical data that, at first glance, seems odd and inconsistent with actual circumstances is the occurrence of numerous irregular factors. Among them are losses of data in statistical surveys that were caused by the disaster, the inability to provide hospitals and nursing-care businesses even when needs existed, and failure to account for items in statistics because they were handled specially outside the boundaries of traditional medical care and welfare systems.

Using currently obtained data as supporting data when making decisions about the status of reconstruction in afflicted areas, formulating medium- and long-term public welfare policies, and studying other major disasters and their countermeasures is risky. This makes statistical correction, additional surveys, and attention to rereading and interpretation of values necessary.

A statistical material that is generally used to ascertain the health circumstances of Japan's public is the "Comprehensive Survey of Living Conditions" conducted by the Ministry of Health, Labour and Welfare. Conducted every three years, this survey studies the health circumstances of residents throughout Japan using "health questionnaires." However, 2011, the year that the Great East Japan Earthquake struck, was not a scheduled year of the health questionnaire-based survey, and thus no statistics were obtained that could give a comprehensive picture on the disaster's impact on the public's health. Although numerous surveys that attempted to ascertain effects on health after the disaster were planned and executed, their use posed problems, as they focused only on municipalities in the afflicted regions or on specific groups, such as people in evacuation centers or regions affected by the nuclear power plant accident.

Thus, given the need to accurately ascertain actual disaster circumstances in statistical form, the author conducted an original survey for this study that includes the following items. By obtaining comprehensively surveyed data on changes in people's mental and physical health state both immediately following the disaster and subsequently, the author was able to conduct a detailed study of whether or not effects on health that are observed in the afflicted areas are characteristic phenomena by comparing the data with changes in the health circumstances of ordinary residents in non-afflicted areas throughout Japan over the past two years.

1.2. Outline of the Original Surveys

The report of this paper is based on results obtained from the following two questionnaire surveys.

Survey A Y. Tsukuda, S. Masuda, H. Yoshida, T. Watanabe, M. Sato, *Higashi Nihon Daishinsai-go no Kenko oyobi Seikatsu ni kan-suru Anketo Chosa (Kihon Shukei Kekka)* (questionnaire survey on health and daily living following the Great East Japan Earthquake (results of basic tabulation)), April 2013.

This survey targeted three prefectures that were directly afflicted by the disaster (Iwate, Miyagi, and Fukushima) as well as other prefectures. Using an Internet research company, the survey's authors requested the cooperation of people registered with the company and received 850 samples (of which 480 came from the three afflicted prefectures and 370 came from other prefectures throughout Japan). They responses received concerned 1) physical health, 2) mental health, 3) receipt of care from medical institutions, 4) changes in living environment, 5) awareness of radiation, and 6) changes in location of residence. The date of the survey was March 21, 2013, which was two years after the date of the Great East Japan Earthquake.

Survey B H. Yoshida, M. Sato, *Higashi Nihon Daishinsai ni kan-suru Yoron Chosa (Kihon Shukei Kekka)* (public opinion survey on the Great East Japan Earthquake (results of basic tabulation)), May 2013.

This survey targeted three prefectures that were directly afflicted by the disaster (Iwate, Miyagi, and Fukushima) as well as prefectures in and around the Tokyo metropolitan area (Saitama, Ibaraki, Chiba, and Tokyo). Using a membership-based Internet survey agency, the authors asked for the cooperation of members in answering questions concerning 1) living environment, 2) rubble disposal, 3) evacuation at the time of the disaster, 4) government response, and 5) changes in awareness following the disaster. Responses were received from 838 samples (of which, 422 were from the three afflicted prefectures and 416 were from the other prefectures). The survey was held on March 28, 2013.

2. Survey A Report on the Results on the Survey related to Health and Daily Living

The following provides a brief overview of health-related results in Survey A.

2.1. Health-Related Survey Results

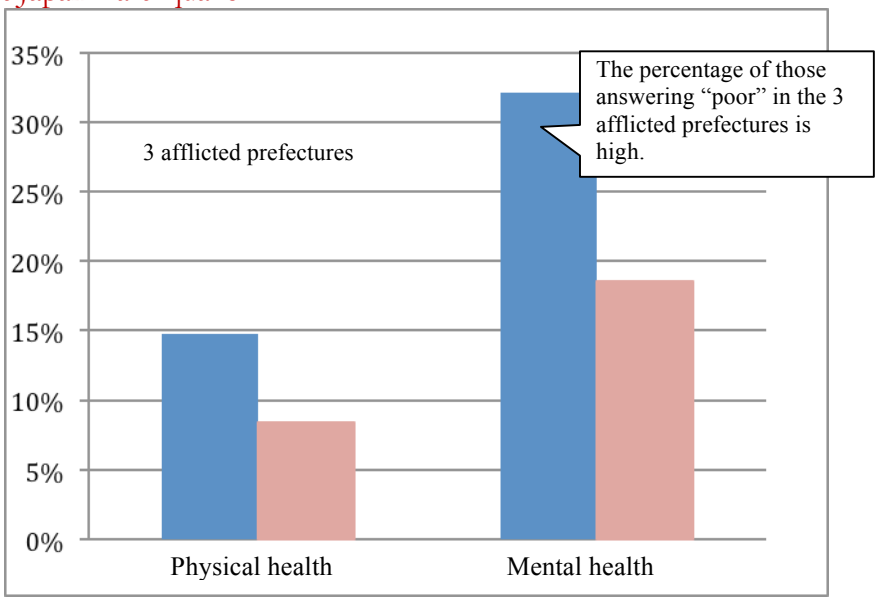
(1) Status of Mental and Physical Health Immediately Following the Great East Japan Earthquake

To begin, Table 1 provides a summary of results obtained when respondents were asked about the state of their mental and physical health during the first three months following the Great East Japan Earthquake. Looking at Table 1, the percentage of people in the three afflicted prefectures who said their physical health state was "poor" is 14.8%. This is higher than the national average of residents living in non-afflicted prefectures, which is 8.4%. This trend is even larger for mental health, as 32.1% of respondents in the three afflicted prefectures answered that their mental health was "poor" immediately following the disaster. This figure is considerably higher than the 18.6% national average in the non-afflicted prefectures. As is shown in Figure 1, these results suggest that residents in the three afflicted prefectures had poorer health states than those in other prefectures at a point immediately following the disaster, and that this phenomenon was more apparent in the case of mental health.

Table 1. States of Mental/Physical Health Immediately Following the Great East Japan Earthquake[2].

	Physical health				Mental health			
	Total	**Good**	**Average**	**Poor**	**Total**	**Good**	**Average**	**Poor**
3 afflicted prefectures	480	20	389	71	480	20	306	154
	100.0	4.2	81.0	**14.8**	100.0	4.2	63.8	**32.1**
Other prefectures (nationwide)	370	14	325	31	370	11	290	69
	100.0	3.8	87.8	**8.4**	100.0	3.0	78.4	**18.6**
Total	850	34	714	102	850	31	596	223
	100.0	4.0	84.0	12.0	100.0	3.6	70.1	26.2

Figure 1. Percentages of People who Answered that their State of Mental/Physical Health was "Poor" Immediately Following the Great East Japan Earthquake[2].



Source: Author' Own Elaboration.

[2] The upper row is the number of responses, while the lower row is the percentage. The table was prepared by the author from the results of the questionnaire survey (Q1, Q2). The question was phrased as follows: "This item pertains to your physical (mental) health. Please respond with regard to the state of your physical (mental) health at the time of the Great East Japan Earthquake and at the present time. Please select the option that best applies. Please note that 'the time of the Great East Japan Earthquake' as it is used here refers to the three-month period that immediately followed the Great East Japan Earthquake".

(2) Changes in States of Physical and Mental Health Two Years after the Disaster

Next, Table 2 summarizes the results of a survey on changes of health state (i.e., "improved," "no change," or "worsened") during the two years following the disaster. Looking at these results, the percentage of residents in the three afflicted prefectures who answered "improved" for physical health is 10.2%, which is higher than the national average of 7.3%. Similarly for mental health, the percentage for this response in the three afflicted regions is 15.6%, which is higher than the national average of 10.0% for the non-afflicted regions. Thus, it was observed that, although health states temporarily suffered as a result of the disaster, both physical health and mental health showed recoveries in the three afflicted prefectures during the subsequent two years. At the same time, however, the percentage of people who answered that their state of physical health had "worsened" during the subsequent two years compared to immediately following the disaster is 9.8%, which is high compared to the national average of 5.9% for non-afflicted prefectures. The same thing can be said about mental health, where the percentage of residents in the three afflicted prefectures who answered "worsened" is 13.3%. This figure is higher than the national average of 8.6% for the non-afflicted prefectures. Thus, as can be seen in Figure 2, a split into "people whose condition is recovering" and "people whose condition is not recovering or is worsening" is occurring in the afflicted areas two years after the disaster, and there is the distinct possibility that mental and physical health states are becoming more disparate.

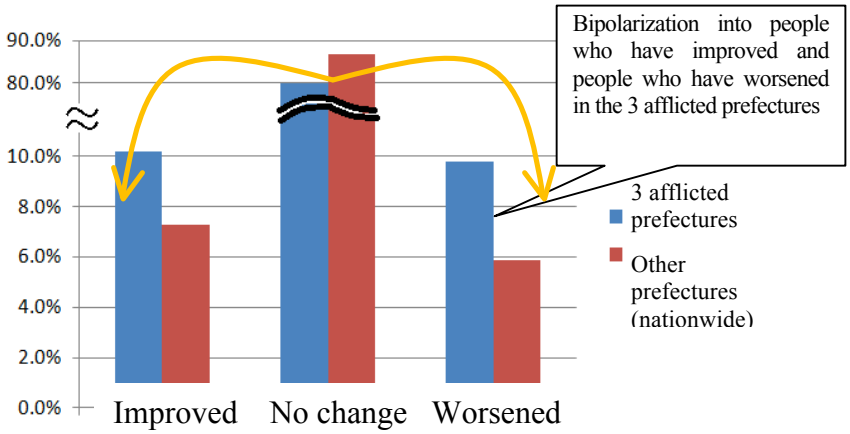
Table 2. Changes in States of Physical/Mental Health Two Years after the Disaster[3].

	Physical health			
	Total	**Improved**	**No change**	**Worsened**
3 afflicted prefectures	480	49	384	47
	100.0	**10.2**	80.0	**9.8**
Other prefectures (nationwide)	370	27	321	22
	100.0	**7.3**	86.8	**5.9**
Total	850	76	705	69
	100.0	8.9	82.9	8.1
	Mental health			
	Total	**Improved**	**No change**	**Worsened**
3 afflicted prefectures	480	75	341	64
	100.0	**15.6**	71.0	**13.3**
Other prefectures (nationwide)	370	37	301	32
	100.0	**10.0**	81.4	**8.6**
Total	850	112	642	96
	100.0	13.2	75.5	11.3

Source: Author's Own Elaboration.

[3] The upper row is the number of responses, while the lower row is the percentage. The table was prepared by the author from the results of the questionnaire survey (Q1, Q2). The question was phrased as follows: "This item pertains to your physical (mental) health. Please respond with regard to the state of your physical (mental) health at the time of the Great East Japan Earthquake and at the present time. Please select the option that best applies".

Figure 2. Changes in States of Physical Health two Years after the Disaster[3].



Source: Author's Own Elaboration.

(3) Effects on the Health of Women and the Elderly

Finally, states of mental and physical health immediately following the disaster and subsequent two-year changes were tabulated by gender and age group. This was done to identify which attributes among residents of the afflicted areas demonstrated the strongest effect on health.

(3.1) Risk of Disaster-Related Negative Impact on Health for Women that is more than triple that for Men

Table 3 shows results that were obtained when data on state of mental and physical health immediately following the Great East Japan Earthquake were re-tabulated by sex. Looking at the table, the percentage of female respondents in the afflicted areas that answered that their physical health is "poor" is 20.4%, which is higher than the 9.2% for men in the same afflicted areas. The percentage of women who answered that their state of physical health is "poor" is also generally high when compared to men nationwide (i.e., in non-afflicted prefectures). However, when it is considered that the percentage for these women is 10.8%, it is apparent that a higher percentage of women are suffering from worsening health in the afflicted regions.

Table 3. States of Mental/Physical Health Immediately Following the Great East Japan Earthquake by Sex[4].

		Physical health			
		Total	**Good**	**Average**	**Poor**
3 afflicted prefectures	**Men**	240	12	206	22
		100.0	5.0	85.8	9.2
	Women	240	8	183	49
		100.0	3.3	76.3	**20.4**
Other prefectures (nationwide)	**Men**	185	6	168	11
		100.0	3.2	90.8	5.9
	Women	185	8	157	20
		100.0	4.3	84.9	**10.8**
Total		850	34	714	102
		100.0	4.0	84.0	12.0
		Mental Health			
		Total	**Good**	**Average**	**Poor**
3 afflicted prefectures	**Men**	240	9	174	57
		100.0	3.8	72.5	23.8
	Women	240	11	132	97
		100.0	4.6	55.0	**40.4**
Other prefectures (nationwide)	**Men**	185	5	156	24
		100.0	2.7	84.3	13.0
	Women	185	6	134	45
		100.0	3.2	72.4	**24.3**
Total		850	31	596	223
		100.0	4.0	70.1	26.2

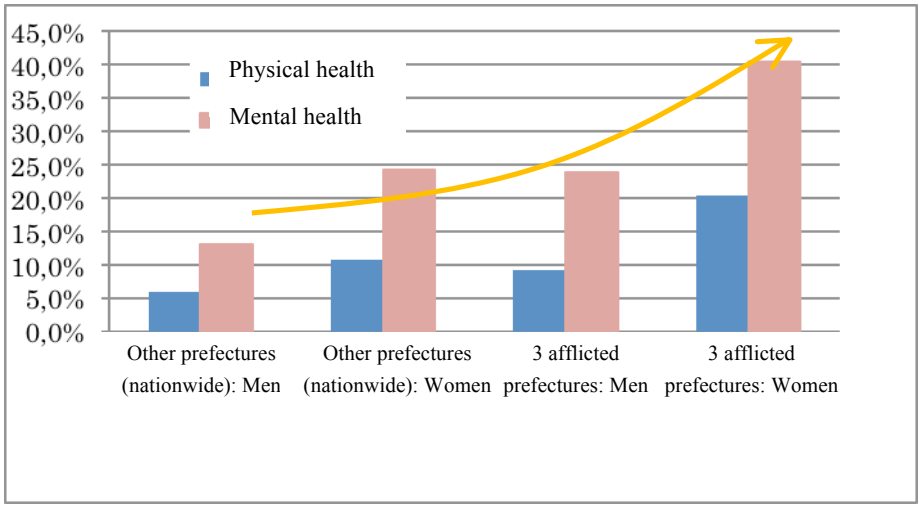
Source: Author's Own Elaboration.

It deserves noting that this trend is even more marked in the case of mental health. Of women in the afflicted areas, a considerably high percentage of 40.4% answered that their mental health state was "poor" immediately following the Great East Japan Earthquake.

As is shown in Figure 3, when the state of health of men in non-afflicted areas is used as the base, the percentage of responses indicating "poor" state of health rises with the factors "residing in an afflicted area" and "female". It reaches 3.46 times (=20.4%/5.9%) in the case of physical health and 3.11 times (=40.4%/13%) in the case of mental health. Thus, it is possible that the risk that women in the afflicted areas will suffer from poorer mental or physical health as a result of the disaster more than triples.

[4] The upper row is the number of responses, while the lower row is the percentage. Other details are the same as Table 1. Tabulated by sex.

Figure 3. Percentages of People who answered that their State of Mental/Physical Health was "Poor" Immediately Following the Great East Japan Earthquake by Sex[4].



Source: Author's Own Elaboration.

Table 3 looked at the evaluation of mental and physical health immediately following the disaster in terms of sex. Next, Table 4 shows tabulated results concerning changes in state of health during the two-year period following the disaster.

Table 4. Changes in States of Physical/Mental Health two Years after the Disaster by Sex[5].

		Physical health			
		Total	Improved	No change	Worsened
3 afflicted prefectures	Men	240	19	199	22
		100.0	7.9	82.9	9.2
	Women	240	30	185	25
		100.0	12.5	77.1	10.4
Other prefectures (nationwide)	Men	185	8	164	13
		100.0	4.3	88.6	7.0
	Women	185	19	157	9
		100.0	10.3	84.9	4.9
Total		850	76	705	69
		100.0	8.9	82.9	8.1
		Mental Health			
		Total	Improved	No change	Worsened
3 afflicted prefectures	Men	240	27	185	28
		100.0	11.3	77.1	11.7
	Women	240	48	156	36
		100.0	20.0	**65.0**	15.0
Other prefectures (nationwide)	Men	185	12	156	17
		100.0	6.5	84.3	9.2
	Women	185	25	145	15
		100.0	13.5	78.4	8.1
Total		850	112	642	96
		100.0	13.2	75.5	11.3

Source: Author's Own Elaboration.

Looking at Table 4, the percentages of people who answered that their state of mental/physical health had "improved" are higher but improving for both men and women in the three afflicted prefectures compared to the national average for the other prefectures. However, as was pointed out for Table 2, the percentages of people who answered "worsened" are also high in the afflicted areas for both men and women, leading to concern that a so-called "bipolarization" of health states is occurring. This bipolarization trend is more evident among women than men in the afflicted areas. This becomes clear when looking at the percentages of "no change" outside of "improved" and "worsened." A look at the table shows that, in particular, 65% of women in the afflicted areas answered "no change." This was the lowest percentage when compared to the percentages of "no change" for the other respondent attributes. This

[5] The upper row is the number of responses, while the lower row is the percentage. Other details are the same as Table 2. Tabulated by sex.

suggests that health disparities continue to grow among women in the afflicted areas.

(3.2) Worsening Health among Elderly People aged 50 years or Older

In this section, the ages of respondents are classified into "less than 50 years" and "50 years or older" to examine the effects that the Great East Japan Earthquake had on health by age group.

Table 5. States of Mental/Physical Health Immediately Following the Great East Japan Earthquake by Age Group[6].

		Physical health			
		Total	Good	Average	Poor
3 afflicted prefectures	Less than 50 years	288	14	232	42
		100.0	4.9	80.6	14.6
	50 years or older	192	6	157	29
		100.0	3.1	81.8	15.1
Other prefectures (nationwide)	Less than 50 years	222	11	190	21
		100.0	5.0	85.6	9.5
	50 years or older	148	3	135	10
		100.0	2.0	91.2	6.8
Total		850	34	714	102
		100.0	4.0	84.0	12.0
		Mental health			
		Total	Good	Average	Poor
3 afflicted prefectures	Less than 50 years	288	12	175	101
		100.0	4.2	60.8	35.1
	50 years or older	192	8	131	53
		100.0	4.2	68.2	27.6
Other prefectures (nationwide)	Less than 50 years	222	9	166	47
		100.0	4.1	74.8	21.2
	50 years or older	148	2	124	22
		100.0	1.4	83.8	14.9
Total		850	31	596	223
		100.0	3.6	70.1	26.2

Source: Author's Own Elaboration.

[6] The upper row is the number of responses, while the lower row is the percentage. Other details are the same as Table 1. Tabulated by age group.

Looking at Table 5, although the percentages for "poor" are higher in the three afflicted prefectures compared to other regions nationwide for both mental and physical health, there is no significant difference among the age groups in terms of physical health. As for mental health, the percentage answering "poor" for the "less than 50 years" group in the afflicted areas is 35.1%, which is higher than that for the more elderly "50 years or older" group in the afflicted areas. However, it must be noted that a similar trend is evident for mental health in the national averages.

Next, Table 6 shows tabulated results concerning changes in state of health during the two-year period following the disaster with focus on the same age groups. Here, trends that differ from those seen in Table 5 are observed. First, looking at physical health, the percentage of respondents who answered "improved" during the two-year period following the disaster in the "less than 50 years" group is 13.5%, which is higher than the 8.7% who answered "worsened." In contrast, the percentage of those who answered "worsened" in the "50 years or older" group is 11.5%, which is higher than the 5.2% who answered "improved." Similarly, looking at mental health, the percentage of respondents who answered "improved" in the "less than 50 years" group is 20.1%, which is higher than the 11.5% who answered "worsened." The opposite trend is seen in the "50 years or older" group, where the percentage of those who answered "worsened" is higher.

From the above, it is apparent that there was little difference between age groups in terms of physical health in the afflicted areas immediately following the disaster, although the "less than 49 years" group showed slightly poorer mental health states. However, after the passage of two years, there are rising percentages of respondents in the "50 years or older" group who answered "worsened" for both mental and physical health, which on average suggests a worsening trend. Thus, the possibility that the disaster has caused expanding disparities in states of health between the age groups is a concern.

Table 6. Changes in States of Physical/Mental Health two Years after the Disaster by Age Group[7].

		Physical health			
		Total	Improved	No change	Worsened
3 afflicted prefectures	Less than 50 years	288	39	224	25
		100.0	**13.5**	77.8	8.7
	50 years or older	192	10	160	22
		100.0	5.2	83.3	**11.5**
Other prefectures (nationwide)	Less than 50 years	222	20	188	14
		100.0	9.0	84.7	6.3
	50 years or older	148	7	133	8
		100.0	4.7	89.9	5.4
Total		850	76	705	69
		100.0	8.9	82.9	8.1
		Mental health			
		Total	Improved	No change	Worsened
3 afflicted prefectures	Less than 50 years	288	58	197	33
		100.0	**20.1**	68.4	11.5
	50 years or older	192	17	144	31
		100.0	8.9	75.0	**16.1**
Other prefectures (nationwide)	Less than 50 years	222	29	179	14
		100.0	13.1	80.6	6.3
	50 years or older	148	8	122	18
		100.0	5.4	82.4	12.2
Total		850	112	642	96
		100.0	13.2	75.5	11.3

Source: Author's Own Elaboration.

(4) Receipt of Care from Medical Institutions

Next, this section looks at results concerning the receipt of care from medical institutions. To begin, it is apparent that a slightly high percentage of men in the afflicted areas did not receive medical care immediately following the disaster.

[7] The upper row is the number of responses, while the lower row is the percentage. Other details are the same as Table 2. Tabulated by age group.

Table 7. Receipt of Medical Care Immediately following the Great East Japan Earthquake[8].

		Total	Receiving care	Require care but not receiving it	No need for care
Total		850	232	91	527
		100.0	27.3	10.7	62.0
Region of residence (by sex)	Afflicted areas: Men	240	59	32	149
		100.0	24.6	13.3	62.1
	Afflicted areas: Women	240	69	22	149
		100.0	28.8	9.2	62.1
	Other areas: Men	185	55	19	111
		100.0	29.7	10.3	60.0
	Other areas: Women	185	49	18	118
		100.0	26.5	9.7	63.8

Source: Author's Own Elaboration.

Next, there are many people, both male and female, in the afflicted areas who are not receiving the medical care they require now.

Table 8. Receipt of Medical Care at the Present Time[9].

		Total	Receiving care	Require care but not receiving it	No need for care
Total		850	59	82	709
		100.0	6.9	9.6	83.4
Region of residence (by sex)	Afflicted areas: Men	240	17	27	196
		100.0	7.1	**11.3**	81.7
	Afflicted areas: Women	240	15	23	202
		100.0	6.3	**9.6**	84.2
	Other areas: Men	185	16	17	152
		100.0	8.6	9.2	82.2
	Other areas: Women	185	11	15	159
		100.0	5.9	8.1	85.9

Source: Author's Own Elaboration.

[8] The upper row in the table is the number of respondents (people). The lower row shows the response rate (%) within the total.
Q3: "This item pertains to your receipt of medical care at a hospital or other medical institution. Please answer regarding your receipt of care at a hospital, etc., for a physical or mental health condition at the present time. Please select the option that best applies."
[9] The upper row in the table is the number of respondents (people). The lower row shows the response rate (%) within the total.

2.2. Changes in Living Environment

Next, this section examines comparisons with pre-disaster conditions in three areas—namely, income, residential environment, and human relationships—in order to see changes in living environments that occurred after the disaster.

Q4: "This item pertains to changes in your current living environment compared to conditions prior to the Great East Japan Earthquake. Please respond by comparing your current income, residential environment, and human relationships with those that existed prior to the disaster. Please select the option that best applies."

(1) Income

In terms of income, the results for the afflicted areas are not particularly bad.

Table 9. Changes in Income[10].

		Total	Better	Somewhat better	No change	Somewhat worse	Worse
Total		850	21	58	519	149	103
		100.0	2.5	6.8	61.1	17.5	12.1
By region of residence	3 afflicted prefectures	480	14	38	276	81	71
		100.0	2.9	**7.9**	57.5	16.9	14.8
	Other regions	370	7	20	243	68	32
		100.0	1.9	5.4	65.7	**18.4**	8.6

Source: Author's Own Elaboration.

[10] The upper row in the table is the number of respondents (people). The lower row shows the response rate (%) within the total.

(2) Residential environment

Residential environments are clearly worsening in the afflicted areas.

Table 10. Changes In Residential Environment[11].

		Total	Better	Somewhat better	No change	Somewhat worse	Worse
Total		850	19	35	659	91	46
		100.0	2.2	4.1	77.5	10.7	5.4
By region of residence	3 afflicted prefectures	480	15	24	329	72	40
		100.0	3.1	5.0	68.5	**15.0**	**8.3**
	Other regions	370	4	11	330	19	6
		100.0	1.1	3.0	89.2	5.1	1.6

Source: Author's Own Elaboration.

(3) Human relationships

While many responses from the afflicted areas indicated that human relationships were "worse," the afflicted areas also produced more answers of "better" than the other regions. This may suggest a split into two distinct groups.

Table 11. Changes in Human Relationships[12].

		Total	Better	Somewhat better	No change	Somewhat worse	Worse
Total		850	15	81	652	75	27
		100.0	1.8	9.5	76.7	8.8	3.2
By region of residence	3 afflicted prefectures	480	10	56	342	53	19
		100.0	2.1	**11.7**	71.3	**11.0**	**4.0**
	Other regions	370	5	25	310	22	8
		100.0	1.4	6.8	83.8	5.9	2.2

Source: Author's Own Elaboration.

(4) Awareness of Radiation

Immediately following the disaster, a contrasting distribution existed whereby awareness of radiation was strong in the afflicted areas but nonexistent in other regions.

[11] The upper row in the table is the number of respondents (people). The lower row shows the response rate (%) within the total.

[12] The upper row in the table is the number of respondents (people). The lower row shows the response rate (%) within the total.

Table 12. Awareness of Radiation at the Time of the Great East Japan Earthquake[13].

		Total	Strong	Weak	No awareness
Total		850	542	38	270
		100.0	63.8	4.5	31.8
By region of residenc	3 afflicted prefectures	480	315	22	143
		100.0	**65.6**	4.6	29.8
	Other regions	370	227	16	127
		100.0	61.4	4.3	**34.3**

Source: Author's Own Elaboration.

However, currently both the afflicted areas and other regions are showing stronger awareness. The afflicted areas produced more responses of "weaker" than the other regions, while in fact the other regions produced more responses of "stronger."

Table 13. Current Awareness of Radiation[14].

		Total	Stronger	Weaker	No change
Total		850	409	168	273
		100.0	48.1	19.8	32.1
By region of residence	3 afflicted prefectures	480	230	108	142
		100.0	47.9	**22.5**	29.6
	Other regions	370	179	60	131
		100.0	48.4	16.2	35.4

Source: Author's Own Elaboration.

3. Survey B Situation at the Time of the Disaster, Government, Response, and Changes in Awareness

This next section clarifies 1) living environments, 2) rubble disposal, 3) evacuation at the time of the disaster, 4) government response, and 5) changes in awareness following the disaster based on Survey B.

[13] The upper row in the table is the number of respondents (people). The lower row shows the response rate (%) within the total.
[14] The upper row in the table is the number of respondents (people). The lower row shows the response rate (%) within the total.

3.1. Situation at the time of the Disaster

(1) Place of Lodging

On the day that the earthquake struck, 78% of respondents in the afflicted areas and 83% in the Tokyo metropolitan area stayed at their own home. A point worth noting in the case of the Tokyo metropolitan area is that nearly 10% of respondents stayed at their "place of employment," which points to a strong need for disaster-management measures at companies.

Table 14. Place of Lodging on the Day of the Disaster.

		Q3 From the day of the disaster to the following day (March 11 to 12, 2011), where did you stay? *If you stayed at more than one place, please choose the one at which you spent the longest time.													
		Total	Own home (undamaged)	Own home (damaged)	Relative's home	Building of employment	Government building (ex.: city office, prefectural office)	School	Hospital	Other public facility (ex.: gymnasium, community center)	Private-sector lodging or hotel	Private facility	On street or in park	Public transport facility (ex.: train station)	Other
Total		838	419	259	28	50	5	22	5	20	6	2	8	1	13
		100.0	50.0	30.9	3.3	6.0	0.6	2.6	0.6	2.4	0.7	0.2	1.0	0.1	1.6
Afflicted areas	**3 afflicted prefectures**	422	160	171	18	11	4	15	4	19	5	1	6	0	8
		100.0	37.9	40.5	4.3	2.6	0.9	3.6	0.9	4.5	1.2	0.2	1.4	0.0	1.9
	Near Tokyo met. area	416	259	88	10	39	1	7	1	1	1	1	2	1	5
		100.0	62.3	21.2	2.4	**9.4**	0.2	1.7	0.2	0.2	0.2	0.2	0.5	0.2	1.2

Source: Author's Own Elaboration.

Table 15. Cases Excluding "Own Home (Undamaged).

	Own home (damaged)	Relative's home	Building of employment	Government building	School	Hospital	Other public facility	Private-sector lodging	Private facility	On street	Public transport facility	Other
Afflicted areas	**65.3 %**	6.9 %	4.2 %	1.5 %	5.7 %	1.5 %	7.3 %	1.9 %	0.4 %	2.3 %	0.0 %	3.1 %
Tokyo met. area	56.1 %	6.4 %	**24.8 %**	0.6 %	4.5 %	0.6 %	0.6 %	0.6 %	0.6 %	1.3 %	**0.6 %**	3.2 %

Source: Author's Own Elaboration.

(2) Method for Obtaining Information

Table 16. Method for Obtaining Information.

		Q8 What was your primary source of information at the time of the disaster? Please select all of the following that apply.										
		Total	Television	Radio	Mobile phone television ("one-seg TV")	E-mail, Twitter, etc.	Internet website	Newspaper	Announcements by city dept., etc.	Word of mouth	Other means	None in particular
Total		838	414	428	168	104	189	102	52	75	22	18
		100.0	49.4	51.1	20.0	12.4	22.6	12.2	6.2	8.9	2.6	2.1
Afflicted areas	**3 afflicted prefectures**	422	126	273	116	52	54	60	35	53	10	11
		100.0	29.9	**64.7**	27.5	12.3	12.8	14.2	8.3	12.6	2.4	2.6
Afflicted areas	**Near Tokyo met. area**	416	288	155	52	52	135	42	17	22	12	7
		100.0	**69.2**	37.3	12.5	12.5	32.5	10.1	4.1	5.3	2.9	1.7

Source: Author's Own Elaboration.

Looking means of obtaining information, radio was the most common in the afflicted areas (where some power outages occurred), while television

was the most common in the Tokyo metropolitan area. There was also a difference in Internet use between the two regions.

3.2. Opinions vis-à-vis Government

(1) Persons/Organizations that Proved Reliable

It is worth noting that confidence in the government and public institutions was low, and that respondents relied on local residents and family in the afflicted areas and others in the workplace in the Tokyo metropolitan area.

Table 17. Persons/Organizations that Proved Reliable.

	Q10 On which of the following did you rely most at the time of the disaster. Please choose one.															
	Total	Prime minister/other minister	Prefectural governor	Mayor	Diet member	Bureaucrats	Teacher	Police	Fire dept.	Self-Defense Forces	Neighborhood association, neighbors	Family, relatives	Others in the workplace	Volunteers, NPOs	Other	None in particular
Total	838	2	5	3	0	0	7	7	17	53	74	341	68	7	30	224
	100.0	0.2	0.6	0.4	0.0	0.0	0.8	0.8	2.0	6.3	8.8	40.7	8.1	0.8	3.6	26.7
Iwate	107	0	1	0	0	0	0	0	4	4	10	51	10	1	6	20
	100.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	3.7	3.7	9.3	47.7	9.3	0.9	5.6	18.7
Miyagi	207	1	4	0	0	0	3	1	3	17	32	91	14	2	9	30
	100.0	0.5	1.9	0.0	0.0	0.0	1.4	0.5	1.4	8.2	15.5	44.0	6.8	1.0	4.3	14.5
Fukushima	108	0	0	0	0	0	0	1	4	6	8	52	6	0	1	30
	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	3.7	5.6	7.4	48.1	5.6	0.0	0.9	27.8
Ibaraki	105	1	0	0	0	0	0	1	3	7	13	44	7	1	2	26
	100.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	2.9	6.7	12.4	41.9	6.7	1.0	1.9	24.8
Saitama	110	0	0	0	0	0	1	1	2	7	3	37	9	3	4	43
	100.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	1.8	6.4	2.7	33.6	8.2	2.7	3.6	39.1
Chiba	104	0	0	2	0	0	2	0	1	6	6	36	9	0	3	39
	100.0	0.0	0.0	1.9	0.0	0.0	1.9	0.0	1.0	5.8	5.8	34.6	8.7	0.0	2.9	37.5
Tokyo	97	0	0	1	0	0	1	3	0	6	2	30	13	0	5	36
	100.0	0.0	0.0	1.0	0.0	0.0	1.0	3.1	0.0	6.2	2.1	30.9	13.4	0.0	5.2	37.1

Source: Author's Own Elaboration.

(2) Confidence in Announcements Concerning Disaster Rubble Safety

Regarding announcements concerning the safety of disaster rubble, the most common response in Fukushima Prefecture was "do not trust any

organizations regarding safety", which demonstrates extremely strong distrust.

Table 18. Organizations Trusted with Safety.

	Q13 Which organizations do you think are the most trustworthy regarding their announcements concerning the safety of disaster rubble?										
	Total	Government (METI, etc.)	Prefectural governor	Mayor	Electric power company	Research institute of university, etc.	Nuclear Regulation Authority	Specialized organization from other country	Other organization	Do not trust the safety of information announced by any of the above	Do not know
Total	838	121	81	87	5	104	13	99	7	186	135
	100.0	14.4	9.7	10.4	0.6	12.4	1.6	11.8	0.8	22.2	16.1
Iwate	107	8	16	23	1	11	1	5	3	16	23
	100.0	7.5	15.0	21.5	0.9	10.3	0.9	4.7	2.8	15.0	21.5
Miyagi	207	32	33	26	1	21	1	12	1	45	35
	100.0	15.5	15.9	12.6	0.5	10.1	0.5	5.8	0.5	21.7	16.9
Fukushima	108	10	6	9	0	8	0	17	1	38	19
	100.0	9.3	5.6	8.3	0.0	7.4	0.0	15.7	0.9	35.2	17.6
Ibaraki	105	18	12	8	1	14	3	11	0	20	18
	100.0	17.1	11.4	7.6	1.0	13.3	2.9	10.5	0.0	19.0	17.1
Saitama	110	19	3	7	2	21	2	17	0	26	13
	100.0	17.3	2.7	6.4	1.8	19.1	1.8	15.5	0.0	23.6	11.8
Chiba	104	14	4	9	0	18	5	16	0	22	16
	100.0	13.5	3.8	8.7	0.0	17.3	4.8	15.4	0.0	21.2	15.4
Tokyo	97	20	7	5	0	11	1	21	2	19	11
	100.0	20.6	7.2	5.2	0.0	11.3	1.0	21.6	2.1	19.6	11.3

Source: Author's Own Elaboration.

3.3. Lessons Learned from the Disaster

(1) Purchase of Earthquake Insurance

Here, respondents of the afflicted areas and Tokyo metropolitan area are compared in terms of whether or not they purchased earthquake insurance as a form of economic preparation or not following the disaster. The results show that purchase rates in the Tokyo metropolitan area remain low, which suggests that lessons from the disaster may not have fully permeated among residents.

Table 19. Purchase of Earthquake Insurance following the Disaster.

		Q25 What kind of disaster preparations have you made at the present time? Please choose one option for each of the following items. <Purchase of earthquake insurance>			
		Total	I have owned insurance since before the disaster	I purchased insurance after the disaster	I do not own earthquake insurance
Total		838 100.0	260 31.0	96 11.5	482 57.5
Afflicted areas	3 afflicted prefectures	422 100.0	142 33.6	59 14.0	221 52.4
	Near Tokyo met. area	416 100.0	118 28.4	37 8.9	261 62.7

Source: Author's Own Elaboration.

According to this result, the earthquake insurance purchase rate in the three afflicted prefectures is 48%, while that in the Tokyo metropolitan area remains fairly low at 37%.

Table 20. Lessons Learned from the Disaster.

		Q29 Did you apply any lessons you learned from the Great East Japan Earthquake of March 11, 2013, in your evacuation or disaster-management activities at the time of the aftershock of December 7, 2012?						
		Total	I took appropriate action by fully applying what I learned	I took appropriate action by applying some of what I learned	I was aware of the situation, but did not apply much of what I learned	I applied nothing of what I learned	I could only do what I did before the disaster	I was not affected by the aftershock of December 7, 2012
Total		838	39	245	192	14	4	344
		100.0	4.7	29.2	22.9	1.7	0.5	41.1
Afflicted areas	3 afflicted prefectures	422	29	139	96	6	3	149
		100.0	6.9	32.9	22.7	1.4	0.7	35.3
	Near Tokyo metropolitan area	416	10	106	96	8	1	195
		100.0	2.4	25.5	23.1	1.9	0.2	46.9

Source: Author's Own Elaboration.

Although more than 40% of respondents in the afflicted areas applied what they learned fully or to some degree, only 28% in the Tokyo metropolitan area did so.

Table 21. Cases Excluding "was not affected by the Aftershock".

	I took appropriate action by fully applying what I learned	I took appropriate action by applying some of what I learned	I was aware of the situation, but did not apply much of what I learned	I applied nothing of what I learned	I could only do what I did before the disaster
3 afflicted prefectures	**10.6%**	50.9%	35.2%	2.2%	1.1%
Near Tokyo met. area	4.5%	48.0%	**43.4%**	3.6%	0.5%

Source: Author's Own Elaboration.

The above-mentioned trend becomes obvious in tabulation of **"cases excluding "was not affected by the aftershock"."**

References

H. Yoshida (2013a), *Hisaichi no Kenko ya Fukushi wo Arawasu Koshiki Tokei ni Jittai to no Kairi ya Yugami* (divergences and distortions from actual circumstances in official statistics on health and welfare in the afflicted areas"), *Tohoku University press release,* February 7, 2013; *http://www.tohoku.ac.jp/japanese/newimg/pressimg/tohokuuniv-press20130212_02.pdf*.

H. Yoshida and M. Sato, *Higashi Nihon Daishinsai ni kan-suru Yoron Chosa (Kihon Shukei Kekka)* (public opinion survey on the Great East Japan Earthquake (results of basic tabulation), TERG Discussion Paper No. 296, Graduate School of Economics and Management, Tohoku University, 2013; *http://www.econ.tohoku.ac.jp/e-dbase/dp/terg/terg296.pdf*.

Y. Tsukuda, S. Masuda, H. Yoshida, T. Watanabe, and M. Sato, *Higashi Nihon Daishinsai-go no Kenko oyobi Seikatsu ni kan-suru Anketo Chosa (Kihon Shukei Kekka)* (questionnaire survey on health and daily living following the Great East Japan Earthquake (results of basic tabulation)), TERG Discussion Paper No. 295. Graduate School of Economics and Management, Tohoku University, 2013; *http://www.econ.tohoku.ac.jp/e-dbase/dp/terg/terg295.pdf*.

M. Kresnow, J. Peddicord, L. Dahlberg, K. Powell, A. Crosby, and J. Annest, *Suicide After Natural Disasters*, in *The New England Journal of Medicine*, vol. 338(6), 1998, 373-378.

Adapt International Network

ADAPT is a non-profit organisation founded in 2000 by Prof. Marco Biagi with the aim of promoting studies and research in the field of labour law and industrial relations from an international and comparative perspective. Our purpose is to encourage and implement a new approach to academic research, by establishing ongoing relationships with other universities and advanced studies institutes, and promoting academic and scientific exchange programmes with enterprises, institutions, foundations and associations. In collaboration with DEAL – the Centre for International and Comparative Studies on Law, Economics, Environment and Work, the Marco Biagi Department of Economics, University of Modena and Reggio Emilia, ADAPT set up the International School of Higher Education in Labour and Industrial Relations, a centre of excellence which is accredited at an international level for research, study and postgraduate programmes in the area of industrial and labour relations. Further information at *www.adapt.it*.

For more information about the E-journal and to submit a paper, please send a mail to *LS@adapt.it*.

DEAL Centre for International and Comparative Studies Law Economics Environment Work
THE MARCO BIAGI DEPARTMENT OF ECONOMICS
UNIVERSITY OF MODENA AND REGGIO EMILIA

ADAPT International.it
Building the Future of Work