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## INVESTIGATIVE RESEARCH PROJECTS RELATED TO THE TOHOKU EARTHQUAKE (THE GREAT EAST JAPAN EARTHQUAKE) CONDUCTED IN FUKUSHIMA

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**Abstract : Backgrounds :** On March 11<sup>th</sup> 2011, the Tohoku region of Japan was struck by catastrophic disasters. Thousands of people were killed due to a magnitude 9.0 earthquake and its subsequent tsunami. Furthermore, a serious nuclear crisis occurred in Fukushima Prefecture as a result of the disasters, and an emergency evacuation was ordered to people living near the nuclear power plants. There was a lot of anxiety regarding lost families as well as the influences of radioactivity on the health of people and their children. Based on these urgent and uncertain situations, a number of research projects were developed at many institutes both inside and outside Fukushima.

**Methods :** We herein report the investigative research projects related to the Tohoku Earthquake (The Great East Japan Earthquake) conducted after the disasters. The research projects were reviewed by the Institutional Review Board in Fukushima Medical University during the two years following the disasters. The research projects conducted in universities other than Fukushima Medical University were also examined using questionnaire analysis.

**Results :** Among the research projects conducted in Fukushima Medical University (n=424), 7% (n=32) were disaster-related investigative research. The mean duration planned to pursue the projects was 25.5 months. Among these projects, those focusing on the health of Fukushima citizens were most common (n=9), followed by the influence of chronic exposure of radiation on chronic inflammatory disorders (n=6), and the mental health of Fukushima citizens (n=5). They were carefully reviewed for the purpose, suitability, and necessity from ethical as well as scientific viewpoints. The majority of the research projects focused on the effects of the Tohoku Earthquake and/or chronic exposure to low-dose radioactivity on the health of children and pregnant women, as well as on various disorders, such as mental health and chronic inflammatory diseases. On the other hand, among 58 projects we collected from 22 institutes in prefectures other than Fukushima, mental health-related projects were the most common (n=18), followed by radiation exposure-related projects (n=10).

**Conclusions :** Many of these projects are ongoing, and in particular, long term follow-up regarding the health of the residents of Fukushima Prefecture, especially children and pregnant women, is necessary.

**Key words :** Tohoku Earthquake, Great East Japan Earthquake, Ethics, Research project

### INTRODUCTION

On March 11<sup>th</sup> 2011, a megaquake (magnitude 9.0) struck the Tohoku region of Japan, which was

then devastated by a subsequent giant tsunami. The suddenness of the disasters resulted in a death toll reaching 15,000, and the number of missing people was estimated to be over 2,600. These disas-

ters led to further catastrophe in the form of the 'Fukushima disaster', the Nuclear Power Plant accident, which added to the suffering of the Fukushima residents. A number of research projects were then planned to investigate the actual conditions, *i.e.* the health conditions of the people of Fukushima, or to keep record of any serious problems. We herein describe the investigative projects conducted inside and outside Fukushima.

### METHODS

Since the onset of the Tohoku Earthquake (The Great East Japan Earthquake), the Institutional Review Board of Fukushima Medical University, consisting of 10 members (professors of clinical medicine, basic science, nursing, law, and education, from inside and outside our university), reviewed various research projects both related and unrelated to the disaster in its following two years. In particular, regarding the disaster-related projects, the initial decision for the implementation of each project was made at the facility of the Research Promoting Committee of our university. All of the disaster-related projects were reviewed notwithstanding that the projects were conducted solely by our university or designed in collaboration with other institutes even outside Fukushima. The board checked the projects from ethical as well as scientific viewpoints, and then, the project plans were finally approved by the Institutional Review Board of our university.

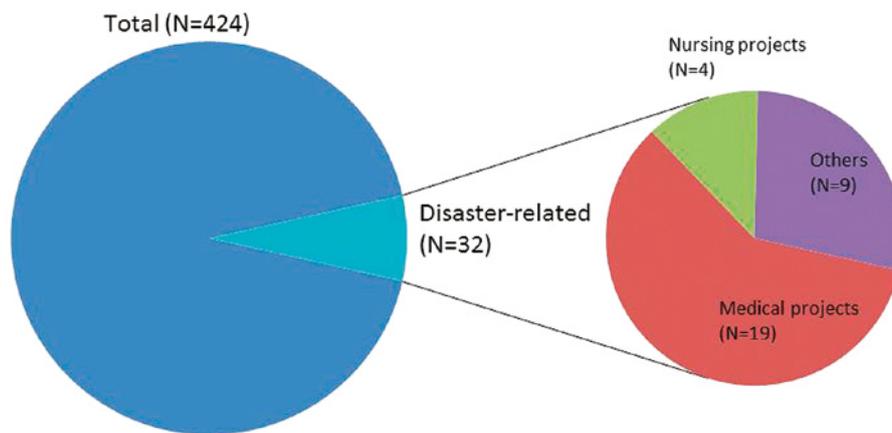
Furthermore, to understand projects planned and actually performed in Fukushima by university hospitals in other prefectures, we sent questionnaire forms to 80 of such hospitals outside Fukushima Prefecture. The questionnaires consisted of sever-

al questions, regarding the title, duration, method, funding sources, and whether the project in question was a single- or multi-center investigation.

### RESULTS

#### *Research projects conducted in the Fukushima Medical University*

As Fukushima Medical University is the only medical university in Fukushima Prefecture, the Fukushima Medical University Institutional Review Board initially reviewed all medical and nursing projects. However, due to the large number of projects pertaining to serious problems, and the fact that the government required special attention to be given to the mental condition of the residents, our university decided that projects on the disaster should be firstly urged in the superior facility, the Research Promoting Committee. At the next step, those projects were finally approved by the Institutional Review Board. All projects whose subjects were the disaster victims were carefully examined from the points of purpose, suitability, compassion for the subjects, and whether the study findings were expected to be of some help to future measures. The most common areas of study were the influences of disasters on chronic inflammatory disorders such as mental stress, diabetes mellitus, hypertension, allergic skin diseases, asthma, and lifestyle-related diseases. Other projects dealt with the health of Fukushima Nuclear Power Plant workers. The total number of proposed projects (both disaster-related and -unrelated) was 424 during the 2 years, and disaster-related projects summed up 7% ( $n=32$ ) (Fig. 1). Among those 32 projects, 20 were planned to be



**2011.3.11~2013.3.31**

Fig. 1. Number of research projects reviewed by Fukushima Medical University from March 11, 2011 to March 31, 2013.

conducted by solely our university, 8 were conducted mainly by our university, and the remaining 4 were planned in collaboration (our university is the blanch institute and the main institutes were outside Fukushima Prefecture). The subjects of each project are listed in Table 1. The mean duration planned to pursue the projects was 25.5 months (Fig. 2). After the disaster, a new institute that aimed to investigate the health science of the Fukushima people was established at the Fukushima Medical University, and was named the Radiation Medical Science Center. The projects were planned from various departments, a quarter of which were occupied by the Radiation Medical Science Center, followed by the Psychological department, and the Nursing department (Fig. 3). Of particular importance among these projects were those that focused on the health of Fukushima citizens, especially children and pregnant women. Long term follow-up studies of the possible involvement of thyroid diseases, hematological disorders, as well as any types of unfavorable events are necessary.

Table 1. Main subjects of research projects conducted in Fukushima Medical University.

Main subjects	n
Mental health	5
Chronic disorders	6
Medical staff	3
Health of citizens	9
Children	2
Pregnant women	2
Nuclear power plant workers	1
Quality of life of disaster victims	3
Radiation exposure	1
Others	2

#### *Research projects conducted in Fukushima Prefecture by investigators from outside Fukushima*

We next examined the research projects performed in Fukushima by investigators from outside Fukushima, by sending questionnaires to medical universities in Japan (n=80). We searched for projects with titles associated with the disaster, whose subjects were disaster victims, and whose main focus was the disaster. We received 22 replies confirming that there were 58 projects in total, 49 of which were medical investigations, and 9 were nursing investigations. The projects varied in topics, such as mental stress, posttraumatic stress disorder, radiation medicine, radiation exposure dose, and public health. Mental health-related projects were the most common (n=18), followed by radiation exposure-related projects (n=10). Moreover, some of the research subjects were children, pregnant women, and medical staff. The mean duration of the research projects was 22.8 months. Single-center studies were over the multi-center studies (55% vs 45%). One third of the projects required the investigators to visit Fukushima, while another third carried out their investigations by sending questionnaires to institutes or suffered people. Most of the projects were conducted with the aid of grants or funds from the university, Japanese Ministry of Health, Labour and Welfare, or foundation. Overall, these projects were similar to those conducted in Fukushima Medical University, and the influence of radiation on mental health was most frequently examined.

#### DISCUSSION

We herein reported on the investigative research projects that have been conducted in Fuku-

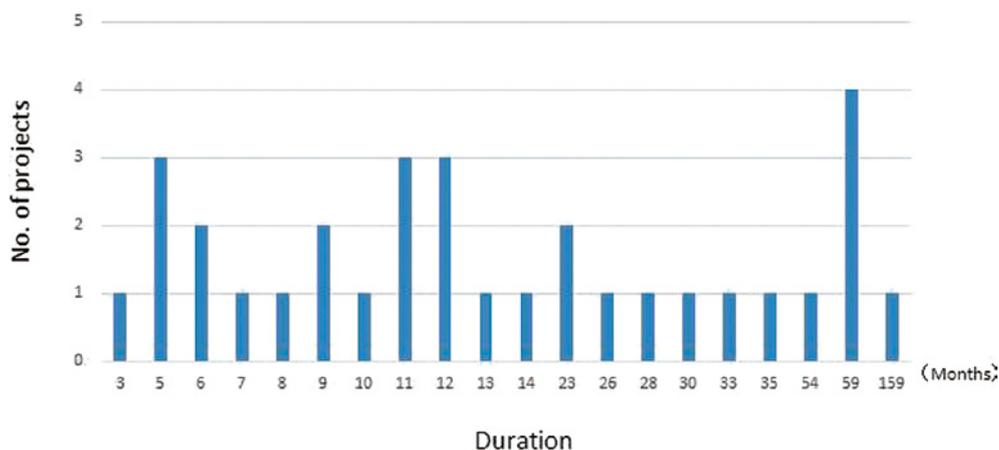


Fig. 2. Planned duration of the projects.

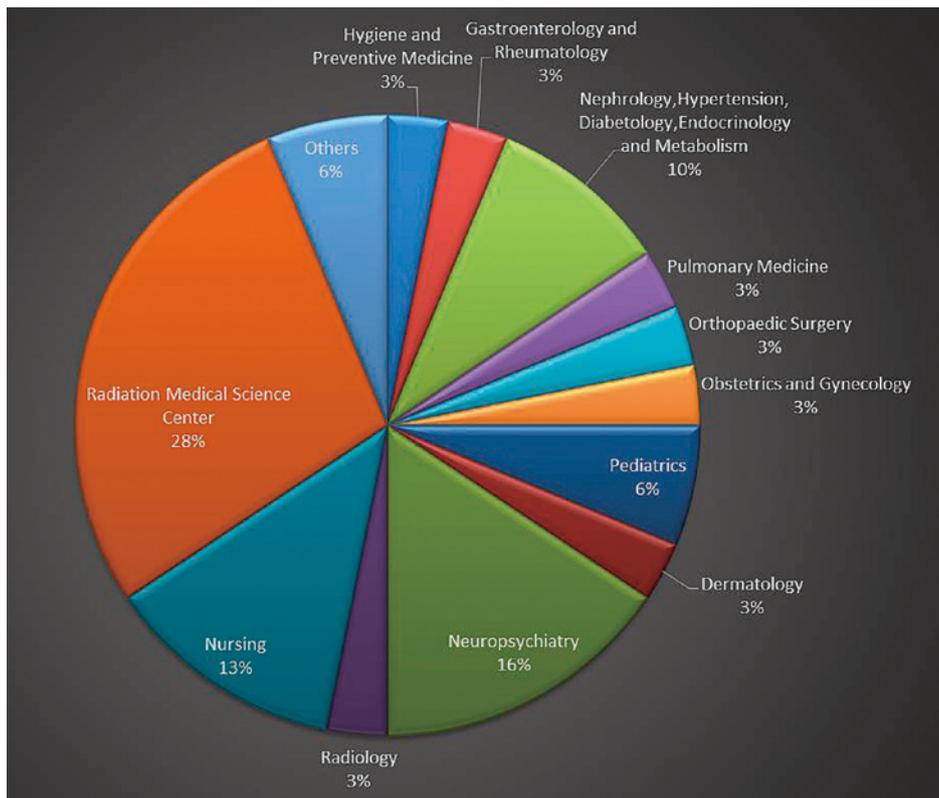


Fig. 3. Ratio of the departments that conducted the projects.

shima in the two years following the disasters on March 11<sup>th</sup> 2011. Considering the delicacy of the issue and the time in which those projects were conducted only months following the disaster, it was pertinent to carry out the projects with the utmost empathy, as strongly declared by the Japanese Society of Psychiatry and Neurology, Fukushima Prefectural Government, and the Japanese Ministry of Health, Labour and Welfare. At that time in Fukushima, however, university researchers had no room to set up the projects, and the proposals of various research projects began shortly after the nuclear situation had stabilized to an extent. The Fukushima Medical University Ethical Committee Board discussed that we can understand the feeling of the suffered people because we ourselves are the Fukushima citizens, however, it is necessary that those of us living in the suffered area should also execute and promote those researches by ourselves. We distributed a letter to evoke consideration for special affairs. At our university, the final decision on project approval was made by the Research Promoting Committee, with the critical points being i) enough and deep compassions should be paid to the feeling of the disaster victims, ii) the purpose of the researches should not be research only, and iii) the results of the projects should be made useful to the fu-

ture studies.

Since the disaster, a number of studies have been conducted in the Tohoku region. The most frequent subject is mental stress-related investigations<sup>1-6</sup>. Also, various influences of the disasters on various conditions such as infectious diseases (influenza, tuberculosis, pneumonia)<sup>7-9</sup>, cardiovascular diseases<sup>10-14</sup>, diabetes<sup>15</sup>, dialysis<sup>16,17</sup>, gastrointestinal diseases<sup>18,19</sup>, respiratory disease<sup>20</sup>, asthma<sup>21</sup>, and deep vein thrombosis<sup>22</sup> have been published. In particular, long term follow-up studies of the health of people living in Fukushima, especially pregnant women and children, are extremely important. The records obtained through these various researches, many of which are still going, are also of international importance.

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