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Great East Japan Earthquake on School Children,  
and Health Support initiatives by *Yogo* Teachers:**

Findings from a survey of high school *yogo* teachers 5 years after the disaster

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# Mental and physical effects of the 2011 Great East Japan Earthquake on School Children, and Health Support initiatives by *Yogo* Teachers:

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## Abstract

**Objective:** To clarify the current mental and physical state of students 5 years after experiencing the Great East Japan earthquake, tsunami, and nuclear accident, and to shed light on the practical initiatives and issues faced by *yogo* teachers in supporting students' health.

**Method:** In May 2016, we conducted a mail-based questionnaire of *yogo* teachers at 15 prefectural high schools in Soma District and Futaba District (collectively, "Soso") in Fukushima Prefecture, one of the areas most heavily affected by the Fukushima Daiichi Nuclear Power Plant accident. The questionnaire focused on (1) health and school life of students; and (2) current initiatives and issues faced by *yogo* teachers in supporting student health.

**Results:** We received responses from 8 of the 15 high school *yogo* teachers surveyed (response rate: 53.3%). Six *yogo* teachers (75%) responded that the "students are calm." However, 6 *yogo* teachers (75%) recognized a tendency among students towards weight gain and obesity, as well as reduced physical stamina and sporting ability, while 4 *yogo* teachers (50%) indicated that some students were anxious about their future and career path, and were receiving personal support from the school counselor. The *yogo* teachers provided support to students while attempting to ascertain their mental and physical well-being through greater health

monitoring and questionnaires, and while coordinating with the school physician and counselor.

**Conclusion:** Five years after the earthquake, high school students in the Soso district are now leading a more relaxed school life, but still feel anxious about their future health and career path due to lingering concerns about radiation, highlighting the need for long-term support by *yogo* teachers.

**Keywords:** Great East Japan Earthquake, nuclear accident, *yogo* teacher, health support, family support

## I. Introduction

The Great East Japan Earthquake was a major disaster that occurred on 11 March 2011 when an earthquake struck off the Pacific coast of the Tohoku region of Japan, triggering a tsunami and ultimately a nuclear accident at the Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Plant. The disaster caused catastrophic damage to Pacific coastal areas of the Tohoku and Kanto regions. According to a report released by Japan's National Police Agency, as of 19 December 2016, the death toll from the disaster stood at 15,893, while the numbers of missing and injured were 2,556 and 6,152, respectively<sup>1)</sup>, making it one of the largest disasters in Japanese history. A further 3,523 deaths were indirectly related to the disaster, and many people have been forced to live as evacuees for prolonged periods<sup>2,3)</sup>.

In 2010, the Ministry of Education, Sports, Science and Technology prepared a document entitled "The Mental Care of Children in Disasters—Focusing on natural disasters, emergencies and accidents—" (provisional translation)<sup>4)</sup>. This instructional manual was distributed to all schools in Japan to improve understanding among teachers about mental health care for children who experience disasters and accidents, and about creating frameworks to provide this mental health care. The manual emphasizes the need for long-term, ongoing support in the form of early detection and assistance for children with mental and physical health issues through a range of initiatives, including surveys on mental health care, sharing of information among teachers, coordination with health care providers, and situational assessments. In a study conducted a year after earthquake, in 2012, Shiokawa et al. emphasized the need for family and social supports after finding that many children had some form of mental health issue and that, although many of their symptoms would improve over time, some would follow a chronic course<sup>5)</sup>.

We have previously researched "*yogo* teachers" who supported the health of school children forced to evacuate their homes after the Great East Japan Earthquake. Sako et al. interviewed a *yogo* teacher who spent time with her students in an evacuation shelter in Aizuwakamatsu City in Fukushima after their entire town was forced to evacuate due to the accident at the nearby Fukushima nuclear power plant. The results of a survey conducted 18 months after the disaster demonstrated that the *yogo* teacher provided extensive health support to not only the school children, but also other teaching staff and parents, by constantly assessing the children's changing mental and physical state following the disaster, and by attempting to create a calm environment within the school's health room while staying close to the children<sup>6)</sup>.

Aoyagi et al.<sup>7)</sup> interviewed a *yogo* teacher who spent time with her students in an evacuation shelter in Iwaki City in Fukushima after their entire town was forced to evacuate. The results of a survey conducted 2 years after the disaster demonstrated that the *yogo* teacher had provided mental health care to the students while collaborating with various professionals, and was also a source of constant health advice to the

teachers<sup>7)</sup>. Aoyagi et al. also identified the anxiety arising from potential long-term health issues facing these children, and the need for mental health care for parents to counter their risk of developing mental and physical health issues due to prolonged evacuation.

Kanaizumi et al. interviewed a *yogo* teacher who was working at a special needs school in Fukushima at the time of the disaster, and who spent time with her students in an evacuation shelter in Aizuwakamatsu City in Fukushima following the accident at the nuclear plant. The results of a survey conducted 3.5 years after the disaster demonstrated the importance of providing diverse support for special needs school children who require various types of medical care and medication to treat a range of disabilities and diseases, and who are unable to express their mental and physical state after a disaster, thus underscoring the urgent need to establish a disaster management system in schools that includes the management of student medication<sup>8)</sup>.

Finally, Aoyagi et al. interviewed a *yogo* teacher who was working at a middle school in Fukushima at the time of the disaster, and who spent time with her students in an evacuation shelter in Minami Soma City in Fukushima following the accident at the nuclear power plant. The results of a survey conducted 4 years after the disaster demonstrated that the *yogo* teacher succeeded in expediting the school's reopening in cooperation with the other teaching staff despite also being personally affected by the disaster and being separated from her family, and that she constantly provided mental health care while collaborating with a university instructor of psychology<sup>9)</sup>.

The elementary school students described in these studies are currently attending high school and are entering puberty and adolescence. Despite being left with deep mental and physical scars from the disaster, many of these children are attending school with a positive outlook for the future. However, there are also concerns about problematic behaviors among these children<sup>10,11)</sup>. The occurrence of nuclear and other disasters is believed to have a real impact on the long-term mental and physical development of children, and so, *yogo* teachers play a central role within schools in supporting children's health.

With this in mind, we sought to investigate the effects of the Great East Japan Earthquake on the mental and physical health of high school students as perceived by *yogo* teachers 5 years after the disaster, and to explore the practical initiatives and issues faced by *yogo* teachers in supporting the health of students.

- \* ) A “*yogo* teacher” is a special licensed educator who supports children's growth and development through health education and health services on the basis of principles of health promotion in all areas of educational activities in school<sup>12)</sup>.

## II. Method

### 1. Study population and method

In May 2016, we conducted a mail-based questionnaire of 15 *yogo* teachers at prefectural high schools in the “Soso” District of Fukushima Prefecture, which was forced to evacuate following the earthquake, tsunami, and ensuing nuclear accident at the Fukushima Daiichi Nuclear Power Plant.

- \* ) The “Soso” District is the name given to the Pacific coastal area of Fukushima Prefecture that comprises the 8 towns in Futaba District apart from Iwaki City (i.e., the towns of Hirono,

Naraha, Tomioka, Okuma, Futaba and Narie, and the villages of Kawauchi and Katsurao), and the 4 municipalities in the Soma District (i.e., Soma City, Minami Soma City, Shinchi Town, and Iitate Village).

## 2. Description of the survey

We prepared a self-administered questionnaire based on a survey conducted in 2013 by the *Yogo* Teacher Subcommittee of the Fukushima Prefectural School Health Committee<sup>13)</sup>.

The questionnaire contained the following key themes: (1) General factors relating to student school life; (2) Health support initiatives by *yogo* teachers; and (3) Issues relating to health support initiatives.

## 3. Analysis methods

Our summary and analysis of the study data were based on simple tabulation of each questionnaire item. We analyzed the free-answer responses by organizing them into similar semantic categories.

## 4. Ethical considerations

This study was approved by Epidemiologic Research Ethics Committee of the primary authors' university.(Approval No.25-6,2013/6/1). Before commencing the study, we explained to the *yogo* teachers that their privacy would be protected because the questionnaire was anonymous and because all data on their age and years of experience would be statistically processed, that the data obtained from this study would be used exclusively for research purposes, and that submission of a completed questionnaire would be regarded as informed consent for study participation.

## III. Results

### 1. Key attributes of respondents (Table 1)

We received responses from 8 *yogo* teachers working at 8 high schools in the Soso District of Fukushima Prefecture. A summary of respondent attributes is shown in Table 1. While most of the high schools surveyed had a school counselor, none of the schools had more than one *yogo* teacher following the disaster.

**Table 1** Key attributes of respondents

N = 8

Questionnaire item	Category	No. of responses
Respondent's age	20–29 years	3
	30–39 years	0
	40–49 years	2
	≥ 50 years	3
Two or more <i>yogo</i> teachers hired at the school	Yes	0
	No	8
If a school counselor present at the school	Yes	7
	No	1

## 2. Description of student school life (Table 2)

When asked to describe the school life of the students, 6 *yogo* teachers (75%) responded that the students were “calm”. Reasons for this response provided in the free-answer section of the questionnaire included “calm home environment” and “positive outlook of the students.”

The responses also showed that none of the students were receiving their schooling at the school health room on a permanent basis (as is sometimes organized for students with physical or mental challenges) Conversely, 2 *yogo* teachers (25% ) responded that students were “not calm,” and cited “interpersonal relationship issues” and “not willing to learn” as the reasons for their response (Table 2).

**Table 2** Description of student school life

N = 8

Questionnaire item	Category	No. of responses
Calmness of students	Calm	6
	Not calm	2
	Don't know	1
Student visits to the school health room	Visits are increasing	0
	Visits are decreasing	3
	No change	3
	Don't know	2
Permanent health room students	Yes	0
	No	8

## 3. Mental & physical health of students affected by the disaster (Table 3)

In response to questions about the effects of the disaster on the students' mental and physical health, 6 *yogo* teachers (75%) stated that students exhibited a “tendency toward weight gain/obesity” and “reduced physical stamina/sporting ability.”

**Table 3** Mental & physical health of students affected by the disaster

N = 8

Questionnaire item	Yes	No	Unknown
1 Some students have stopped coming to school	1	5	2
2 Some students tend to take time off school	2	5	1
3 Increase in number of permanent health room students	0	7	1
4 Increase in medically unexplained symptoms	4	4	0
5 Some students are unable to sleep at night (insomnia)	3	4	1
6 Some students have tendency toward weight gain/obesity	6	2	0
7 Some students have reduced physical stamina/sporting ability	6	2	0
8 Some students have displayed a noticeable disturbance in basic lifestyle habits	4	2	2
9 Some high school students live apart from their family	3	5	0
10 Some students cannot adjust to school life	4	3	1
11 Some students are anxious about their future & career path	4	2	2
12 Incidence of arguments and bullying has increased	1	6	1
13 Some students may have PTSD	2	5	1
14 Some students are receiving personal support from the school counselor	4	4	0
15 Some students are anxious about radiation exposure	1	3	4
16 Some parents have sought advice about their child's mental & physical health	4	4	0
17 Some teachers have sought advice about students' mental & physical health	3	5	0

\*\* Same content as 2013 survey

Four *yogo* teachers (50%) indicated that some students had exhibited an “increase in medically unexplained symptoms” and “disturbance in basic lifestyle habits,” and that some students “cannot adjust to school life,” “are anxious about their future and career path,” and “are receiving personal support from the school counselor.”

Furthermore, 4 *yogo* teachers (50%) responded that “parents have sought advice about their child’s mental & physical health,” and 3 *yogo* teachers (37.5%) responded that “teachers have sought advice about students mental & physical health.”

#### 4. Health support by *yogo* teachers (Table 4)

In response to questions about the types of mental health care initiatives implemented after the disaster, 7 *yogo* teachers (87.5%) had “confirmed student health status,” or “coordinated with the school counselor,” 5 *yogo* teachers (62.5%) had “improved the school’s mental and physical health monitoring,” “conducted a questionnaire/situational assessment of students,” “improved the *yogo* teacher and teacher consultation system,” and “coordinated with the school physician.”

Moreover, 6 of the *yogo* teachers stated that they had “convened or participated in mental and physical health care lectures or seminars.”

However, health support initiatives related to radiation measures were scarce, as demonstrated by the fact that only 2 *yogo* teachers (25%) had “measured radiation levels,” 3 *yogo* teachers (37.5%) had “provided information on radiation to parents and students,” 2 *yogo* teachers (25%) had “participated in lectures or seminars on radiation,” and 1 *yogo* teacher (12.5%) had “planned and implemented school lectures or seminars on radiation.”

**Table 4** Health support by *yogo* teachers

N = 8

Questionnaire item	Yes	No	Unknown
1 Confirmed student health status	7	1	0
2 Distributed information/materials on mental health care to teachers	4	4	0
3 Distributed information/materials on mental health care to parents	4	4	0
4 Improved mental & physical health monitoring	5	2	1
5 Conducted questionnaire/situational assessment of students	5	3	0
6 Conducted questionnaire/situational assessment of parents & teachers	0	8	0
7 Coordinated with school physician	5	3	0
8 Cooperated with school health committee	3	4	1
9 Coordinated with school counselor	7	1	0
10 Improved <i>yogo</i> teachers & teacher consultations	5	3	0
11 Convened or participated in mental & physical health care lectures or seminars	6	2	0
12 Measured radiation levels	2	5	1
13 Participated in decontamination efforts	0	8	0
14 Provided information on radiation to parents & students	3	4	1
15 Participated in lectures or seminars on radiation	2	5	1
16 Planned & implemented school lectures or seminars on radiation	1	6	1

#### 5. Future issues & roles of *yogo* teachers (Table 5)

Seven *yogo* teachers submitted responses to the free-answer section of the questionnaire about future



issues concerning health support initiatives.

These respondents expressed concern about the “decrease in physical stamina and increase in obesity among students,” “improving student capacity for self-care,” “the decline in public safety,” and the “decline in academic ability.”

In terms of the role of *yogo* teachers during disasters, the respondents perceived their role as a “mental health care provider,” “staying close to students,” “physical and emotional supervisor to school children,” “support coordinator,” and “first aid provider.”

Our findings demonstrate that, 5 years after the Great East Japan Earthquake, *yogo* teachers are attempting to ascertain the health status of their students by improving the school’s mental and physical health monitoring and conducting questionnaires.

The findings also showed that the *yogo* teachers are developing a framework to deliver ongoing mental health care by distributing information and materials on mental health care, and through consultation and individual student support initiatives in collaboration with the school physician, teachers and school counselor.

Although these health support initiatives have helped students to return to leading a calm school life, the *yogo* teachers are also concerned about the mental and physical health issues that these students face as a result of having to evacuate their homes for a prolonged period, such as weight gain and obesity, reduced physical stamina, and anxiety about the future.

**Table 5** Future issues & roles of *yogo* teachers (open-response)

<b>Future issues</b>
<ul style="list-style-type: none"> <li>• Improving student capacity for self-care (2)</li> <li>• Decline in public safety</li> <li>• Improving health care systems</li> <li>• Decline in academic ability</li> <li>• Establishing disaster response systems</li> <li>• Decrease in physical stamina &amp; increase in obesity among students</li> <li>• Coordination with medical institutions</li> </ul>
<b>Roles of <i>yogo</i> teachers</b>
<ul style="list-style-type: none"> <li>• Role as mental health care provider (4)</li> <li>• Role of staying close to students (2)</li> <li>• Role as physical &amp; emotional supervisor to school children (2)</li> <li>• Role as first aid provider</li> <li>• Role as support coordinator</li> </ul>

## IV. Conclusion

### 1. High school life and health support by *yogo* teachers

In the present study, we conducted a questionnaire of *yogo* teachers at 15 high schools in the Soso District of Fukushima in May 2016, approximately 5 years after the Great East Japan Earthquake. Our findings have shed light on the current school lives of these students, and the effects of the Great East Japan Earthquake on their mental and physical health, as well as current initiatives of *yogo* teachers in support of

student health.

Some of the *yogo* teachers recognized that the students were leading calm school lives based on a positive future outlook, as well as the fact that there were no permanent health room students.

However, some *yogo* teachers were also aware of physical issues such as the tendency toward weight gain/obesity and reduced physical stamina/sporting ability, and psychological issues such as increase in medically unexplained symptoms, disturbance in basic lifestyle habits, anxieties about future and career path, etc.

Sato et al. showed that the Great East Japan Earthquake had affected the development of children, particularly children with a predisposition to obesity, which worsened due to overeating in response to psychological stress or due to reduced exercise caused by limits placed on outdoor activity in response to radiation concerns<sup>14</sup>). Similarly, our findings suggested that the disaster had impacted on the physical development of high school students.

Yoshida et al. argued that a certain number of children had developed mental health issues after the disaster, and that while not all of these issues would become chronic, they would become prolonged in the absence of adequate support from family members and society<sup>15</sup>). Our findings also highlighted the mental health issues that high school students face after having to evacuate their homes for a prolonged period.

Furthermore, Okuyama et al. demonstrated that high school students were susceptible to psychological hazards due to the stress caused by limited career options within disaster-affected areas, and highlighted the need for mental health care comprising consultation on career options<sup>16</sup>). Similarly, our findings showed that some high school students were anxious about their future career path, and suggested the need for long-term support in collaboration with mental health experts.

To address these issues, the *yogo* teachers adopted measures for the early detection and treatment of mental and physical health problems by attempting to better understand the health of their students through improved mental and physical health monitoring and the use of questionnaires.

Our findings also showed that the *yogo* teachers are involved in developing a framework to deliver ongoing mental health care that encompasses preventive measures by distributing information and materials on mental health care, and through consultation and individual student support initiatives in collaboration with the school physician, teachers and school counselor.

In a survey of 127 disaster-affected high schools conducted by the *Yogo* Teacher Subcommittee of the Fukushima Prefectural School Health Committee shortly after the disaster in March 2013, almost 70% of the schools surveyed indicated that their *yogo* teacher was already providing mental health support for students in collaboration with the school counselor<sup>13</sup>). Our findings also suggested that *yogo* teachers were involved in providing ongoing health support to students.

## 2. Future Issues

Our study showed that *yogo* teachers were concerned about the decrease in physical stamina and increase in obesity among students and the need to improve student capacity for self-care, and that these issues need to be addressed through support tailored to the student's stage of development. To realize this support, collaboration between schools, households, and regional stakeholders is essential.

It follows, therefore, that the *yogo* teachers perceived their role as one of a physical and emotional

supervisor to school children and a support coordinator.

Meanwhile, the *yogo* teachers were also concerned about mental health issues stemming from the students' adolescent anxiety and sense of helplessness about their future career path, which points to the need for long-term mental health care.

The *yogo* teachers recognized their role as a mental health care provider to address these issues by leveraging their expertise in monitoring students over the mid-to-long term, constantly staying in close contact with their students, and referring them to professionals where necessary.

Both Ide<sup>17)</sup> and Aoyagi et al.<sup>7)</sup> have described the indispensable need for providing parent support in supporting children after a natural disaster, and have argued the importance of consideration for parents in the event of large-scale disasters that affect entire families. In our study, the majority of *yogo* teachers indicated that they had responded to parents seeking advice about their child's health, but that their efforts directed towards parents were limited to distributing information and materials on mental health care, and there were no measures for supporting the health of parents.

In the future, as the repercussions of the Great East Japan Earthquake continue to be felt, it will become essential to develop a support system for not just students, but their parents as well, through collaboration and coordination between existing school and community health networks.

## V. Study Limitations and Future challenges

As only 8 *yogo* teachers responded to our questionnaire, our data was obtained from a limited segment of the schools affected by the disaster, thus preventing us from making general statements about the findings. Further studies are needed to accumulate more data.

## VI. Acknowledgment

We would like to express our gratitude to the *yogo* teachers who participated in the questionnaire in the midst of very difficult circumstances. It is our sincere hope that all of the disaster-affected areas will make a rapid recovery.

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## Disclosure

None of the authors have any involvement, financial or otherwise that might potentially bias their work

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