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Importance of Psychological Support for Disaster-Affected Adolescents: 10 Years After the Great East Japan Earthquake

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Introduction: Adolescents affected by disasters need mental health support because they tend to be at risk of developing psychiatric disorders and stress as grown-ups. However, it is difficult to develop and validate a support system for adolescents affected by disasters because it is unknown when and where disasters occur, and there is inadequate data related to this in Japan. **Methods:** To address these issues, we present a mental health support system for high school students affected by the Great East Japan Earthquake. We hypothesized that mental health support could be provided by classroom teachers and school nurses, who are familiar with high school students. We investigated the psychological state of the affected high school students for three years after the earthquake, and the students in psychological crises received interventions from their class teachers and school nurses. **Results:** The intervention resulted in improvements in depression and post-traumatic stress reaction (PTSR). **Conclusion:** These results suggest that our high school-based intervention is a feasible solution for mental health support for adolescents affected by the disaster.

Keywords: psychological support, adolescents, school-based intervention, mental health

1. Introduction

Disasters such as earthquakes and floods are associated with significant consequences on people's mental health. The damage may cause post-traumatic stress disorder (PTSD) in adolescents, a possible highly persistent problem [1–5]. Its presence can lead to psychological problems [6] or be negatively associated with quality of life (QOL) [7].

We searched PubMed for literature published up to

April 2021 using the term “psychological support for affected adolescents from disaster.” The search yielded 105 potentially relevant articles. After including “in Japan” to the search, eight more papers were added. These are shown below in the box on the left side of **Fig. 1**. These papers were classified into the following categories:

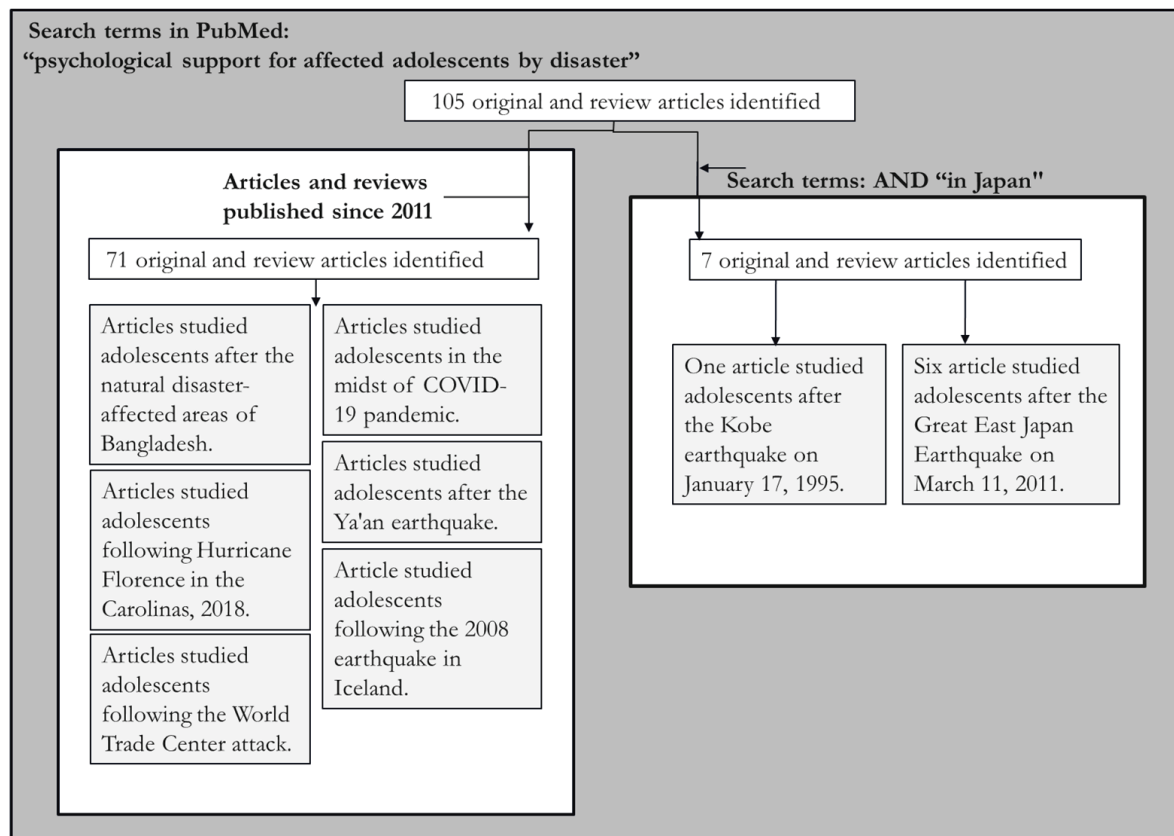
- Great Hanshin-Awaji Earthquake (n = 1) [8]
- Great East Japan Earthquake (n = 6) [9–14]

The box on the left side of **Fig. 1** shows the disasters targeted for psychological support for adolescents affected by the disaster in Japan. Uemoto et al. extracted three core factors of post-traumatic stress reactions in school children after the Kobe earthquake, but they were unable to find measures in which school children were supported [8]. Most of the research on adolescents after the Great East Japan Earthquake also investigated mental health and showed the importance of psychological support [10, 12, 13] but did not discuss specific support methods.

The box on the right side of **Fig. 1** shows the disasters targeted for psychological support for adolescents affected by the disaster, published up to and including April 2021. These range from adolescents affected by earthquakes [15–19] in Japan, the World Trade Center attack [20], and more recently, the pandemic from the coronavirus (COVID-19) infection [21, 22].

The results showed that psychological support for affected adolescents was more frequently reported in other countries than in Japan. A possible explanation is that the Great East Japan Earthquake was the most devastating disaster in recent years [23, 24].

As needed, psychological support then may have been enhanced. Many disasters have caused stress since. There needs to be a renewed focus on psychological interventions. We believe that the provided psychological support after the Great East Japan Earthquake can be applied to



The PubMed database was searched in April 2021 for studies on psychological support for affected adolescents, using the term “psychological support for affected adolescents from disaster.” The search revealed that 105 studies have been conducted since the start of the PubMed data collection, 71 of which were published after 2011, the year of the Great East Japan Earthquake. Our search for studies conducted in Japan, using the “Japan” filter revealed seven studies.

Fig. 1. Literature on psychological support for adolescents affected by disaster, retrieved from PubMed.

affected adolescents to alleviate stress by these disasters and the ongoing pandemic [25].

2. Materials and Methods

The Great East Japan Earthquake of March 11, 2011 was a massive earthquake with a magnitude of 9.0 on the Richter scale. The ensuing tsunami destroyed the towns and villages along Japan’s east coast [26]. More than 18,000 people were reported dead or missing, and more than 6,000 were injured, making it one of the most significant natural disasters in Japan’s history [27].

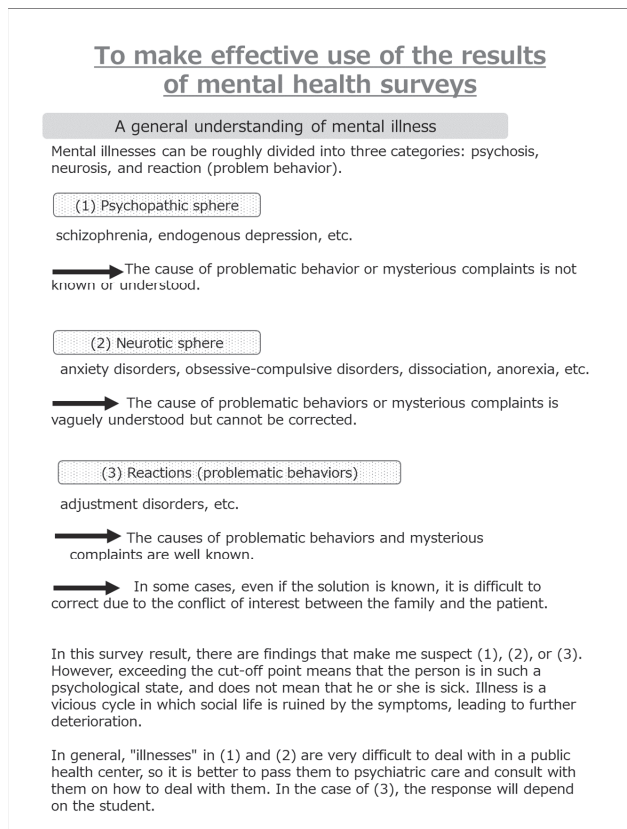
Since the Great East Japan Earthquake, several organizations have provided psychosocial support to the victims. Many studies reported that the affected survivors faced various setbacks. These include unbalanced nutrition, lack of proper medical follow-up, unpleasant living conditions, and psychological stress owing to the loss of family, relatives, friends, colleagues, and their homes and workplaces [26, 28]. Therefore, a variety of psychological support was provided [29, 30].

We presented the example of psychological support for adolescents as follows:

High school students affected by the Great East Japan Earthquake were evaluated for three years (2012–2014) to

extract valuable information for improving adequate support during the three years [11, 14, 31, 32]. In this study, we focused on three high schools in Natori City, Miyagi Prefecture, near the earthquake’s epicenter. In May 2012 (the first year of the study), representatives from the target high schools gathered at the Miyagi Psychiatric Center to discuss how to proceed with the psychological interventions for a year. In June, a psychiatrist explained the intervention and research procedures to all the participating teachers at each high school. On September 4, after the psychological survey at each high school had been completed, their representatives received a one-day training on child and adolescent psychological characteristics at the Miyagi Psychiatric Center. Additionally, in October, a one-day training session was held at each high school for all the participating teachers. This session was based on a pamphlet on intervention methods (**Fig. 2**). Training using this pamphlet was conducted again in May 2013 and 2014 for the teachers participating in the intervention.

The students with depression, anxiety disorder, or post-traumatic stress response (PTSR) above the cutoff were considered to be at higher psychological risk (**Fig. 3**). An evaluation was conducted using the following three types of psychological assessments:



This is the first page of the pamphlet used in the training of high school teachers to provide psychological intervention. In May 2012, the first year of the study, representatives from target high schools gathered at the Miyagi Psychiatric Center to discuss how to proceed with the study. In June, a psychiatrist explained the study method and research procedures to participating teachers at each high school. On September 4, after the psychological survey at each high school had been completed, representatives from the high schools received a one-day training on child and adolescent psychological characteristics at the Miyagi Psychiatric Center. In addition, from October onward, one-day training sessions based on intervention methods presented in this pamphlet were held at each high school for all participating teachers. This training was conducted again in May 2013 and 2014 for the participating teachers.

Fig. 2. The first page of a pamphlet used to train high school teachers in psychological intervention.

(1) Quick Inventory of Depressive Symptomatology (QIDS-J)

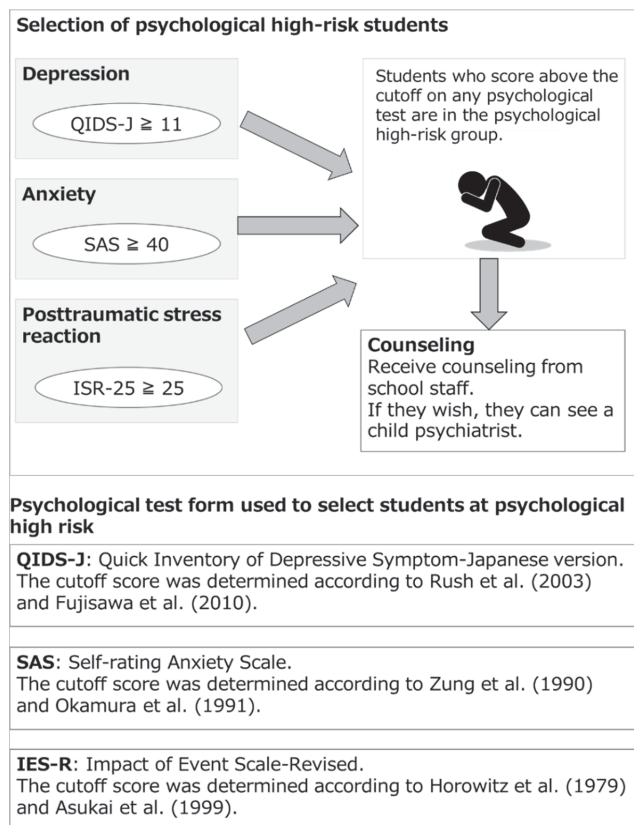
QIDS-J is a 16-item depressive symptom scale [33] developed by Rush et al. The Japanese version of this scale, translated by Fujisawa et al., was used in this survey [34].

(2) Zung Self-Rating Anxiety Scale (SAS)

SAS is a Japanese version of the 20-item rating scale for anxiety disorders [35] created by Zung and developed by Okamura and colleagues [36].

(3) Impact of Event Scale-Revised (IES-R)

IES-R is a 22-item self-administered questionnaire for PTSR developed by Horowitz et al. [37]. It consists of eight intrusive recall and re-experiencing symptoms, eight avoidance symptoms, and six hyperarousal symptoms. This is a revised version of the Impact Scale (IES) [38]. School teachers, nurses, and counselors provided coun-



The homeroom teachers distributed the survey to the students in their classes. Students who met at least one of the following criteria were judged to be at high risk psychologically, and intervention was provided to all students considered to be at high risk: QIDS-J score of 11 or higher, SAS score of 40 or higher, or IES-R score of 25 or higher. The school-based intervention consisted of four sessions that focused on improving psychological problems and enhancing school adjustment.

Fig. 3. Selection of students at high psychological risk.

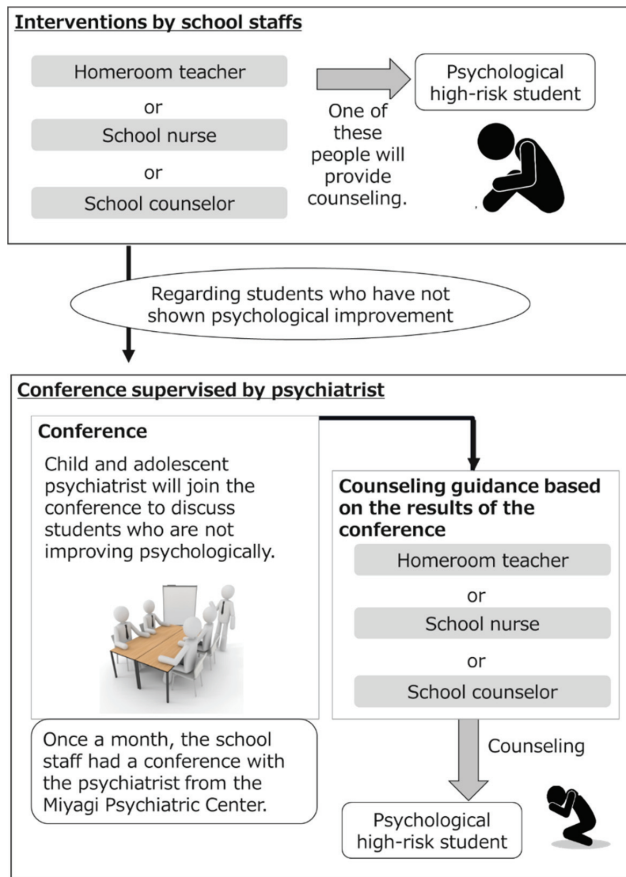
seling to all the high-risk students identified in the survey (Fig. 4). The teacher in charge provided one hour of counseling to each student. Those who wished to receive counseling were counseled twice a month, for an hour, by the school counselor. Once a month, the school staff had a conference with the children and adolescents' psychiatrist [11].

3. Results

As shown in previous reports [11,31,32], we concluded that intervention may have improved the depressed mood and PTSR of the high school students. However, the anxiety symptoms of the high school students did not respond to the intervention. Hence, we can conclude that school-based interventions can improve depressive symptoms and PTSR in adolescents after a disaster [39].

To examine the differences in the skills of homeroom teachers selected to intervene, the post-intervention psychological test scores of the classes were compared (Fig. 5).

High school A has six classes per grade, and high school B has seven classes per grade. The comparison



The teacher in charge provided a one-hour counseling session to each student, and students who requested it received two one-hour counselling sessions per month. For students whose condition did not improve, the school staff held monthly conferences with a doctor at the Miyagi Psychiatric Center. Based on the results of the conferences, the school staff again provided counseling to those students. Interventions were conducted by a high school vice principal, homeroom teacher, school nurse, and a staff member selected from among the school counselors.

Fig. 4. Counseling methods for psychological high-risk groups.

showed no significant difference among the six classes in high school A for all of the psychological examination forms. However, in high school B, students in classes 1–6 in 2012 showed significantly lower anxiety symptoms and PTSR in the following year's survey.

The fact that there was no difference in the effects of intervention by homeroom teachers at high school A, but a difference at high school B was observed, may not be attributable to differences in the intervention skills of individual homeroom teachers, but rather to differences in the intervention policies of each high school.

In a report from the United States, Chemtob et al. reported a decrease in PTSD among children after school-based interventions, indicating they may be effective [40]. In addition, the effectiveness of a post-disaster intervention system for adolescents called the school therapeutic enhancement program (STEP) has been demonstrated [41]. However, these require a large number of staff, experts, and financial resources. Such interventions do not apply to the Great East Japan Earthquake, where the communities faced enormous damage. In this paper, we introduced a school-based intervention system using

Japanese high schools' resources. Owing to differences in assessing psychological status and the duration of the study, it is difficult to accurately compare the effects of the STEP intervention in previous studies with the intervention in this study.

This study showed that teachers and other high school staff could play an important role in the psychological recovery of students after the disaster. In general, high school teachers, nurses, and counselors [41] are involved with students' mental health, including others such as the local community and family pediatricians. Empowering high school students under stress with psychological support from those involved with their daily functions may help them cope with the current COVID-19 pandemic.

4. Conclusion

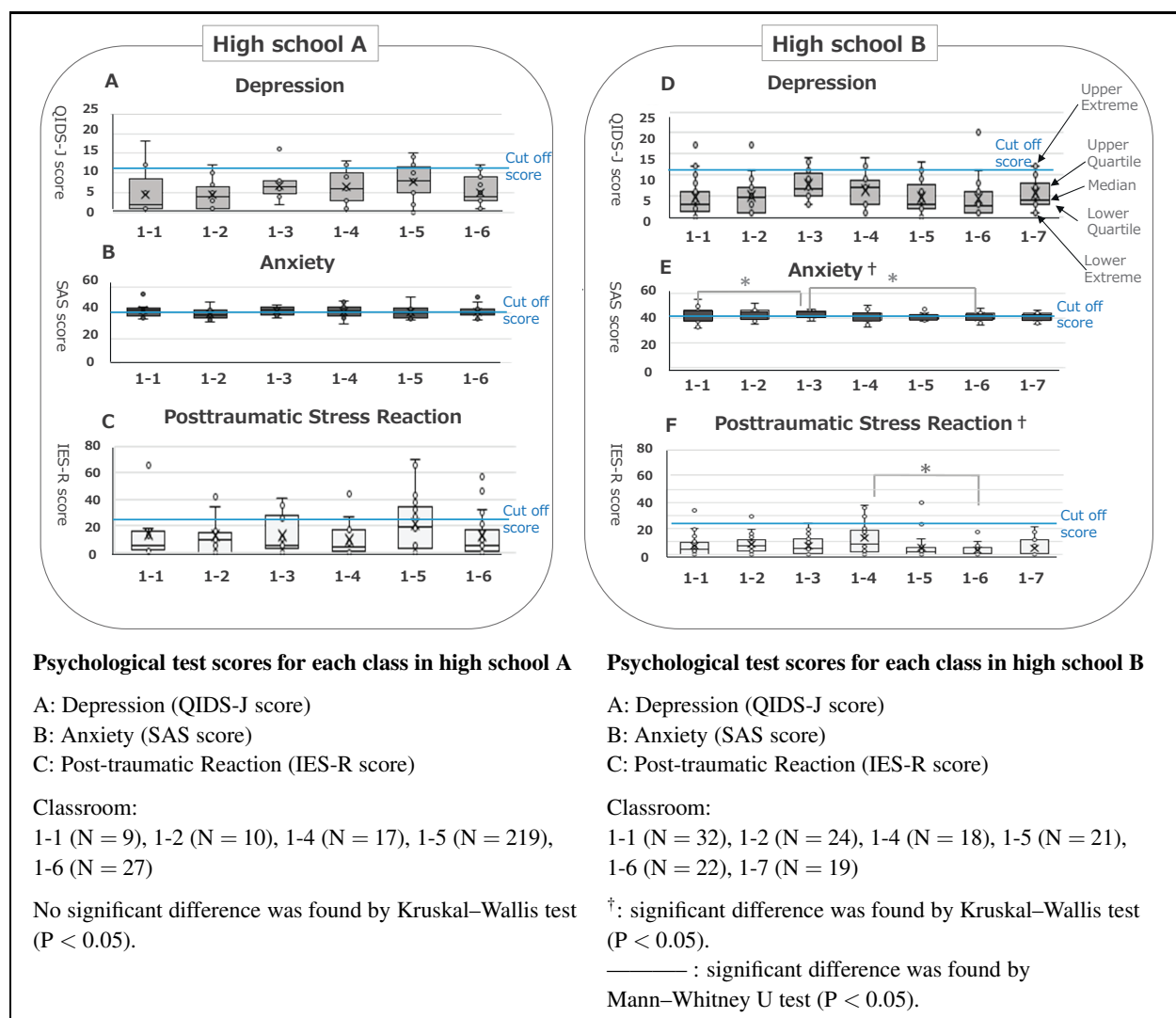
Adolescents affected by disasters may be at risk of developing psychiatric disorders and stress when grown up. However, the school-based psychological interventions provided to high school students after the Great East Japan Earthquake may be effective for future disaster victims in Japan. For example, it may serve as a model of appropriate intervention for adolescents who are feeling stressed under the current pandemic of novel coronavirus infections.

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High school A has six classes per grade, and high school B has seven classes per grade. A comparison of the scores of the three types of psychological examinations completed after the high school-based intervention, divided by class, revealed no significant difference among the six classes in high school A. However, for high school B, in 2012, students in classes 1–6 showed significantly lower anxiety symptoms and PTSR in the following year's survey.

Fig. 5. Psychological test scores by class.

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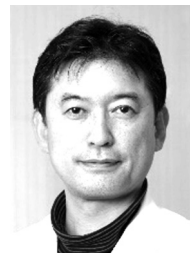
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1995-2000 Associate Professor, Disaster Control Research Center
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2000-2012 Professor, DCRC, Tohoku University
2012-2013 Deputy Director, IRIDeS, Tohoku University
2014- Director, IRIDeS, Tohoku University

Selected Publications:

- F. Imamura, A. Suppasri, S. Sato, and K. Yamashita, "The Role of Tsunami Engineering in Building Resilient Communities and Issues to Be Improved After the GEJE," V. Santiago-Fandiño et al. (Eds.), "The 2011 Japan Earthquake and Tsunami: Reconstruction and Restoration – Insights and Assessment after 5 Years," pp. 435-448, Springer, ISBN: 978-3-319-58691-5, 2017
- A. Suppasri, N. Leelawat, P. Latcharote, V. Roeber, K. Yamashita, A. Hayashi, H. Ohira, K. Fukui, A. Hisamatsu, D. Nguyen, and F. Imamura, "The 2016 Fukushima earthquake and tsunami: Local tsunami behavior and recommendations for tsunami disaster risk reduction Article reference," Int. J. of Disaster Risk Reduction, Vol.21, pp. 323-330, doi: 10.1016/j.ijdr.2016.12.016, 2017.
- A. Muhari, I. Charvet, F. Tsuyoshi, A. Suppasri, and F. Imamura, "Assessment of tsunami hazards in ports and their impact on marine vessels derived from tsunami models and the observed damage data," Natural Hazards, Vol.78, Issue 2, pp. 1309-1328, doi: 10.1007/s11069-015-1772-0, 2015.

Academic Societies & Scientific Organizations:

- Japan Society of Civil Engineers (JSCE)
- American Geophysical Union (AGU)
- Japan Society for Natural Disaster Science (JSNDS)
- Science Council of Japan
- Central Disaster Management Council, Cabinet Office, Government of Japan
- Study Group of the Reconstruction Design Council in Response to the Great East Japan Earthquake, Cabinet Office, Government of Japan



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Brief Career:

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2002- Department of Physical Medicine and Rehabilitation, Graduate
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2008- Graduate School of Biomedical Engineering, Tohoku University

Selected Publications:

- "Development of a clinical tool for rating the body function categories of the ICF generic-30/rehabilitation set in Japanese rehabilitation practice and examination of its interrater reliability," BMC Medical Research Methodology, Vol.21, 121, doi: 10.1186/s12874-021-01302-0, 2021.

Academic Societies & Scientific Organizations:

- Japanese Association of Rehabilitation Medicine (JARM)
- Japanese Society of Dysphagia Rehabilitation (JSDR)
- Society of Swallowing and Dysphagia of Japanese (SSDJ)