

# The Role of School Health Rooms during Disasters and their Facility's Medical Resources: A Post-Quake Survey Report by *Yogo* Teachers in Niigata Prefecture

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**In natural disasters, do school health rooms have any function as facilities to accommodate local residents with temporary evacuation and emergency care needs? In order to investigate the current conditions and issues of school health rooms regarding their facility and equipment availability, self-administered survey questionnaires were distributed in February 2010 to 372 *Yogo* teachers (health promotion and nursing professionals similar to school nurses in the West) working in public schools in Niigata prefecture, the epicenter of two recent major earthquake disasters. Surveys included questions about the facilities and equipments of school health rooms. Responses were received from 207 *Yogo* teachers (response rate: 55.6%): (1) Those who answered that their school health rooms were "capable" of temporarily accommodating school children and local residents in disasters comprised 70.5% of all respondents. However, nearly 50% reported that necessary conditions were not met in the physical placement of the school health rooms, citing that ambulances cannot make close approaches and that there is no direct access from the school grounds. (2) In terms of school health equipment placement, the rate was below 50% in 35 out of 91 items, including air purifier, fax machine, toilet, shower, television, and flashlights, items that are necessary in the event of an emergency evacuation. More specifically, 90% of school health rooms were not well equipped, with only approximately 10% of them having toilets, showers, and conference rooms. (3) In terms of school health equipment installation, more than half of the *Yogo* teachers reported that they were aware of the need to have in place 58 out of the 91 listed pieces of equipment in school health rooms. Many of the items were "equipment for information collection" or for "primary health care and disease prevention." (4) A comparison between *Yogo* teachers in non-stricken and stricken areas showed that the non-stricken area group tended to recognize the need for school health room equipment and *Yogo* teachers more highly than those in the stricken area group.**

**These results revealed the current status of equipment installation in public school health rooms in Niigata prefecture. The installation rate of "equipment for information collection" (e.g., personal computers and internet access) exceeded 80%, but the rate of televisions and fax machines was low. In addition, regarding "primary health care and disease prevention" materials, while all school health rooms had first-aid kits and related supplies, the installation**

**rates of crutches, wheelchairs, toilets, showers, and sterilizers were low and the budgets for installing new equipment were limited. The survey results suggest that in order to meet a wide range of health care needs for local residents in disasters from the perspective of disaster management and in coordination with local public health organizations, additionally, national standards for equipment installation in school health rooms should be re-examined and crisis management conducted in coordination with local public health organizations.**

**Keywords:** large earthquake, evacuation site, school health room, *Yogo* teacher

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## 1. Introduction

At 10:13 in the morning of Monday, July 16, 2007, the Niigata Chuetsu-oki Earthquake hit the Chuetsu region around Kashiwazaki city with an intensity of 6.8 on the Richter scale. This catastrophic disaster killed 10 persons and injured 1,278, completely destroyed 944 dwellings, and caused over 11,000 persons to be evacuated. The earthquake occurred several months after a large earthquake with an intensity of 6-plus hit another region on the coast of the Sea of Japan in Hokuriku region around the Noto peninsula in Ishikawa prefecture. Moreover, 3 years earlier on October 23, 2004, Niigata prefecture had been hit by the Niigata Chuetsu Earthquake around Nagaoka city which had an intensity 7, and caused the death of 67 persons (including children) and injuries to more than 4,800, and a derailment on the Shinkansen train line (Niigata prefecture, 2007). The 2007 earthquake was another massive earthquake that struck almost the same areas of the Chuetsu region as the previous one that had extensively damaged the Kashiwazaki city area. The earthquake immediately disrupted lifelines such as gas and water supplies, blocked traffic due to collapsed houses and damaged streets, and paralyzed all forms of public transportation such as trains. There was no school on that day, and schools turn into the evacuation sites for many local residents later that afternoon (Niigata Nippo, 2007).

After the Great Hanshin Earthquake in 1995, the importance of the functions of school health rooms and the roles of *Yogo* teachers (health promotion and nursing professionals similar to school nurses in the West) at evacuation sites of disasters has been recognized (Ueno, et al, 1996). In 2003, the Ministry of Education, Culture, Sports, Science and Technology issued “Guidelines for Children's Mental Health Care in Disasters (Revised),” which describes the importance of *Yogo* teachers for the mental health care of children after disasters (The Ministry of

Education, Culture, Sports, Science and Technology, 2003). The Niigata Prefecture Association of *Yogo* Teachers reviewed the experience of the Niigata Chuetsu Earthquake that had occurred 3 years earlier, and issued an “Urgent Report: Lessons from the Niigata Chuetsu Earthquake, Reflecting *Yogo* Teachers’ Engagement” (The Niigata Prefecture Association of *Yogo* Teachers, 2005). That report detailed what the *Yogo* teachers did during the earthquake, how school health offices functioned as evacuation sites, and how they were used immediately after the earthquake. However, other issues remain unaddressed; for example, guidelines for schools and teachers in disasters and manuals for support services are not yet available, and training programs and support systems for teachers in times of disasters have not yet been established (Tokuyama, et al., 1996: Nishimura, et al., 1998). Only a few studies have explored the roles of *Yogo* teachers and the functions of school health offices in disasters (Nagai, 1996: Matsushima, & Kamei, 1998).

Some school officials think that schools and its employees, including *Yogo* teachers, are ultimately for the benefit of the students, and so there is a limit to what they can do beyond student care. The primary role of the school during a disaster is securing the safety and lives of the students, minimizing damage to a school, and resuming the education of the students as soon as possible. When school staff arrived immediately after the Niigata Chuetsu-oki Earthquake, local residents had already been evacuated to the school gymnasium and were using school health room equipments (Sakou, et al., 2011). In light of resident needs and beliefs, school health rooms need to be equipped so that they can function as emergency aid sites for responding to school crisis and natural disasters.

In April 2009, the School Health and Safety Law (revised from the previous School Health Law) was enforced, which mandated the basic capabilities of schools to respond to accidents and natural disasters

that might endanger children's lives, safety, or health (The Ministry of Education, Culture, Sports, Science and Technology, 2008). Re-examination of the educational activities and school environment during disaster scenarios is a pressing issue. However, school health room equipment conditions at present do not pre-suppose care for elderly persons, infants, or individuals with disabilities, making it difficult to respond to a variety of patients and diverse health care needs. *Yogo* teachers are the only health professionals placed in schools and work out of the school health room within the school. Their expertise and skills correspond by cooperation and collaboration with medical health professionals during times of disaster in order to respond to the health care needs of elderly, infants, and individuals with disabilities, as well as school children and staff.

Thus, this study sought to investigate the current capability of school health rooms to meet the needs of local residents and children in disasters in terms of office facilities and equipments and to identify issues needing attention to ensure the rapid delivery of services in support of good quality of life and mental health care. In this study, we discuss how school health room facilities can function as emergency evacuation sites. The report is also designed to serve as reference material for re-examining national equipment standards pertaining to school health rooms.

## 2. Objective

The aim of the present study was to examine the workings of school health rooms designated as emergency evacuation sites. The study was designed to reveal the current conditions and issues affecting equipment availability at school health rooms through surveys that targeted *Yogo* teachers in Niigata prefecture, an area that incurred damage from two large earthquakes. In addition, the study aimed to re-examine national installation standards for school health room equipment and investigate publicly supported regional disaster prevention systems.

## 3. Methods

### 3.1. Study Period and Respondents

In February 2010, self-reporting survey questionnaires were mailed to one third ( $n = 327$ ) of

*Yogo* teachers working at elementary, junior-high, and senior-high schools in four cities of Niigata prefecture, namely Niigata, Joetsu, Kashiwazaki, and Nagaoka.

Permission to conduct the survey was granted by the Boards of Education of the aforementioned cities and the Association of *Yogo* Teachers. *Yogo* teachers employed in the main cities of the three regions of Niigata prefecture (Joetsu, Chuetsu, and Kaetsu) were selected to be surveyed. The Chuetsu region contains Nagaoka city and Kashiwazaki city, both of which had experienced two large earthquakes previously. All respondents had experienced earthquake disasters, either at their present schools or at schools in the same region. Prior to the survey, preliminary interviews were conducted in August 2008 of 11 *Yogo* teachers who were working at elementary and junior high schools in areas devastated by the Niigata Chuetsu-oki Earthquake.

### 3.2. Survey Items

The survey questionnaire listed a total of 91 items of school health room equipment. Included were 67 items from public notices of the Department of Sports, a division of the Ministry of Education, Culture, Sports, Science and Technology, (The Department of Sports in the Ministry of Education, Culture, Sports, Science and Technology, 1986: Japanese Society of School Health, 2004) and additional 24 items that researchers considered necessary for school health rooms designated as an emergency evacuation sites, such as wheelchairs, televisions, fax machines, inside toilets and showers, air conditionings, and personal computers. For each of the 91 items of equipment, respondents were asked to answer: (1) "Have" or "Do Not Have" (binary choice); (2) "Necessary" "Neither" or "Unnecessary" (multiple choice) for their perceptions about the need for each item; and (3) "Yes" or "No" (binary choice) for 13 statements about the overall condition of their school health rooms. In addition, 8 questions were asked about the respondent characteristics (**Table 1**). Finally, the survey documented the purpose of the current study and inquired about *Yogo* teachers' judgments and thoughts at the time of filling in the questionnaire.

### 3.3. Data Analysis

We used SPSS Windows ver. 17 for data collection and analysis, and conducted a chi-square test for

**Table 1** Respondent Characteristics

Items	Categories	No.	%	Stricken Areas n=91		Non-stricken Areas n=116		p-value
				No.	%	No.	%	
Schools	Elementary	76	36.7	55	60.4	21	18.1	p<0.01
	Junior High	85	41.1	20	22.0	65	56.0	
	Senior High	32	15.5	12	13.2	20	17.2	
	Special Needs	12	5.8	3	3.3	9	7.8	
	Other	2	1.0	1	1.1	1	0.9	
Number of Students	Fewer than 200	71	34.3	43	47.5	28	24.1	p<0.01
	200-399	58	28.0	23	25.3	35	30.2	
	400-599	46	22.2	17	18.7	29	25.0	
	600 or more	32	15.5	8	8.8	24	20.7	
Years of Experience	Fewer than 10 years	25	12.1	12	13.2	13	11.2	p<0.01
	11-19 years	40	19.3	21	23.1	19	16.4	
	20 years or more	141	68.1	57	62.6	84	72.4	
	Blank	1	0.5	1	1.1	0	0.0	
Yogo Teacher Certificate	Category 2	21	10.1	9	9.9	12	10.3	p<0.05
	Category 1	177	85.5	78	85.7	99	85.3	
	Specialization	6	2.9	1	1.1	5	4.3	
	Assistant Teacher	2	1.0	2	2.2	0	0.0	
	Blank	1	0.5	1	1.1	0	0.0	
Nursing License	Have	98	47.4	34	37.4	64	55.2	p<0.05
	Do not have	105	50.7	54	59.3	51	44.0	
	Blank	4	1.9	3	3.3	1	0.9	
Average Use of School Health Office per Day	Fewer than 10	85	41.1	44	48.4	41	35.3	p<0.01
	11-20 persons	73	35.3	31	34.1	42	36.2	
	21-29 persons	33	15.9	11	12.1	22	19.0	
	30 persons or more	14	6.8	4	4.4	10	8.6	
	Blank	2	1.0	1	1.1	1	0.9	
Multiple Assignment	Yes	19	9.2	5	5.5	14	12.1	p<0.01
	No	186	89.9	85	93.4	101	87.1	
	Blank	2	1.0	1	1.1	1	0.9	
Total		207	100.0	91	100.0	116	100.0	

descriptive statistics and comparisons of demographic characteristics. Significance level was set at 5%. *Yogo* teachers were divided into two groups: those in Kashiwazaki city and Nagaoka city, areas where there was massive earthquake damage (stricken-area group), and those in Niigata and Joetsu cities (non-stricken-area group), in order to control disaster experiences that may influence their judgment and perceptions of school health room equipment.

### 3.4. Ethical Considerations

The study's objectives and methods were stated in the survey questionnaire, and were completed anonymously to avoid identifying any respondent. Additional protection included guarantees of individual privacy and that data would not be used for non-study purposes. Receipt of a completed questionnaire was regarded as informed consent to participate.

## 4. Results

### 4.1. Respondent Attributes

Responses from 207 *Yogo* teachers (response rate: 55.6%) were obtained. The respondent attributes are shown in **Table 1**.

For type of schools, 76 *Yogo* teachers (36.7%) worked at elementary schools, 85 (41.1%) at junior high schools, 32 (15.5%) at senior high schools, and 12 (5.8%) at schools for special needs education. *Yogo* teachers with over 20 years of work experience comprised 68.1% ( $n = 141$ ) of the sample. There were 98 *Yogo* teachers (47.7%) who had nursing licenses (e.g., nurse, and public health nurse).

The stricken-area group consisted of 91 teachers from Kashiwazaki city ( $n = 43$ ) and Nagaoka city ( $n = 48$ ). The non-stricken area group was composed of 116 teachers from Niigata city ( $n = 77$ ) and Joetsu city ( $n = 39$ ).

### 4.2. School Health Room Equipment and Conditions

As shown in **Table 2-1**, out of 91 listed pieces of equipment, 56 were installed in more than 50% of school health rooms. Seven of these 56 items, which included beds, heaters, thermometers, and portable first-aid bags, were available in all schools. Eleven of other 35 items, including fax machines, humidifiers and dehumidifiers, air purifiers, toilets and showers, conference room, and televisions were installed in no more than 80% of school health rooms. Sixty to seventy percents of the schools did not have crutches or wheelchairs.

**Table 2-1** Facility Medical Resources of School Health Room

Categories	Facility Medical Resources of School Health Rooms (N=207)								p-value
	Stricken Areas n=91				Non-stricken Areas n=116				
	Have		Do Not Have		Have		Do Not Have		
	No.	%	No.	%	No.	%	No.	%	
Desks and Chairs (for office work)	91	100.0	0	0.0	116	100.0	0	0.0	
Beds, Mattresses, Blankets	91	100.0	0	0.0	116	100.0	0	0.0	
Clothes-changing baskets	49	53.8	42	46.2	73	62.9	43	37.1	
Bed Linens and Closets	67	73.6	24	26.4	101	87.1	15	12.9	p<0.05
Primary Healthcare Stretchers and Pillows	65	71.4	26	28.6	98	84.5	18	15.5	p<0.05
Couches	72	79.1	19	20.9	107	92.2	9	7.8	p<0.01
Screens and Partitions	89	97.8	2	2.2	115	99.1	1	0.9	
Drug Cabinets	90	98.9	1	1.1	116	100.0	0	0.0	
File Cabinets	89	97.8	2	2.2	114	98.3	2	1.7	
Basins and Basin Stands	91	100.0	0	0.0	115	99.1	1	0.9	
Cabinets for Health Records	60	65.9	31	34.1	89	76.7	27	23.3	
Hot-Water Heaters	80	87.9	11	12.1	110	94.8	6	5.2	
Refrigerator	80	87.9	11	12.1	114	98.3	2	1.7	p<0.01
Thermometers and Hygrometers	87	95.6	4	4.4	115	99.1	1	0.9	
Flashlights	31	34.1	60	65.9	65	56.0	51	44.0	p<0.01
Clocks and Timers	89	97.8	2	2.2	113	97.4	3	2.6	
★Conference Tables and Chairs	65	71.4	26	28.6	103	88.8	13	11.2	p<0.01
★Washers, Dryers, and Laundry Stands	67	73.6	24	26.4	97	83.6	19	16.4	
★Air Conditioners	71	78.0	20	22.0	115	99.1	1	0.9	p<0.01
★Heaters	91	100.0	0	0.0	116	100.0	0	0.0	
★Humidifiers	7	7.7	84	92.3	58	50.0	58	50.0	p<0.01
★Dehumidifiers	4	4.4	87	95.6	8	6.9	108	93.1	
★Air Cleaners	2	2.2	89	97.8	12	10.3	104	89.7	p<0.05
★Computers and Internet Access	77	84.6	14	15.4	101	87.1	15	12.9	
★Printers	20	22.0	71	78.0	57	49.1	59	50.9	p<0.01
★Intercom System	90	98.9	1	1.1	112	96.6	4	3.4	
★Outside Telephone Lines	88	96.7	3	3.3	114	98.3	2	1.7	
★Fax machines	1	1.1	90	98.9	1	0.9	115	99.1	
★Conference Room for School Health Office	7	7.7	84	92.3	22	19.0	94	81.0	p<0.05
★Conference Lounge Furniture	24	26.4	67	73.6	39	33.6	77	66.4	
★Toilets Attached to School Health Rooms	5	5.5	86	94.5	8	6.9	108	93.1	
Water Supplies	90	98.9	1	1.1	116	100.0	0	0.0	
★Showers	9	9.9	82	90.1	19	16.4	97	83.6	
Clinical Thermometers	91	100.0	0	0.0	116	100.0	0	0.0	
Nippers and Nipper Stands	91	100.0	0	0.0	116	100.0	0	0.0	
Scissors and Tweezers	91	100.0	0	0.0	113	97.4	3	2.6	
Kidney Dishes	84	92.3	7	7.7	105	90.5	11	9.5	
Gauze Cans	77	84.6	14	15.4	103	88.8	13	11.2	
Disinfection Trays	66	72.5	25	27.5	92	79.3	24	20.7	
Splints	89	97.8	2	2.2	114	98.3	2	1.7	
Masks for CPR	67	73.6	24	26.4	91	78.4	25	21.6	
Crutches	23	25.3	68	74.7	51	44.0	65	56.0	p<0.01
Stools for First-Aid Care	83	91.2	8	8.8	106	91.4	10	8.6	
Facial Washing Bottles and Water Dishes	40	44.0	51	56.0	52	44.8	64	55.2	
Sterilizers and Waste Baskets	29	31.9	62	68.1	42	36.2	74	63.8	
Ice Bags and Ice Pillows	85	93.4	6	6.6	105	90.5	11	9.5	
Foot Warmers	28	30.8	63	69.2	34	29.3	82	70.7	
★Wheel Chairs	22	24.2	69	75.8	31	26.7	85	73.3	
★Couches (for Waiting)	49	53.8	42	46.2	89	76.7	27	23.3	p<0.01
★Ice Making Machines	32	35.2	59	64.8	38	32.8	78	67.2	
Portable First-Aid Bags	91	100.0	0	0.0	116	100.0	0	0.0	
First-Aid Supplies and Kits	89	97.8	2	2.2	115	99.1	1	0.9	
Water Supplies (for Hands and Foot)	83	91.2	8	8.8	106	91.4	10	8.6	
Assmann's Ventilated Psychrometers	19	20.9	72	79.1	46	39.7	70	60.3	p<0.01
Catathermometers	20	22.0	71	78.0	31	26.7	85	73.3	
Black-bulb Thermometers	10	11.0	81	89.0	11	9.5	105	90.5	
Gas Detectors	30	33.0	61	67.0	63	54.3	53	45.7	p<0.01
Dust Counters	2	2.2	89	97.8	0	0.0	116	100.0	
Blackboard Color Examiners	11	12.1	80	87.9	8	6.9	108	93.1	
Tools for Examining Water Quality	83	91.2	8	8.8	112	96.6	4	3.4	
Water-Temperature Meters for Swimming Pool	28	30.8	63	69.2	33	28.4	83	71.6	
Tools for Examining Swimming-Pool Water Quality	42	46.2	49	53.8	34	29.3	82	70.7	p<0.05
Height Rulers	90	89.9	1	1.1	116	100.0	0	0.0	
Weight Scales	90	89.9	1	1.1	116	100.0	0	0.0	
Trunk Rulers	89	97.8	2	2.2	116	100.0	0	0.0	
Tape Measures	73	80.2	18	19.8	101	87.1	15	12.9	
Blinders	87	95.6	4	4.4	108	93.1	8	6.9	
Illuminating Devices	83	91.2	8	8.8	110	94.8	6	5.2	
International Visual Acuity Test Chart and Lighting Devices	88	96.7	3	3.3	112	96.6	4	3.4	
Color Blindness Test Chart	76	83.5	15	16.5	90	77.6	26	22.4	
Audiometers	72	79.1	19	20.9	113	97.4	3	2.6	p<0.01
Head Mirrors, Cotton Applicators, Probes	16	17.6	75	82.4	27	23.3	89	76.7	
Otolaryngologic Tweezers	20	22.0	71	78.0	34	29.3	82	70.7	
Otoscopies, Rhinoscopies, Tongue Depressors	40	44.0	51	56.0	68	58.6	48	41.4	p<0.05
Cotton Applicators for Throat	17	18.7	74	81.3	31	26.7	85	73.3	
Mouth Mirrors, Dental Probes	55	60.4	36	39.6	61	52.6	55	47.4	
Dental Tweezers	30	33.0	61	67.0	34	29.3	82	70.7	
Tuberculin Reaction Test Boards	3	3.3	88	96.7	5	4.3	111	95.7	
Stethoscope, Plexors	72	79.1	19	20.9	97	83.6	19	16.4	
Spirometers, Hand Dynamometers	11	12.1	80	87.9	20	17.2	96	82.8	
Back Dynamometers, Manometers	5	5.5	86	94.5	9	7.8	107	92.2	
Body Fat Scales	18	19.8	73	80.2	42	36.2	74	63.8	p<0.05
Pen Lights	68	74.7	23	25.3	106	91.4	10	8.6	p<0.01
Blood-Pressure Gauges	88	96.7	3	3.3	115	99.1	1	0.9	
★Health Education Materials and Books	91	100.0	0	0.0	116	100.0	0	0.0	
★Audio-Visual Resources (e.g., video, DVD)	80	87.9	11	12.1	105	90.5	11	9.5	
Models	42	46.2	49	53.8	56	48.3	60	51.7	
★Books and Dictionaries for Students	64	70.3	27	29.7	98	84.5	18	15.5	p<0.05
★White Boards	20	22.0	71	78.0	38	32.8	78	67.2	
Dental Models for Dental Care Instructions	70	76.9	21	23.1	75	64.7	41	35.3	
★Videos, Televisions	14	15.4	77	84.6	14	12.1	102	87.9	

★24 items that researchers considered necessary for school health rooms



Thus, while equipments and supplies needed for immediate treatment in disasters, such as drugs and beds, were usually installed, other necessary equipment such as wheelchairs, crutches, and flashlights were not readily available. Important lifelines such as telephones and personal computers for internet access were usually installed. But equipment needed for the acquisition or exchange of information, such as televisions and fax machines, were not readily available.

In addition, other equipments to meet the diverse health care needs of evacuees such as showers, toilets, conference rooms, humidifiers and dehumidifiers, and air purifiers were not sufficiently available.

**Table 2-1**, comparisons between the stricken-area group of *Yogo* teachers (in Kashiwazaki and Nagaoka) and the non-stricken-area group (in Niigata and Joetsu) showed significant differences in relation to 21 items, including flashlights, air conditioners, humidifiers and dehumidifiers, crutches, printers, desks and chairs for a conference room, and couches. The non-stricken group area (in Niigata and Joetsu) was better equipped than the stricken group area.

### 4.3. School Health Room Locations and Environments

As shown in **Table 3**, 52.2% of the entire school health office sample had school health offices that were located on the ground floor facing playgrounds or streets where ambulances could have an easy access. In addition, 49.8% of the schools had direct access from playgrounds.

There were 146 *Yogo* teachers (70.5%) who reported that their school health rooms would temporarily be capable, of accepting people who needed emergency care during a disaster. Sixty schools (30.0%) were addressing issues in their school safety plans concerning school health office conditions in disasters. While 30 schools (14.5%) have school health rooms being included in the scope of their municipality's disaster control plans.

These findings demonstrate that while 70% of *Yogo* teachers reported that their school health rooms would be capable of serving as temporary evacuation sites in disasters, more than half of the school health rooms would experience problems with ambulance access or difficulties in entering from outside. The findings also clarify that the role and function of school health rooms were typically not considered in school safety

plans or in regional or municipal disaster control plans.

Comparisons of the stricken-area group (Kashiwazaki and Nagaoka) and the non-stricken area group (Niigata and Joetsu) of *Yogo* teachers revealed that the non-stricken area group rated two items significantly higher than the stricken-area group, namely "air conditioning equipment" and "fund for school health offices" ( $p < 0.01$ ).

### 4.4. Equipment Perceived as Necessary in School Health Offices to be used as Evacuation Sites in Disasters

As shown in **Table 2-2**, more than half of the *Yogo* teachers were aware of the need to equip 58 out of the 91 items in the school health rooms. In particular, 36 items, including beds, partitions, hot-water heaters, refrigerators, clocks, flashlights, and air conditioners, were perceived as necessary pieces of equipments by more than 80% of *Yogo* teachers.

However, 16 of these 36 items were in fact absent in more than half of the surveyed school health rooms. These items included flashlights, toilets and showers, humidifiers/dehumidifiers, printers, televisions, wheelchairs, crutches, and sanitizers. The rate of placement for televisions, a valuable source of information during times of disaster, was especially low. Rates of items needed to meet diverse physical care needs, specifically those for toilet and shower installation and wheelchair availability, were also particularly low. These items can be put to use on a daily basis in the school health rooms.

Hence, only a limited number of pieces of equipment were installed in school health rooms, even though *Yogo* teachers considered the other equipment as a necessity during disasters. Only 90 *Yogo* teachers (43.5%) were satisfied with their budgets for school health room equipments, or to put it another way, more than half thought their budgets were too small (**Table 3**).

In addition, as shown in **Table 2-2**, *Yogo* teachers in the non-stricken-area group (Niigata and Joetsu) were significantly more likely to consider 9 items of equipments necessary (e.g., primary health care stretchers and pillows, splints, first-aid supplies, and hot-water heaters) than those in the stricken-area group (Kashiwazaki and Nagaoka).

**Table 2-2** Comparisons of Equipment Available between the Stricken Areas and Non-stricken Areas

Categories	Perceptions of School Health Rooms as Evacuation Sites (N=207)												p-value
	Stricken Areas n=91						Non-stricken Areas n=116						
	Necessary		Neither		Unnecessary		Necessary		Neither		Unnecessary		
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Desks and Chairs (for office work)	76	83.5	13	14.3	2	2.2	107	92.2	9	7.8	0	0.0	
Beds, Mattresses, Blankets	87	95.6	4	4.4	0	0.0	114	98.3	1	0.9	0	0.0	
Clothes-changing baskets	58	63.7	25	27.5	8	8.8	79	68.1	34	29.3	3	2.6	
Bed Linens and Closets	77	84.6	21	13.2	2	2.2	104	89.7	11	9.5	1	0.9	
Primary Healthcare Stretchers and Pillows	76	83.5	14	15.4	1	1.1	113	97.4	3	2.6	0	0.0	
Couches	75	82.4	13	14.3	3	3.3	106	91.4	9	7.8	1	0.9	
Screens and Partitions	88	96.7	3	3.3	0	0.0	115	99.1	0	0.0	1	0.9	
Drug Cabinets	79	86.8	11	12.1	1	1.1	109	94.0	5	4.3	2	1.7	
File Cabinets	57	62.6	25	27.5	9	9.9	77	66.4	26	22.4	13	11.2	
Basins and Basin Stands	79	86.8	12	13.2	0	0.0	109	94.0	6	5.2	1	0.9	
Cabinets for Health Records	34	37.4	27	29.7	30	33.0	57	49.1	28	24.1	31	26.7	
Hot-Water Heaters	87	95.6	4	4.4	0	0.0	116	100.0	0	0.0	0	0.0	
Refrigerator	88	96.7	3	3.3	0	0.0	115	99.1	1	0.9	0	0.0	
Thermometers and Hygrometers	88	96.7	3	3.3	0	0.0	110	94.8	6	5.2	0	0.0	
Flashlights	86	94.5	5	5.5	0	0.0	112	96.6	2	1.7	2	1.7	
Clocks and Timers	89	97.8	2	2.2	0	0.0	114	98.3	1	0.9	1	0.9	
★Conference Tables and Chairs	65	71.4	18	19.8	8	8.8	84	72.4	24	20.7	8	6.9	
★Washers, Dryers, and Laundry Stands	79	86.8	9	9.9	3	3.3	107	92.2	7	6.0	2	1.7	
★Air Conditioners	86	94.5	5	5.5	0	0.0	111	95.7	5	4.3	0	0.0	
★Heaters	88	96.7	3	3.3	0	0.0	114	98.3	2	1.7	0	0.0	
★Humidifiers	52	57.1	31	34.1	8	8.8	76	65.5	34	29.3	6	5.2	
★Dehumidifiers	34	37.4	42	46.2	15	16.5	55	47.4	47	40.5	14	12.1	
★Air Cleaners	43	47.3	39	42.9	9	9.9	63	54.3	38	32.8	15	12.9	
★Computers and Internet Access	79	86.8	8	8.8	4	4.4	103	88.8	10	8.6	3	2.6	
★Printers	58	63.7	27	29.7	6	6.6	88	75.9	19	16.4	9	7.8	
★Intercom System	88	96.7	3	3.3	0	0.0	109	94.0	5	4.3	2	1.7	
★Outside Telephone Lines	88	96.7	3	3.3	0	0.0	111	95.7	5	4.3	0	0.0	
★Fax machines	45	49.5	31	34.1	15	16.5	68	58.6	35	30.2	13	11.2	
★Conference Room for School Health Office	63	69.2	24	26.4	4	4.4	85	73.3	26	22.4	5	4.3	
★Conference Lounge Furniture	61	67.0	24	26.4	6	6.6	75	64.7	34	29.3	7	6.0	
★Toilets Attached to School Health Rooms	73	80.2	14	15.4	4	4.4	95	81.9	17	14.7	4	3.4	
Water Supplies	89	97.8	2	2.2	0	0.0	113	97.4	2	2.6	0	0.0	
★Showers	76	83.5	15	16.5	0	0.0	99	85.3	15	12.9	2	1.7	
Clinical Thermometers	85	93.4	6	6.6	0	0.0	114	98.3	2	1.7	0	0.0	
Nippers and Nipper Stands	82	90.1	9	9.9	0	0.0	112	96.6	4	3.4	0	0.0	
Scissors and Tweezers	82	90.1	9	9.9	0	0.0	113	97.4	3	2.6	0	0.0	
Kidney Dishes	75	82.4	15	16.5	1	1.1	103	88.8	13	11.2	0	0.0	
Gauze Cans	64	70.3	23	25.3	4	4.4	94	81.0	20	17.2	2	1.7	
Disinfection Trays	65	71.4	22	24.2	4	4.4	94	81.0	19	16.4	3	2.6	
Splints	79	86.8	11	12.1	1	1.1	113	97.4	3	2.6	0	0.0	
Masks for CPR	79	86.8	10	11.0	2	2.2	106	91.4	8	6.9	2	1.7	
Crutches	63	69.2	22	24.2	6	6.6	87	75.0	26	22.4	3	2.6	
Stools for First-Aid Care	75	82.4	16	17.6	0	0.0	96	82.8	18	15.5	2	1.7	
Facial Washing Bottles and Water Dishes	55	60.4	28	30.8	8	8.8	79	68.1	29	25.0	8	6.9	
Sterilizers and Waste Baskets	56	61.5	29	31.9	6	6.6	87	75.0	25	21.6	4	3.4	
Ice Bags and Ice Pillows	79	86.8	12	13.2	0	0.0	108	93.1	6	5.2	2	1.7	
Foot Warmers	65	71.4	24	26.4	2	2.2	78	67.2	28	24.1	10	8.6	
★Wheel Chairs	71	78.0	18	19.8	2	2.2	93	80.2	20	17.2	3	2.6	
★Couches (for Waiting)	67	73.6	22	24.2	2	2.2	101	87.1	11	9.5	4	3.4	
★Ice Making Machines	61	67.0	28	30.8	2	2.2	87	75.0	24	20.7	5	4.3	
Portable First-Aid Bags	77	84.6	12	13.2	2	2.2	111	95.7	4	3.4	1	0.9	
First-Aid Supplies and Kits	81	89.0	9	9.9	1	1.1	113	97.4	2	1.7	1	0.9	
Water Supplies (for Hands and Foot)	84	92.3	7	7.7	0	0.0	114	98.3	2	1.7	0	0.0	
Assmann's Ventilated Psychrometers	10	11.0	33	36.3	48	52.7	24	20.7	48	41.4	44	37.9	
Cathetermeters	12	13.2	32	35.2	47	51.6	27	23.3	53	45.7	36	31.0	
Black-bulb Thermometers	6	6.6	34	37.4	51	56.0	14	12.1	53	45.7	49	42.2	
Gas Detectors	19	20.9	29	31.9	43	47.3	31	26.7	46	39.7	39	33.6	
Dust Counters	5	5.5	39	42.9	47	51.6	16	13.8	51	44.0	49	42.2	
Blackboard Color Examiners	4	4.4	30	33.0	57	62.6	7	6.0	47	40.5	62	53.4	
Tools for Examining Water Quality	55	60.4	18	19.8	18	19.8	81	69.8	17	14.7	18	15.5	
Water-Temperature Meters for Swimming Pool	7	7.7	30	33.0	54	59.3	12	10.3	43	37.1	61	52.6	
Tools for Examining Swimming-Pool Water Quality	7	7.7	30	33.0	54	59.3	10	8.6	45	38.8	61	52.6	
Height Rulers	43	47.3	26	28.6	22	24.2	52	44.8	42	36.2	22	19.0	
Weight Scales	58	63.7	19	20.9	14	15.4	71	61.2	33	28.4	12	10.3	
Trunk Rulers	23	25.3	30	33.0	38	41.8	44	37.9	31	26.7	41	35.3	
Tape Measures	38	41.8	31	34.1	22	24.2	57	49.1	34	29.3	25	21.6	
Blinders	30	33.0	25	27.5	36	39.6	37	31.9	44	37.9	35	30.2	
Illuminating Devices	58	63.7	19	20.9	14	15.4	83	71.6	22	19.0	11	9.5	
International Visual Acuity Test Chart and Lighting Devices	32	35.2	36	39.6	23	25.3	55	47.4	40	34.5	21	18.1	
Color Blindness Test Chart	12	13.2	37	40.7	42	46.2	21	18.1	44	37.9	51	44.0	
Audiometers	38	41.8	31	34.1	22	24.2	57	49.1	37	31.9	22	19.0	
Head Mirrors, Cotton Applicators, Probes	20	22.0	41	45.1	30	33.0	30	25.9	49	42.2	37	31.9	
Otolaryngologic Tweezers	27	29.7	33	36.3	31	34.1	33	28.4	52	44.8	31	26.7	
Otoscopes, Rhinoscopes, Tongue Depressors	37	40.7	29	31.9	25	27.5	42	36.2	51	44.0	23	19.8	
Cotton Applicators for Throat	26	28.6	35	38.5	30	33.0	33	28.4	54	46.6	29	25.0	
Mouth Mirrors, Dental Probes	28	30.8	35	38.5	28	30.8	32	27.6	55	47.4	29	25.0	
Dental Tweezers	20	22.0	38	41.8	33	36.3	30	25.9	52	44.8	34	29.3	
Tuberculin Reaction Test Boards	5	5.5	22	24.2	64	70.3	9	7.8	35	30.2	72	62.1	
Stethoscope, Plexors	68	74.7	16	17.6	7	7.7	87	75.0	17	14.7	12	10.3	
Spirometers, Hand Dynamometers	11	12.1	30	33.0	50	54.9	12	10.3	54	46.6	50	43.1	
Back Dynamometers, Manometers	9	9.9	28	30.8	54	59.3	10	8.6	52	44.8	54	46.6	
Body Fat Scales	16	17.6	38	41.8	37	40.7	26	22.4	53	45.7	37	31.9	
Pen Lights	79	86.8	5	5.5	7	7.7	103	88.8	9	7.8	4	3.4	
Blood-Pressure Gauges	87	95.6	2	2.2	2	2.2	112	96.6	3	2.6	1	0.9	
★Health Education Materials and Books	35	38.5	33	36.3	23	25.3	40	34.5	51	44.0	25	21.6	
★Audio-Visual Resources (e.g., video, DVD)	21	23.1	43	47.3	27	29.7	37	31.9	51	44.0	28	24.1	
Models	12	13.2	43	47.3	36	39.6	23	19.8	54	46.6	39	33.6	
★Books and Dictionaries for Students	28	30.8	35	38.5	28	30.8	39	33.6	49	42.2	28	24.1	
★White Boards	38	41.8	33	36.3	20	22.0	59	50.9	43	37.1	14	12.1	
Dental Models for Dental Care Instructions	15	16.5	43	47.3	33	36.3	23	19.8	56	48.3	37	31.9	
★Videos, Televisions	49	53.8	26	28.6	16	17.6	67	57.8	35	30.2	14	12.1	

★24 items that researchers considered necessary for school health rooms

**Table 3** Overall Condition of School Health Rooms

Question Items	Stricken Areas n=91						Non-stricken Areas n=116						p-value
	Yes		No		Blank		Yes		No		Blank		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
1 Is the space of the school health room appropriate?	63	69.2	28	30.8	0	0.0	91	78.4	24	20.7	1	0.9	
2 Does the school health room have good ventilation?	59	64.8	32	35.2	0	0.0	87	75.0	28	24.1	1	0.9	
3 Is the school health room air conditioned?	71	78.0	20	22.0	0	0.0	114	98.3	2	1.7	0	0.0	p<0.01
4 Is the school health room located in a convenient place for school children?	66	72.5	25	27.5	0	0.0	90	77.6	26	22.4	0	0.0	
5 Is there easy access for ambulances and mobile X-ray vans?	47	51.6	43	47.3	1	1.1	61	52.6	55	47.4	0	0.0	
6 Is there direct access from the playground?	45	49.5	45	49.5	1	1.1	58	50.0	57	49.1	1	0.9	
7 Are there toilets in or close to the office?	51	56.0	40	44.0	0	0.0	75	64.7	40	34.5	1	0.9	
8 Are stretchers and wheelchairs easily available?	72	79.1	18	19.8	1	1.1	99	85.3	17	14.7	0	0.0	
9 Is the school health room able to be used by other teachers and staff in the absence of a <i>Yogo</i> teacher?	89	97.8	2	2.2	0	0.0	113	97.4	3	2.6	0	0.0	
10 Would the school health room be capable, albeit temporarily, of accepting people during a disaster?	66	72.5	25	27.5	0	0.0	80	69.0	34	29.3	2	1.7	
11 Are disaster control responses addressed in school health and safety plans?	26	28.6	63	69.2	2	2.2	36	31.0	79	68.1	1	0.9	
12 Are the school health room functions and roles included in the scope of your municipality's disaster control plans?	17	18.7	58	63.7	16	17.6	13	11.2	82	70.7	21	18.1	
13 Are budgets for physical resources of the school health room adequate?	29	31.9	59	64.8	3	3.3	61	52.6	50	43.1	5	4.3	p<0.01

## 5. Discussion

When the Niigata Chuetsu-oki Earthquake occurred in July 2007, many evacuated residents found their way to school health rooms and were already using the rooms and equipments before the school staffs arrived. This study found that while the installation rate of "equipment for information collection" exceeded 80% in the school health rooms of public schools in Niigata prefecture, where a devastating earthquake disaster had just occurred, only 13.5% had televisions. As television sets are commonly installed and used in classrooms and in principals' offices, this issue of school health rooms without televisions, a primary source of information in natural disasters, should be immediately addressed. Regarding "primary health care and disease prevention" items, while first-aid kits and supplies were installed in 98.6% of health offices, the installation/availability rates of crutches, sterilizers, and wheelchairs were low.

Toilets, showers, and conference rooms attached to school health rooms were even lower. The findings also revealed insufficient budgets to improve these conditions.

The study found that 70% of *Yogo* teachers reported that school health offices could be used as temporary evacuation sites during times of disaster. However, they have difficulties with ambulance access and no direct access from the outside. The school safety and community disaster prevention plans do not include the role and function of school health rooms.

A comparison of the stricken area and the non-stricken area groups revealed that the facilities in the non-stricken area group were significantly better equipped than those in the stricken area group in regard to 13 items, including air conditioners, humidifiers/dehumidifiers, crutches, printers, conference desks and chairs, and benches.

While awareness of the need for *Yogo* teachers

and sufficient equipment may well be expected among *Yogo* teachers in the disaster areas, the results of the present study actually indicate otherwise. "School health room funding" and "air conditioning installation" were better among non-stricken area group facilities, suggesting the influence of financial assistance from local municipalities.

Ishizuka et al. (2010) reported that the location of health rooms was important for *Yogo* teachers to properly fulfill their tasks, and that school health rooms should be sited such that *Yogo* teachers are able to closely observe all children and any primary health care treatment at all times. In addition, school health rooms should be located to facilitate convenient contact with other teachers and staff. A study of sterilization/disinfection conditions and hygienic supplies in school health rooms by Yokoyama et al. (2007) showed that 80% of school health rooms in their study sterilized equipment by boiling, and the use of disposable gloves was routine practice in only 40% of schools, which led them to conclude that technical knowledge about infection control was inadequate in schools. As noted in the School Health and Safety Law and the School Education Law Enforcement Regulations, these issues of school health room conditions should not be left to individual *Yogo* teachers' competencies to address. Municipal governments and school boards, who are in charge of these establishments, should have comprehensive and systematic involvement in the issues and the local conditions at each school and school health room.

The survey results of this study also demonstrated that further improvements to school health rooms are needed in terms of facilities and the availability of equipments. This study found questionable aspects of current school health room preparedness and it is not clear whether school health rooms could actually respond not only to the needs of school children, teachers, and staffs, but also to a wide range of



care needs of local residents (including the elderly and young children) in disaster emergencies. Thus, the school health room equipment standards of the Ministry of Education, Culture, Sports, Science and Technology for earthquake disaster scenarios need to be re-examined immediately.

An evacuation site is legally defined as a place to accommodate those who are, or are at risk of becoming, casualties of a disaster, and should usually be situated in existing buildings such as schools and community centers (The Ministry of Health, Labour, and Welfare, 2000). During the Niigata Chuetsu-oki Earthquake, school health room equipments and supplies were already being used prior to the arrival of school staffs. Fujioka et al. (2009) asserted that school health rooms should function as earthquake crisis centers in disasters. However, the present study revealed the reality of there being limited resources and tight budgets for supplies and manpower to provide emergency primary health care services in disasters. We should not simply rely on individual *Yogo* teacher's competencies to address these issues. Rather an urgent task is to review school environments and educational activities around the use of school health rooms in disaster situations. As indicated by Ishizuka et al. (2010), the system should allow for the opinions of *Yogo* teachers to be fully reflected in the design and construction of school health rooms.

Furthermore, we suggest that the curricula of *Yogo* teacher training and on-the-job training programs should be reviewed in order to reinforce the management and administrative skills needed to turn school health rooms into facilities providing crisis-oriented service in the event of earthquake crisis.

The School Health and Safety Law mandated improvements in schools so that they could respond to emergency events, accidents, and disasters where children's lives, safety, and health are at risk (The Ministry of Education, Culture, Sports, Science and Technology, 2008). However, under current conditions where school health rooms are not prepared to respond to a wider population of local older adults, infants, and handicapped persons, it would be extremely difficult to meet the mandated care needs. As the only health professionals typically working in schools, *Yogo* teachers may be required in a disaster to apply their professional knowledge and skills in cooperation with other local professionals (such as public health nurses) not only to assist school

children, teachers, and staffs, but also the elderly, infants, the handicapped, and other local residents.

With reports that local residents used school health rooms and the equipments before school staffs arrived during the Niigata Chuetsu-oki Earthquake, improvements are needed in the conditions at schools and in the human resources needed to support the current *Yogo* teachers so that they can provide temporary primary health care services and otherwise respond to local residents' needs in disasters. In addition, given the increasing interest in reinforcing the crisis control functions of schools that was triggered by a revision of the School Health and Safety Law, a review on the status of the availability of equipment in school health rooms based on the 1958 and 1986 Public Notice of the Sports Bureau, the Ministry of Education, Science, and Culture should be conducted. Furthermore, based on lessons learned from previous disaster, schools need to actively participate in their community's comprehensive disaster control plans through coordination and cooperation with public health organizations and municipal governments.

A few limitations to the present study make generalization of results difficult. First, the questionnaire response rate was 55.6%, which suggests that responses were yielded from only *Yogo* teachers with particular interest. Furthermore, *Yogo* teachers in the target sample were not representative of all of Niigata prefecture, nor were they randomly chosen. The study sample was limited to four main cities within Niigata prefecture that had agreed to cooperate with the study. Future studies should employ better sampling methods, as well as accumulate and analyze more data. In addition, further research involving *Yogo* teachers needs to be conducted and new standards set for school health rooms in order to meet current needs—standards that go beyond those previously set for school health equipments.

## 6. Conclusion

In natural disasters, school health rooms are required to function as facilities to accommodate local residents with temporary evacuation and emergency care needs. In order to investigate the current conditions and issues of school health rooms regarding their facilities and equipment availability, a self-administered survey questionnaire was

distributed in February 2010 to 372 *Yogo* teachers working in public schools in Niigata prefecture, the epicenter of two recent major earthquake disasters. Surveys included questions about the facilities and equipment installed in school health rooms.

The survey results suggest that in order to meet a wide range of care needs for local residents in disasters from the perspective of disaster management and in coordination with local public health organizations, it is critically important to review and improve the status of equipment availability in school health rooms, as well as re-examine the national standards for installation.

While school health rooms are part of school facilities, they may be required to temporarily function as public health centers to meet diverse primary health care needs when disaster strikes. Given the fact that Japan is a highly seismic country and disaster could strike anywhere and at any time, we should advance policies and budgets to establish and improve the function of school health rooms as evacuation sites for community residence within a framework of comprehensive disaster control planning, along with improvement of *Yogo* teacher training programs.

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**Main Works:**

- School health activities of Yogo-teachers and the function of school health offices in Niigataken Chuetsu-oki Earthquake, Japanese Journal of Public Health 58: 274-281, 2011 (in Japanese)
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**Membership in Learned Societies:**

- Japanese Association of School Health
  - Japanese Society of Public Health
  - Japanese Association of Yogo Teacher Education
  - Japanese Society of Child Health
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