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Consideration on the new psychiatric emergency cases related to the Great East Japan Earthquake

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Abstract

This study was conducted to identify disaster-related factors in those who presented at the psychiatric emergency services during a 1-year period following the Great East Japan Earthquake. The study population comprised 771 patients with a psychiatric emergency who newly presented at the Iwate Prefectural Advanced Critical Care and Emergency Center or the psychiatry emergency department of Iwate Medical University Hospital between March 11, 2011 and March 8, 2012. The subjects were divided into two groups (disaster-related group [51] and non-disaster-related group [720]). A multiple logistic regression analysis was performed to identify factors associated with disaster-related medical consultations. Factors identified as associated with the disaster-related group included the affected coastal area, severe suicidal group, consultation within 4 weeks after the disaster, early consultation after the disaster, insomnia, and re-consultation within 30 days. It is suggested that the following factors are important for emergency psychiatry in disaster areas: 1) early psychiatric interventions and prevention; 2) cooperation with localities; 3) early restoration of medical equipment and adequate inventory of medical supplies; 4) prevention of serious suicide attempts; 5) a system for accepting patients; 6) dispatching a psychiatric team to disaster areas; and 7) education of psychiatric care providers.

Key words : Great East Japan Earthquake, disaster, psychiatric emergency, suicide attempt, disaster-related consultation

I. Introduction

On March 11, 2011, the Great East Japan Earthquake occurred with its seismic center located off the Sanriku coast of Japan. Iwate Prefecture was severely damaged by the magnitude 9.0 earthquake and the subsequent giant tsunami and intermittently occurring aftershocks. The most remarkable fact of the disaster was the tremendous damage to the coastal areas caused by the giant

tsunami; the total damage to Iwate Prefecture alone involved 4,664 deaths and 24,738 buildings completely or partially destroyed[1]. In addition, various other problems arose soon after the disaster, including difficulty in obtaining medical supplies, damage to medical facilities themselves, and poor availability of medical information due to the damage to communication networks.

From before the time of the disaster the Iwate Prefectural Government has provided psychiatric emergency services in four areas divided from north to south. As a full-time operating facility in the Morioka district of Iwate Prefecture, the Department of Neuropsychiatry in Iwate Medical University has been operating a system to provide psychiatric emergency measures not only on weekdays (including the nighttime), but also in specified time zones on Saturdays and Sundays, as well as around-the-clock psychiatric emergency care services for advanced critical care and emergency medicine. In the Great East Japan Earthquake Disaster, we started psychiatric emergency measures early on the day of onset, and we attempted to provide treatment for the sick and wounded in the Morioka district and take measures for severely affected patients from all coastal areas. To date, only a few reports are available, both in Japan and abroad, on the details of psychiatric emergency services during earthquake disasters.

Residence factors such as loss of a house and property becoming a risk factor have also been reported[2]. With regard to the relation between disasters and the rate of suicide in particular, there has been a report that suicides decreased in Japan[3], but it is reported that suicides increased in Taiwan[4] and the United States[5]. Psychiatric emergency service is the index of the mental crisis of residents. The present study was conducted on those who presented to psychiatric emergency services during the year following the Great East Japan Earthquake Disaster, which is said to be unlike any other in the world, with the aim to 1) identify factors associated with consultations closely related to the disaster, and to 2) design an appropriate psychiatric emergency medical care system necessary during earthquake disasters.

II. Materials and methods

The study period spanned 52 weeks from 14:46 on March 11, 2011, when the Great East Japan Earthquake occurred, to March 8, 2012. A total of 1,644 patients presented to the Iwate Prefectural Advanced Critical Care and Emergency Center (hereinafter referred to as the Emergency Center) or the psychiatry emergency department (hereinafter referred to as the PED) of Iwate Medical University Hospital (hereinafter referred to as our hospital) in the study period (373 at the Emergency Center and 1,271 at the PED), of whom 771 were new first-time patients selected for the study population.

At the Emergency Center of our hospital and the PED, full-time psychiatrists belonging to the Emergency Center or doctors on duty at the Department of Psychiatry at Iwate Medical University Hospital assess, diagnose, and treat psychiatric symptoms in all patients seeking psychiatric emergency consultation. For each patient, "the Emergency Outpatient Acceptance Information Form"[6] is completed by the physician. In the present study,

assessments and diagnoses were made for each survey item by 13 psychiatric emergency physicians at Iwate Medical University Hospital under the supervision of a senior psychiatrist (designated psychiatrist).

The survey items examined in the present study using the aforementioned form were gender, age, physical emergency site (Emergency Center and PED), consultation status (new comer and second comer), presence or absence of a history of ambulatory treatment, presence or absence of cohabitation, employed or unemployed, presence or absence of an attendant, chief complaints, primary diagnosis according to the International Classification of Diseases 10th Revision (ICD-10), condition findings, measure(s) taken (responders were allowed to mark all applicable answers), and outcome. The main complaints were categorized into physical disorder, suicide feeling, suicidal attempt, prescription shortage, insomnia, excitement, hallucinations and delusions, stupor, anxiety, dejection, irritation, and others. Treatments were categorized into "prescription of psychoactive drugs"; "administration of psychoactive drugs" including oral, intramuscular or intravenous administration of psychoactive drugs on the day of presentation; "psychotherapy"; "physical treatment" including close physical examination and treatment; "no treatment"; and "others". Multiple answers were allowed.

In addition, reasons for consultation related to the disaster, interval from time of the disaster to consultation (weeks), number of consultations for each of two categories ≤4 weeks and ≥5 weeks after onset of the disaster [hereinafter referred to as trends in the number of consultations after the disaster (2 categories)], residence at the time of disaster (inside/outside the Morioka district, inside/outside the affected coastal area), and presence or absence of re-consultation within 30 days after the first consultation (for home returners only) were examined. Reasons for consultation related to the disaster were retrospectively classified according to history of illness: earthquake-related, prescription shortages, radiation-related reasons, tsunami-related reasons, traumatic influence of seeing tsunami damage (hereinafter referred to as seeing tsunami damage), influences of the disaster-related information from television, the Internet, e-mails, and other media sources (hereinafter referred to as the influence of the media), influence of living changes due to the disaster (hereinafter referred to as living changes), deaths or missing family members and/or friends or (hereinafter referred to as deaths of close relatives/acquaintances), and other reasons. The Morioka district was defined as consisting of Morioka City, Shizukuishi Town, Yahaba Town, Shiwa Town, Kuzumaki Town, Iwate Town, and Hachimantai City, and the affected coastal area was defined as consisting of Hirono Town, Kuji City, Miyako City, Yamada Town, Otsuchi Town, Kamaishi City, Ofunato City, and Rikuzentakata City (Fig. 1).

According to the criteria of Kishi et al., a suicide attempt was defined as meeting any one or more of 1) the availability of the subject's statement, 2) the presence of a suicide note or previous notice by the subject, 3) eye witness of the suicidal behavior, and 4) assertion by a juridical person or autopsy, and a patient who was alive at emergency facility

Fig. 1. The Morioka district and the affected coastal area
Black area: Morioka District: Morioka City, Shizukuishi Town, Takizawa City, Yahaba Town, and Shiwa Town, Kuzumaki Town, Iwate Town, Hachimantai City
Dots: Affected coastal areas: Hirono Town, Kuji City, Miyako City, Yamada Town, Otsuchi Town, Kamaishi City, Ofunato City, and Rikuzentakata City

arrival was handled as a suicide attempter[7]. In addition, taking into account physical severity at the time of consultation and treatment course, and according to Asukai's criteria the subjects were divided into two groups: serious suicide attempters [absolutely dangerous group (AD group)] and relatively mildly affected subjects [relatively dangerous group (RD group)][8].

For the patients with information including at least one keyword, such as the disaster, earthquakes, anxiety, insomnia, or physical upset, written in "the Emergency Outpatient Acceptance Information Form," the history of illness was documented on the basis of retrospectively collected information. In order to make comparisons, the patients were divided into two groups: the disaster-related group and non-disaster group. The disaster-related group was defined as a patient meeting at least one of the following criteria: 1) the patient's statement that their symptoms developed following the disaster, 2) an objective discretion of the onset of symptoms upon the disaster, and their persistence to the time of consultation, 3) presence of a past history of mental disorders and exacerbation of symptoms due to the influence of the disaster, and 4) an interruption of oral medication of prescribed drugs or consultation at the department of psychiatry due to an influence of the disaster.

The 771 patients were divided into the above-mentioned two groups and each survey item was compared between the two groups. Ordinal scale data were tested using the Mann-Whitney U-test, and nominal scale using Fisher's exact test or chi-square test. For identifying disaster-related medical factors before consultation, multiple logistic regression analysis was carried out for the presence or absence of a patient belonging to the disaster-related group as a dependent variable (rating 1 for the disaster-related group, and rating 0 for the non-disaster-related group), and as an explanatory variable in psychiatric assessments and background factors with P value of 0.10 or less in comparison between the two groups. In addition, to identifying disaster-related medical factors after the consultation, multiple logistic regression analysis was carried out as an explanatory variable in the measures taken, outcome, and presence or absence of re-consultation within 30 days after the first consultation. Statistical data processing was performed using SPSS 17.0J for Windows, and the level of significance was set at $<5\%$ for all statistical analyses.

Data items that revealed personal identity

were excluded from the analysis, and adequate consideration was given to protect personal information in the process of data management and processing.

III. Results

1. Background of the disaster-related group

In the disaster-related group, the number of subjects meeting one or more of criteria 1) to 4) was 3 for 1), 5 for 2), 5 for 3), and 38 for 4), and the most frequently reported reason for consultation was earthquake-related in 15 subjects, followed by living changes in 9, deaths of close relatives/acquaintances in 6, the influence of the media in 6, prescription shortage in 5, Tsunami-related in 5, eyewitness of tsunami damage in 3, and radiation-related in 2.

2. Comparison of the disaster-related group and the non-disaster-related group

a. Background factors (Table 1)

The disaster-related group consisted of 51 subjects (21 males and 30 females); however, a comparison with the non-disaster-related group revealed no significant difference in gender ratio. In the disaster-related group, the mean age was 44.67 years, with no significant difference observed between the two groups. Study population breakdown by age group revealed high percentages of subjects in their 20s to 50s. In addition, the percentages of subjects receiving consultation at the PED ($p<0.05$), those from outside the Morioka district ($p<0.001$), and those from the damaged coastal area ($p<0.001$) were significantly higher in the disaster-related group. The mean interval from onset of the disaster to consultation was 9.59 weeks, with about one-half (25 subjects) receiving consultation within 1 month. For trends in disaster-related medical consultations (Fig. 2), the mode was 10 subjects at Week 1, and the course of consultation (weeks) ranged from 1 to 48 weeks. The number of days from the occurrence of the disaster to emergency consultation was significantly shorter in this group compared to the non-disaster-related group ($p<0.001$), and the percentage of subjects who presented within 4 weeks was significantly higher ($p<0.001$). The most frequently voiced chief complaint was physical symptom (12 subjects), followed by self-mutilation/suicide attempt (10 subjects), and insomnia (9 subjects), and the percentage of those with insomnia was significantly higher ($p<0.005$) than in the non-disaster-related group.

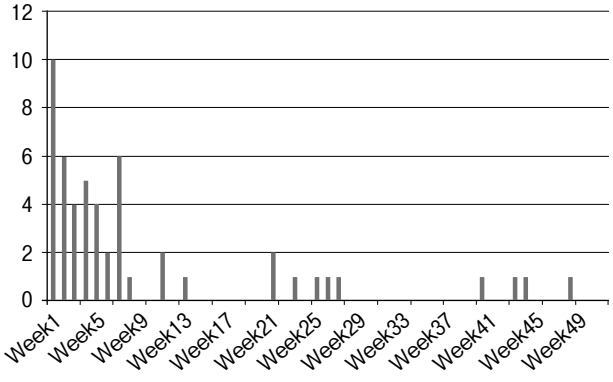

Fig. 2. Trends in the number of disaster-related consultations

b. Psychiatric assessments (Table 2)

The frequently observed front diagnoses according to the ICD-10 Classification in the disaster-related group were F3, F4, and F2 in this order, with the ratio of F1 being significantly lower than in the non-disaster-related group ($p<0.05$). When comparing the data by condition findings, the anxious state was the most common at 45.1%, followed by depressed state at 23.5%. The percentage of

Table 1. Comparison of background factors in the disaster-related group and the non-disaster-related group

		Disaster-related group N=51	Non-disaster-related group N=720	p-value
Gender	Male (%) Female (%)	21 (41.2) 30 (58.8)	262 (36.4) 458 (63.6)	0.294
Mean age ± SD (years)		44.67 ± 16.035	41.27 ± 16.893	0.098
Interval from time of disaster to medical consultation (weeks)		9.59 ± 12.274	25.13 ± 14.335	<0.001 *
Trend in the number of consultations after the disaster(2 categories)	≦ 4 weeks ≧ 5 weeks	25 (49.0) 26 (51.0)	49 (6.8) 671 (93.2)	<0.001 *
Physical emergency category	Emergency Center (%) BLS/ALS outpatient clinic	14 (27.5) 37 (72.5)	289 (40.1) 431 (59.9)	0.048 *
Consultation status	New comer (%) Second comer (%)	26 (51.0) 25 (49.0)	373 (51.8) 347 (48.2)	0.512
History of ambulatory treatment	Yes (%) No/Unknown (%)	42 (82.4) 9 (17.6)	584 (81.1) 136 (18.9)	0.5
Location of residence at time of disaster(1)	Inside the Morioka district (%) Outside the Morioka district (%)	28 (54.9) 23 (45.1)	585 (81.2) 135 (18.8)	<0.001 *
Location of residence at time of disaster(2)	Inside the affected coastal area (%) Outside the affected coastal area (%)	12 (23.5) 39 (76.5)	22 (3.1) 698 (96.9)	<0.001 *
Cohabitation	Yes (%) No/Unknown (%)	38 (74.5) 13 (25.5)	478 (66.4) 242 (33.6)	0.149
Employment	Yes (%) No/Unknown (%)	12 (23.5) 39 (76.5)	193 (26.8) 527 (73.2)	0.372
Attendant	Yes (%) No/Unknown (%)	35 (68.6) 16 (31.4)	565 (78.5) 155 (21.5)	0.076
Chief complaint(s)	Physical symptoms (%)	12 (23.5)	252 (35.0)	0.062
	Suicidal ideation (%)	3 (5.9)	20 (2.8)	0.19
	Excitement (%)	1 (2.0)	7 (1.0)	0.423
	Hallucinations and/or delusions (%)	3 (5.9)	17 (2.4)	0.14
	Stupor (%)	1 (1.9)	2 (0.3)	0.186
	Self-mutilation and/or suicide attempt (%)	10 (19.6)	208 (28.9)	0.101
	Anxiety (%)	5 (9.8)	39 (5.4)	0.158
	Prescription shortage (%)	6 (11.8)	36 (5.0)	0.052
	Insomnia (%)	9 (17.6)	42 (5.8)	0.004 *
	Depression (%)	1 (2.0)	6 (0.8)	0.382
	Irritation (%)	0 (0.0)	21 (2.9)	0.233
	Other (%)	0 (0.0)	70 (9.7)	-

*p<0.05

the former was significantly higher ($p<0.05$) than in the non-disaster-related group. Suicide attempts accounted for nearly 20% for both groups, and a comparison of their severity revealed a significantly higher ratio of the absolutely dangerous group ($p<0.001$) in the disaster-related group.

c. Measures taken on the day and outcome (Table 3)

For measures taken, the percentage of subjects given a prescription for psychotropic medications was significantly higher in the disaster-related group than in the non-disaster-related group ($p<0.05$),

Table 2. Psychiatric assessments

		Disaster-related Group N=51	Non-disaster-related Group N=720	p-value
ICD-10 major diagnosis	F0 (%)	1 (1.9)	38 (5.3)	0.253
	F1 (%)	0 (0.0)	44 (6.1)	0.045 *
	F2 (%)	14 (27.5)	173 (24.0)	0.343
	F3 (%)	17 (33.3)	211 (29.3)	0.321
	F4 (%)	16 (31.4)	180 (25.0)	0.197
	F5 (%)	0 (0.0)	2 (0.3)	0.872
	F6 (%)	0 (0.0)	21 (2.9)	0.233
	F7 (%)	3 (5.9)	27 (3.8)	0.318
	F8 (%)	0 (0.0)	5 (0.7)	0.71
	F9 (%)	0 (0.0)	2 (0.3)	0.872
	G40 (%)	0 (0.0)	8 (1.1)	0.577
	Other (%)	0 (0.0)	7 (1.0)	-
	Unknown (%)	0 (0.0)	2 (0.2)	-
Condition findings	Disturbance of consciousness (%)	5 (9.8)	70 (9.7)	0.567
	Hallucinations and/or delusions (%)	5 (9.8)	55 (7.6)	0.364
	Physical complaints (%)	3 (5.9)	96 (13.3)	0.085
	Anxious state (%)	23 (45.1)	210 (29.2)	0.015 *
	Depressed state (%)	12 (23.5)	153 (21.3)	0.407
	Psychomotor excitement (%)	1 (2.0)	32 (4.4)	0.343
	None (%)	1 (2.0)	2 (0.3)	0.186
	Other (%)	1 (1.9)	102 (14.2)	-
Suicide attempt meeting Kishi's criteria	Yes (%)	10 (19.6)	129 (17.9)	0.44
	No (%)	41 (80.4)	591 (82.1)	
Suicide attempt meeting Kishi's criteria		Disaster-related Group N=10	Non-disaster-related Group N=129	p-value
Severity classification	Absolutely dangerous group (AD group) (%)	8 (80.0)	22 (17.1)	<0.001 *
	Relatively dangerous group (RD group) (%)	2 (20.0)	107 (82.9)	

*p<0.05

and the percentage of physical measures was significantly lower ($p<0.005$). The ratio of patients who received re-consultation within 30 days after the first consultation was significantly higher in the disaster-related group ($p<0.05$).

3. Multivariate analysis

a. Background and psychiatric assessment factors related to disaster-related medical consultation (Table 4)

For background factors and psychiatric assessments, the variables found to be associated with the reason for the patient to be in the disaster-related group were consultation early after onset of the disaster (odds ratio [OR]=0.928), consultation within 4 weeks (OR=3.514), living in the affected coastal area (OR=11.276), and insomnia (OR=3.219). The OR for the absolutely dangerous group for suicide attempt (AD group) was calculated as 8.034.

b. Measures/outcome factors related to disaster-related medical consultation (Table 5)

Table 3. Measures taken on the day and outcome

		Disaster-related Group N=51	Non-disaster-related Group N=720	p-value
Measures taken (including overlapping treatments)	Psychotropic medication prescribed (%)	19 (30.1)	173 (18.6)	0.007*
	Psychotropic medication administered (%)	11 (17.5)	150 (16.2)	0.42
	Physical treatment (%)	13 (20.6)	341 (36.7)	0.002*
	Psychotherapy (%)	19 (30.2)	247 (26.6)	0.387
	None (%)	0 (0)	2 (0.2)	0.872
	Other (%)	1 (1.6)	16 (1.7)	-
Outcome	Admission to the Emergency Center (%)	6 (11.8)	47 (6.5)	0.129
	Admission to the Department of Psychiatry of our hospital (%)	9 (17.6)	198 (27.5)	0.082
	Returned home (%)	35 (68.6)	458 (63.6)	0.287
	Other (%)	1 (2.0)	17 (2.4)	-
Re-consultation within 30 days (home returners only)	Yes (%) No (%)	12 (34.3) 23 (65.7)	75 (16.4) 383 (83.6)	0.011*

*$p<0.05$

For measures taken and outcome, physical measures (OR=0.211) and re-consultation within 30 days after first consultation (OR=2.105) were identified as variables associated with the disaster-related group.

IV. Discussion

1. Comparison of the disaster-related group and the non-disaster-related group

1) Background factors that can lead to disaster-related medical consultation

(1) Physical emergency site

When analyzing the psychiatric emergency services provided at our university, a relatively high percentage of patients who presented at the PED suffered from mental upset, whereas patients who were transported via ambulance with concurrent physical symptoms accounted for a relatively high percentage of those who presented at the Emergency Center. In the present study, the disaster-related group was shown to have a higher percentage of consultations at the PED, demonstrating that the mental crisis during a disaster did not involve remarkable physical symptoms. Although the results of the present study do not provide any evidence, it can be considered that the percentage of subjects who were referred to the PED might have increased due to the lesser use of ambulances by psychiatric patients. The lesser use of ambulances could be because of confusion involving traffic networks and communication organizations just after the disaster, voluntary refrainment of ambulance requests for patients with psychiatric diseases, and ambulance team triage with first priority during disasters given to saving the lives of severely physically

Table 4. Multivariate analysis: Background and psychiatric assessment factors related to disaster-related medical consultation

Item	B	Wald	Odds Ratio	95% confidence interval		
				Lower limit	Upper limit	p-value
Age	0.014	1.981	1.014	0.994	1.034	0.159
Interval from time of disaster to consultation (weeks)	− 0.075	13.140	0.928	0.891	0.966	<0.001*
Trends in the number of consultations after time of disaster (2 categories)	1.257	6.968	3.514	1.382	8.935	0.008*
BLS/ALS outpatient clinic (Emergency Center)	0.441	1.017	1.554	0.660	3.659	0.313
Inside the Morioka district (outside the Morioka district)	− 0.246	0.223	0.782	0.283	2.166	0.637
Inside the affected coastal area (outside the affected coastal area)	2.423	12.650	11.276	2.967	42.854	<0.001*
Attendant Yes (No)	0.183	0.184	1.200	0.521	2.763	0.668
Chief complaint(s) Physical symptom	0.252	0.313	1.287	0.532	3.111	0.576
Chief complaint(s) Prescription shortage	0.359	0.294	1.432	0.391	5.249	0.588
Chief complaint(s) Insomnia	1.169	4.545	3.219	1.099	9.429	0.033*
ICD-10 major diagnosis F1	− 18.367	0.000	0.000	0.000	0.000	0.997
Condition findings Physical complaints	− 0.749	1.171	0.473	0.122	1.837	0.279
Absolutely dangerous group Yes (No)	2.084	11.366	8.034	2.392	26.981	0.001*
Constant	− 2.989	13.264	0.050	0.000	0.000	0.000

*p<0.05

affected patients.

(2) Residential status and psychiatric emergency services

The percentage of subjects who presented from outside the Morioka district was higher in the disaster-related group, and the percentage of subjects who presented from the affected coastal area was also significantly higher. The former finding is attributable to the increase in the number of refugees to Morioka and its vicinities. In fact, by September 10, 2011 Morioka City had accepted 33,547 people affected by the disaster [9]. For example, we encountered some cases in which patients who had been ambulatory visitors to psychiatric clinics outside the Morioka district moved to Morioka or its vicinity, and underwent a consultation at the emergency outpatient clinic of our hospital for reasons such as loss of prescribed drugs or interruption of ambulatory visits.

To explain the higher percentage of subjects who presented from the affected coastal area, it may be assumed that the incidence of mental symptoms and the morbidity rate of psychiatric disease were higher among subjects from coastal areas with severe housing damage from the tsunami. A study found a quantity-response relationship between psychological traumatic experiences and stress reactions [10]; tsunami coastal residents who suffered tremendous housing damage may have been likely to develop mental symptoms and received emergency consultation after evacuation to inland areas.

Coastal residents with serious suicide attempts also presented seeking medical consultation. In the present study, of 8 serious

Table 5. Multivariate analysis: Measures/outcome factors related to disaster-related medical consultation

Item		B	Wald	Odds Ratio	95% confidence interval		
					Lower limit	Upper limit	p-value
Measures taken	Psychotropic medication administered	− 0.718	2.191	0.488	0.189	1.262	0.139*
	Psychotropic medication prescribed	0.172	0.145	1.188	0.489	2.884	0.703
	Physical treatment	− 1.555	8.574	0.211	0.075	0.598	0.003*
	Psychotherapy	− 0.201	0.299	0.818	0.397	1.683	0.585
	None / Other	− 0.920	0.649	0.398	0.042	3.740	0.421
Outcome	Admission to the Emergency Center	1.076	0.891	2.932	0.314	27.389	0.345
	Admission to the Department of Psychiatry	− 0.497	0.203	0.608	0.070	5.297	0.653
	Returned home	− 0.559	0.264	0.572	0.068	4.823	0.607
Re-consultation within 30 days Yes (No)		0.744	4.128	2.105	1.027	4.315	0.042*
Constant		− 1.637	2.074	0.194			0.150

*$p<0.05$

suicide attempters in the disaster-related group, 3 were coastal residents, who were transferred to our hospital mainly for the purpose of treatment of physical injuries. A previous study reported that loss of properties due to earthquake disaster frequently produced suicidal ideation[11].

The present study demonstrated that mental symptom assessments and emergency measures, as well as restart of oral medication are important actions to be implemented at the occurrence of disaster for patients with a past history of psychiatric disease who must evacuate from affected areas. Some schizophrenic patients in need of continued oral medication were reported to be hospitalized for exacerbation of mental symptoms due to interruptions of oral medication during the disaster[12]. Therefore, after a disaster, importance must be placed on preparations for emergency measures, cooperation of medical institutions and smooth confirmation of information, provision of medical care information for patients themselves, and the like. In addition, in areas with severe housing damage, residents invariably must leave; therefore, there are higher needs for psychiatric interventions than in other areas, and outreach activities by psychiatric emergency teams as mental health care teams also seem to be necessary.

(3) Process of the use of services

In the present study, the disaster-related group had a high percentage of subjects who underwent consultation within 4 weeks, and many of them sought medical consultation for reasons of anxiety about earthquakes or acute stress reactions due to the deaths of close relatives or acquaintances. After 1 month, the number of consultations decreased gradually, and reasons include remission of quake-related traumatic stress symptoms over time[10], early restoration of lifelines in about 1 month in Morioka City, and decreased discomposure due to aftershocks and other factors.

However, in the present study, the number of subjects undergoing consultation increased again after 6 months following the earthquake disaster. Upsets were attributable mainly to secondary stress associated with job or

daily life changes. A published report showed that about 6 months after the disaster, symptoms from anxiety about hopeless situations for future living matters such as housing reconstruction and income security developed[13]. Secondary stresses involved living-based factors to a greater extent, and these are known to possibly prolong emotional distress.

In the period immediately following the disaster, when many patients rush to have medical consultation, drugs for the treatment of acute symptoms must be secured. However, for medical consultations made after about half a year, introduction and utilization of social resources must also be taken into account, in addition to continued treatment at outpatient clinics.

(4) Chief complaints

In the disaster-related group, insomnia accounted for a high percentage of chief complaints in comparison between two groups, and insomnia was extracted as a disaster-related factor in the multivariable analysis. Insomnia is considered to reflect a severely stressed state. For example, a study reported that Holocaust survivors experienced more sleep disorders than healthy subjects, with a correlation between the number of years at the concentration camp and the total number of sleep troubles[14]. Insomnia, which is a symptom that is likely to occur in stressed environments[15], has been reported in published literature to occur at incidences of 31.0%[16], 69.1%[11], and 75%[2] during earthquake disasters.

Diagnostically, sleep disorders have been reported to be profoundly associated with PTSD[15, 17] and a published sleep study investigating the relationship between occurrence of a disaster and sleep disorders at 6 months after a hurricane disaster showed that the percent incidence of sleep disorders was 6.5% for people not diagnosed with PTSD versus 39.6% for PTSD patients[17]. The persistence of insomnia symptoms is reported to be a risk factor of the onset of PTSD[18], and sleep disorders have been suggested as inhibiting the recovery from posttraumatic stress[15]; early interventions for insomnia symptoms are thought to be of paramount importance.

2) Psychiatric factors leading to disaster-related medical consultation

(1) Diagnostic categories: PTSD and sleep disorders

The most important diagnoses according to the ICD-10 Classification in the disaster-related group were F3, F4, and F2, in this order; patients with depression, acute stress reactions/PTSD, or schizophrenic patients accounted for high percentages. However, our results did not show the diagnosis classification to be a determinant to divide both groups into.

Published studies reported PTSD morbidity rates of 7.4%[19], 7.8%[20], and 9.2%[21] for the general population. Compared with these figures, considerably higher figures of 15.8%[22], 21%[23], and 23%[24] have been reported after earthquake disasters.

(2) Condition findings

Regarding condition findings, the percentage of subjects with an anxious state was higher in the disaster-related group. Judging from this finding together with the high prevalence of insomnia symptoms as chief complaints, a close association between anxious state and insomnia is assumed.

For psychiatric emergency services during disasters, countermeasures against anxiety and insomnia are a key to successful activities, and the availability of measures in nighttime and specified time zones on Saturdays and Sundays is important. There are high demands for emergency-coping approaches such as sleep inducers and anti-anxiety drugs. In the present earthquake disaster, shortages of medical supplies often necessitated countermeasures with short-term prescriptions.

Medical institutions and pharmacies are required to be fully prepared with adequate stocks of medical materials before a disaster, and to secure a route for supply in case of shortages.

(3) Risk of suicide

The suicide rate for Iwate Prefecture decreased after the earthquake by 3.9 suicides per 100,000 population from 32.2 suicides per 100,000 population for 2010 [25] to 28.3 (per 100,000 population) for 2011 [26]. To explain the fact that many studies found decreased suicide rates after disasters in Japan, Hyodo et al. pointed out that the economic state for affected areas has been improved by national governmental financial aid [27]. In addition, high levels of mutual aid by people living in affected areas and post-quake proactive mental health interventions such as mental health care teams are considered to be other causal factors.

In the present study, in both the disaster-related group and the non-disaster-related group, nearly 20% of all subjects receiving consultation were found to be suicide attempters. Although no significant difference was found between the two groups, a comparison of the severity of suicide attempt revealed a significantly higher percentage of the absolutely dangerous group (AD group) in the disaster-related group. The AD group is reportedly extremely similar to completed suicide in terms of phenomena involved [8], and although no report is available on the severity of suicide attempts following a disaster, it can be assumed that exposure to more stressful environments after the disaster than at normal times, the inability to consult with people surrounding them because they are also affected people, and other situations induce serious mental conditions, which in turn lead to behavior with serious suicide attempts.

Another reason for the increase in a serious suicide attempt after the disaster is that psychiatric interventions are difficult to provide before reduction in daily life level. Endo et al. pointed out the importance of seeking medical consultation with a specialist physician before the daily life level decrease [28], and this may be due to difficulty in providing specialist physician interventions during earthquake disasters with insufficient provision of medical care, unlikelihood of awareness of the condition by people around the patient, and other factors.

3) Measures taken on the day and outcomes

(1) Measures taken

Likely factors for the higher percentage of patients prescribed with psychotropic medications in the disaster-related group include a loss of prescribed drugs due to earthquake/tsunami or prescription shortages due to interruptions of visits to the department of psychiatry, and many cases requiring prescription of hypnotics/anti-anxiety drugs because of consultations

involving many patients with insomnia symptoms and/or anxious state. Regarding the reason why the percentage of physical measures was low despite the high percentage of users of psychiatric emergency services with physical symptoms as chief complaints, it can be estimated that in the actual clinical setting, physical complaints in the disaster-related group are strongly influenced by anxiety and insomnia, so that administration of anti-anxiety drugs and sleep inducers, rather than physical measures, will be effective.

(2) Outcomes following the use of psychiatric emergency services

In the disaster-related group, mental symptoms are likely to persist after the initial consultation. For this reason, not only implementing temporary measures at psychiatric emergency clinics, but also referring the patient to the general outpatient clinic of the department of psychiatry and providing long-term psychiatric treatment are necessary. Mental symptoms and condition findings following a disaster may be considered to be relatively serious to the extent that they require re-consultation within 1 month after the initial consultation.

2. Factors related to the use of psychiatric emergency services in the earthquake disaster (multivariate analysis)

The results of the multivariate analysis identified the following factors to be associated with disaster-related medical consultation: residence in the coastal area severely damaged by the earthquake/tsunami, consultation within 4 weeks after onset of the disaster or at a relatively early time, suicide attempts using serious methods, and other factors. Based on these findings, the psychiatric emergency measures taken after the present disaster are characterized below.

First, it is necessary to secure cooperation between severely affected areas and core psychiatric emergency facilities. In the present disaster, the particularly heavily affected areas were the tsunami-stricken coastal areas. Morioka City, where our hospital is located, and the coastal areas are connected via land routes, with a minimum distance of 100 km and a maximum distance of 150 km. In addition, possible deterioration of traffic conditions during disasters poses a problem concerning cooperation between the two locations. In order to accept patients urgently requiring psychiatric interventions, patients who are serious suicide attempters in need of both physical and mental treatment, and other patients, it is necessary to secure a means of access to psychiatric emergency care facilities during a disaster. For example, the use of helicopter ambulances in cooperation with hospitals in coastal areas seems to be effective for serious suicide attempters. If the patient transfer from coastal areas is difficult, a means may be possible by which a team capable of taking psychiatric emergency actions provides treatment on an outreach basis. Provided that communication equipment is available, remote medicine together with specialist physicians is also effective.

Second, serious suicide attempts must be prevented. During disasters, mental health is affected by various disaster-related stresses and, in addition, it is difficult for victims to consult with the people surrounding them; these factors may result in an increased risk of serious suicide attempts. In such situations, the early introduction of psychiatric care by

a team specializing in anti-suicidal measures, including gatekeepers, is necessary.

Third, appropriate measures must be taken in a period where many disaster-related medical consultations occur at 1 month following the earthquake. To cope with consultation demands that increase rapidly just after the disaster, a system capable of providing medical care in the midst of confusion must be available. Taking into account the necessity for securing pharmaceutical supplies early after onset, and the variation of the health status of affected people depending on time elapsed, appropriate measures must be implemented. It is important that symptomatic treatment targeting condition findings such as acute stress reactions in the acute phase be implemented soon after the disaster, and that patients who receive consultation after an elapse of a relatively long time be followed up for a long time, with the suspicion of psychiatric diseases such as depression and PTSD, bearing in mind that mental symptoms developing due to living changes are mainly manifested.

Finally, mental hospitals in various medical service zones that were not catastrophically damaged should send organized teams of psychiatrists, nurses, and social workers to patrol the shelters. This action proved to be highly effective in improving the situation. We must make the best use of this experience in implementing countermeasures in the future. Considering the fact that a mental health care team at our hospital started acting effectively as early as 2-3 days after the disaster, and the utility of self-completing mental health care teams dispatched from various places throughout Japan, the importance of team-based interventions is evident.

V. Conclusions

People affected by large disasters experience traumatic events in life-threatening situations; they experience sorrow after a loss, secondary stress due to living changes and other events in a chain, a broad range of physical and/or mental symptoms develop and the morbidity rate of psychiatric diseases is high[11], thus early implementation of psychiatric interventions is necessary. Around-the-clock provision of psychiatric emergency services such as that at our hospital must play a key role in the event of a disaster because such institutions serve as core centers for early interventions and early treatment in disaster-stricken areas.

Immediately after the disaster, early interventions and the prevention of worsening of acute stress reactions, especially anxiety or insomnia symptoms, are necessary. For patients with re-consultation, possible incidence of PTSD, depression, and other conditions must be suspected, and it is necessary to refer them to the general outpatient clinic of the department of psychiatry to receive hospitalization and other measures according to the severity of their condition. Importance must be placed on constantly sharing information with the core hospital and local hospitals to maintain a system for mutual cooperation in emergencies, making efforts to secure adequate availability of medical supplies on a routine basis, and early restoration of normal functions of medical facilities. In preventing severe suicide attempts, whose risk increases after the disaster, and providing quick physical and mental interventions for attempters, the best way is to establish a system capable of

providing treatment, both mental and physical, with cooperation of the core hospital and the Emergency Center.

For accepting patients from severely affected areas, not only roadway transportation means, but also a means of access covering a wide area such as helicopter ambulances must be available because the traffic conditions worsen during a disaster. On the other hand, access is actually hindered during a disaster; therefore, it is important to dispatch teams capable of taking psychiatric emergency measures to affected areas, and to ensure triage functions for symptomatic treatments on an outreach basis, and psychiatric care. In addition, general (non-emergency) psychiatrists are also sometimes required to take emergency measures in the event of a disaster; therefore, education of the persons involved in psychiatric care on disaster emergency measures and other programs must be provided, and it is necessary to establish a system allowing appropriate measures to be taken smoothly.

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東日本大震災関連の精神科救急初回受診例に関する検討

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要旨

本研究は東日本大震災後 1 年間の精神科救急利用者の震災関連因子を明らかにした．2011 年 3 月 11 日から 2012 年 3 月 8 日に岩手県高度救命救急センターと岩手医科大学附属病院一次二次外来を受診した精神科救急初回受診者 771 名を対象とし，震災関連群 51 名と震災非関連群 720 名に分類した．震災関連群の関連因子を抽出する目的で多重ロジスティック回帰分析を行った．震災関連群の関連因子は沿岸被災地，重症自殺企図者，震災後 4 週以内の受診，発災後早い時期での受診，不眠の主訴，30 日以内の再受診などであった．震災時の精神科救急システム重点課題は次の通りである：1) 早期の精神的介入と予防；2) 各地域との連携；3) 早期の医療設備の回復，医療物資の充実；4) 重症自殺企図の予防と企図者への身体的・精神的介入；5) 被災地の患者の受け入れ体制；6) 被災地への精神科救急対応チームの派遣；7) 精神医療従事者への救急対応の教育．