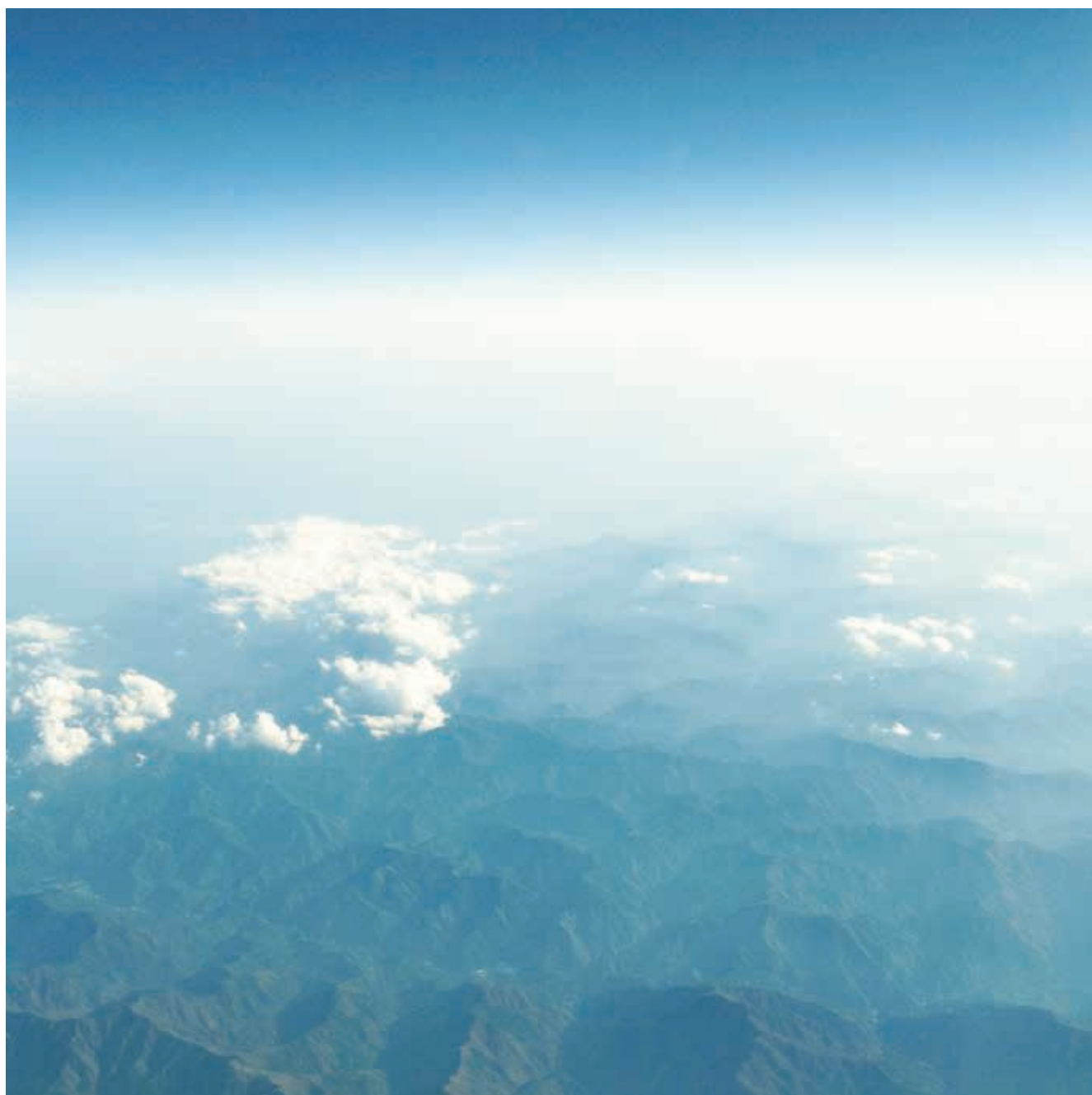


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SHORT PAPER

The Analysis of Disaster Mitigation System and Research on Disaster Rehabilitation

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ABSTRACT

Due to the abnormal climate in the world, as much as the scale of disasters has grown, that of damage has increased for the last 10 years. Japan has been more badly damaged among Asian countries; Korea is also not the perfectly safe place from disasters. The government of Japan spent 90% of the budget for disaster management in the disaster prevention in 2004. Furthermore, the East Japan Great Earthquake has brought the great change of people's life and the discussions about the rehabilitation of victims have been held. It is meaningful for both Japan and Korea to look into their disaster management system and disaster rehabilitation, because it will be helpful to mitigate the damage of disasters.

This study aimed to compare and research the disaster management system and disaster rehabilitation of Japan and South Korea through the review of pertinent literatures to disasters.

The government of Japan operates comprehensive information system for disaster mitigation by planning disaster mitigation and linking Japan Meteorological Agency. Even though the government of South Korea has implemented the disaster mitigation plan, it doesn't seem to have the information system for disaster mitigation that takes advantage of weather forecasts.

Even though the process of disaster rehabilitation in Japan consists of four (4) stages, in the actual situation, several problems have occurred because the period of mitigation is prolonged for a long time. To solve problems, long-term efforts need to be made to build the system that reinforces the roles of coordinators who deal with related organizations

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and gives the special leave to the volunteers for the disaster areas.

In South Korea, the disaster rehabilitation system is concentrated on medical rehabilitation, but does not support rehabilitation in the aspect of life at all. To improve the disaster rehabilitation system in South Korea, the awareness of disaster rehabilitation needs to be raised and when providing supports, psychological and living aspects of victims need to be considered.

<Key-words>

Disaster, Disaster Management System, Rehabilitation

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I . Introduction

The number of natural disasters around the world is increasing, and disasters remain a major drawback to sustainable development. Reducing vulnerabilities to disasters and damage caused by them is an inevitable challenge in the international community.

Every year, disasters worldwide are experienced by 160 million people, kill 100,000 people, and cause more than 33 billion US dollars in damage (annual average from 1970-2004) . Compared to the 1970s, the number of disasters and the number of people affected have tripled in the last decade (1995-2004) Asia is a region where many disasters occur, as exemplified by the Indian Ocean tsunami disaster in late 2004, killing approximately 230,000 people. Looking at disasters worldwide in recent years (2000-2004) , approximately 40% occurred in Asia, accounting for more than 80% of the people killed and affected, and approximately 50% of the economic damage. Most of the casualties are concentrated in low- to middle-income countries, making the vicious cycle of disasters and poverty another challenge (Cabinet Office, Government of Japan 2011).

The total number of deaths in South Korea for the same period was 2,012 and 200 people have been killed every year, which shows that South Korea is not the safe place from disasters (PARK et al 2005).

Natural disasters that are different from man-made disasters cannot be completely prevented, but the damages can be reduced by the prepared measures. When natural disasters happen, the lack of preparation for initial reactions has usually induced the major damages. The secondary damages that are caused by the lack of preparation have become more serious than the initial damages. Therefore, before disasters happen, the most economic and efficient methods to minimize the damages is to prevent and prepare for disasters through reasonable disaster management system. To decrease the damage from natural disasters, predictable disasters need to be prevented and the possibility for disasters to happen needs to be reduced; for the disasters that already happened, the

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efforts to minimize the damages have to be made. The government of Japan that has established disaster management system in advance has attempted to minimize the damages by building the system to prevent and alert disasters and strengthening the prevention activities (Federal Emergency Management Agency 2000). While the government of Japan spent 90% of the budget for disaster management (the expenditure for damage restoration + the expenditure for prevention) in the disaster prevention in 2004, South Korea spent only 50% (Hyo-Jin CHOI 2006).

Since the occurrence of the East Japan Great Earthquake on March 11, 2011, the government of Japan has emphasized the follow-up process after disasters occurred and the disaster rehabilitation as well as disaster management. The East Japan Great Earthquake was the severe one (9 magnitude) that may occur once a thousand years; as of June 11, the number of casualties is 15,413 dead and 8,069 miss; the damages including the harms of ships and farmland and radioactive pollution have greatly affected the all areas of people's life. The severe change of the lifeline by the East Japan Great Earthquake induced the discussion about the rehabilitation of victims. However, the study on these situations is in an opening stage. In South Korea, where is not the completely safe place from disasters, there are almost no studies on disaster rehabilitation. Therefore, it would be meaningful for both Japan and South Korea to understand their disaster management system and disaster rehabilitation for the decrease of the disaster damages.

This study aimed to compare and research the disaster management system and disaster rehabilitation of Japan and South Korea through the review of pertinent literatures to disasters.

II. Current Situation of Disaster Management System

1) Disaster Management System in Japan

(1) Disaster Management Planning System

① Disaster Management Planning System

- Basic Disaster Management Plan: This plan is a basis for disaster reduction activities and is prepared by the Central Disaster Management Council based on the Disaster Countermeasures Basic Act.
- Disaster Management Operation Plan: This is a plan made by each designated government organization and designated public corporation based on the Basic Disaster Management Plan.
- Local Disaster Management Plan: This is a plan made by each prefectural and municipal disaster management council, subject to local circumstances and based on the Basic Disaster Management Plan.

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② Basic Disaster Management Plan

The Basic Disaster Management Plan states comprehensive and long-term disaster reduction issues such as disaster management related systems, disaster reduction projects, early and appropriate disaster recovery and rehabilitation, as well as scientific and technical research. The plan was revised entirely in 1995 based on the experiences of the Great Hanshin-Awaji Earthquake. It now consists of various plans for each type of disaster, where tangible countermeasures to be taken by each stakeholder such as the national and local governments, public corporations and other entities are described for easy reference according to the disaster phases of prevention and preparedness, emergency response, as well as recovery and rehabilitation. Basic Disaster Management Plan also includes countermeasures for the damages from earthquake, storm, flood, volcanic eruption and heavy snow.

(2) Integrated Disaster Management Information System

Based on the experiences of the Great Hanshin-Awaji Earthquake, the Cabinet Office has been developing an integrated disaster management information system that helps to grasp the situation of the disaster early on and promotes information sharing among relevant organizations, thereby enabling quick and appropriate decision-making for emergency response operations.

① DIS (Earthquake Disaster Information System)

DIS is automatically activated upon the receipt of earthquake (intensity level of 4 or greater) information from the Japan Meteorological Agency to estimate the approximate distribution of seismic intensity and scale of damage (human suffering and building damage) within 30 minutes.

② RAS (Real Damage Analysis System by Artificial Satellite)

RAS uses satellite images to assess actual disaster damage when it is otherwise difficult to determine the disaster situation due to the disruption of transportation and communications networks.

③ PF (Disaster Information Sharing Platform)

PF is a common information sharing system with a standardized information format, where various kinds of disaster information provided by ministries and agencies, local governments, relevant organizations and residents, can be posted and freely accessed by all (Cabinet Office, Government of Japan 2011).

2) Disaster Management System in South Korea

(1) Disaster Countermeasures Basic Act

The government of South Korea established Five-Year Plan Disaster Countermeasures Basic Plan that includes disaster prevention, emergency disaster measures and disaster restoration to protect national land and people from disaster since 1977; from 1977 to 2006, it has been implemented six times every five years (See Table 1).

Table 1. The Development of Disaster Countermeasures Basic Plan

Plans	Period	Contents
1 st plan	1977~1981	Preparation of mitigation activity and flood control for the protection of country
2 nd plan	1982~1986	Establishment of mitigation system and expansion of facilities for disaster mitigation
3 rd plan	1987~1991	Establishment and Implementation of adaptable disaster countermeasures for the disaster prevention based on the regional characteristics and the degree of damages
4 th plan	1992~1996	Establishment of rapid disaster management system and disaster mitigation support system
5 th plan	1997~2001	Establishment of scientific disaster mitigation information system and disaster mitigation policy
6 th plan	2002~2006	Establishment of comprehensive prevention countermeasures, the strengthening of rapid emergency countermeasures and the establishment of the countermeasure for improvement and restoration from damages

Source: Seong-Jin KIM(2007) *A Study on the Improvement of National Confrontation Systems against Meteorological Disasters*

As well as Disaster Countermeasures Basic Act, there is the Countermeasures against Natural Disasters Act to deal with the damages from meteorological disasters; it stipulates the organization to work for disaster mitigation, the disaster mitigation plan, disaster prevention, emergency disaster countermeasures, disaster restoration and other pertinent countermeasures to disaster damages to protect national land, and the life and property of the people from natural disasters. The main subjects of the Act are as follows;

- The organization to work for disaster mitigation, the disaster mitigation plan, disaster prevention, emergency disaster countermeasures, disaster restoration and other pertinent countermeasures to disaster damages
- The installment of disaster headquarter as the organization for disaster mitigation
- The implementation of disaster impact assessment and the designation of disaster danger zone
- Earthquake disaster countermeasures, emergency disaster countermeasures, disaster restoration, etc.

Countermeasures against Natural Disasters Act and the Act on Disaster and Safety Management are the basic laws to cope with disasters. They mainly include the contents as follows:

- Details pertinent to the establishment of disaster management system, the

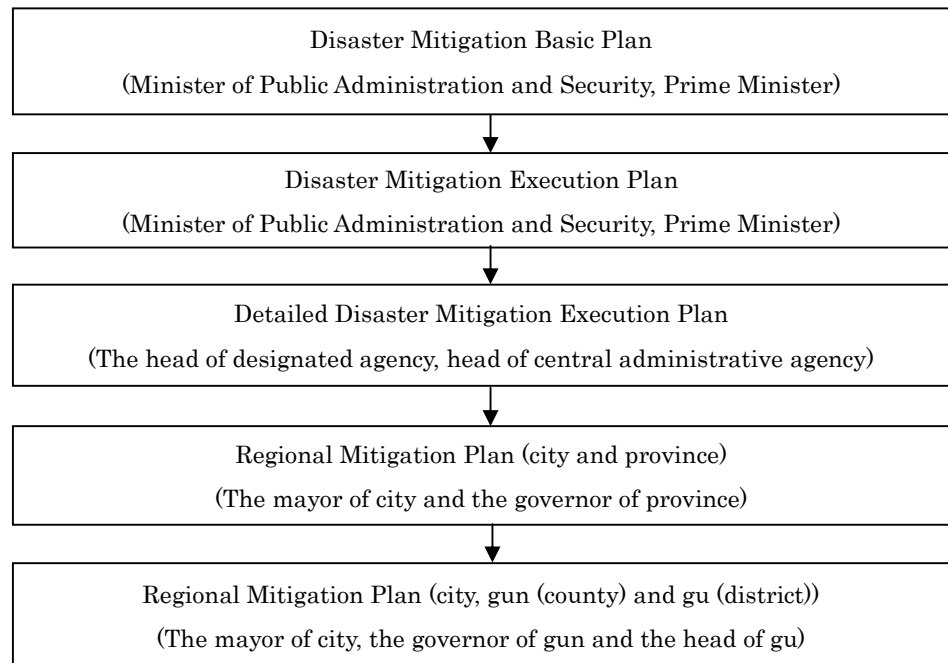
prevention and management of disaster, emergency rescue and other disaster managements

- Details pertinent to the prevention of disaster and emergency measures including emergency rescue and emergency evacuation
- Details pertinent to the installment of disaster countermeasure headquarter and the designation and support of special disaster zone (Seong-Jin KIM 2007).

(2) Disaster Management Planning System

The disaster mitigation plan of South Korea consists of basic plan, execution plan, detailed execution plan and regional plan for disaster mitigation. The disaster mitigation plan is shown in the Figure 1; each plan is included to the plans of disaster mitigation of civil defense plan pursuant to the Framework Act on Civil Defense.

Figure 1. The Flow Chart of Disaster Mitigation Plan



Source: Sung-Kyu LEE (2005) *A Study on the Improvement Plans for Disaster Management of Local Government*

① Disaster Mitigation Basic Plan

Disaster Mitigation Basic Plan includes the long-term and basic contents and guideline of disaster mitigation execution plan; Disaster Mitigation Basic Plan that is submitted to the Minister of Public Administration and Security by the request of the head of central administration agency is lastly confirmed lastly by the Prime Minister. It is included to the civil defense basic plan pursuant to the Framework Act on Civil Defense.

② The Establishment of Disaster Mitigation Execution Plan

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Disaster Mitigation Execution Plan, which is written based on the Disaster Mitigation Basic Plan and is also included to the Civil Defense Execution Plan pursuant to the Framework Act on Civil Defense, is confirmed by the Prime Minister.

③ The Establishment of Detailed Disaster Mitigation Execution Plan

The head of designated agency works on detailed disaster execution plan pursuant to the Disaster Mitigation Execution Plan discusses with the mayor of city and governor of province and finally gets it confirmed by the head of related central administrative agency.

④ The Establishment of Regional Disaster Mitigation Plan

The Regional Disaster Mitigation Plan is delivered to the mayor of city, the governor of gun and the head of gu through the deliberation of city and provincial civil defense committee. The mayor of city, the governor of gun and the head of gu also deliver it to the head of related agencies and execute it.

⑤ The Measures for Disaster Prevention

The person in charge of disaster mitigation must take the action for the disaster prevention pursuant to the related Acts or disaster mitigation plan. The main measures for disaster prevention include the maintenance of disaster mitigation organizations, the education and training for disaster mitigation, the advertisement of disaster prevention, the reserve and maintenance of the goods and materials for disaster mitigation and the inspection and maintenance of disaster mitigation facilities and the vulnerable facilities for disaster (Sung-Kyu LEE 2005).

III. Disasters and Rehabilitation

1) The Definition of Rehabilitation

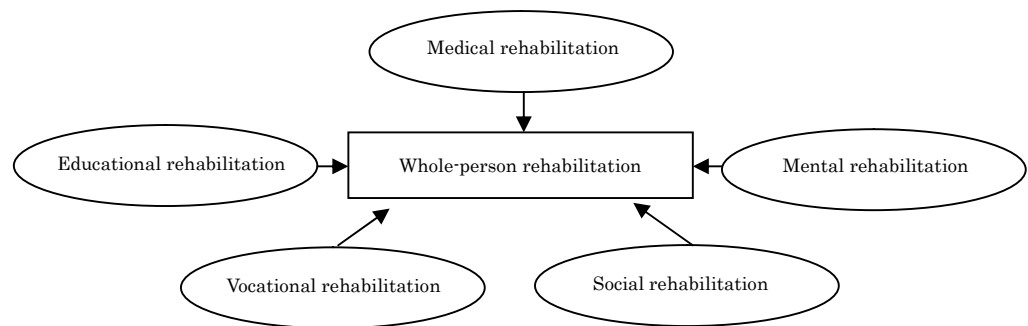
In 1943, National Council on Rehabilitation in San Francisco, U.S.A. defined the rehabilitation as “the restoration of the handicapped to the fullest physical, mental, social, vocational, and economic usefulness of which they are capable.” WHO defined rehabilitation that “the rehabilitation of people with disabilities is a process aimed at enabling them to reach and maintain their optimal physical, sensory, intellectual, psychological and social functional levels; Rehabilitation provides disabled people with the tools they need to attain independence and self-determination.” Sun-Jin KWON defined rehabilitation as the integrated program to help persons with disabilities live independently and interact in society functionally by providing the medical, physical, mental and vocational arbitration for them. Even though rehabilitation of persons with disabilities may be understood to simply refer the restoration from physical and mental damages, it rather means the whole-person restoration to recover their mental, social and vocational potentials as well as the functional and medical recovery from physical and mental illness (See Figure 2).

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Figure 2. The Concept of Rehabilitation of Persons with Disabilities



2) Disaster Rehabilitation

In Japan, the discussion about the rehabilitation after the occurrence of rehabilitation as well as the disaster management system before disasters occur has been actively held since the occurrence of the East Japan Great Earthquake in 2011. This chapter is written based on the study by Masahiro KOHZUKI (2012), which is the representative literature about disaster and rehabilitation; he suggested that the venues where rehabilitation is implemented are shelters, university hospitals and local core hospitals and divided the rehabilitation period into two stages of fifth day to one month and two months to three months after the occurrence of disaster.

(1) The Rehabilitation of fifth days to approximately one month after the occurrence of disaster

According to the Rehabilitation Division of Tohoku University Hospital, patients have increased 50% after the occurrence of earthquake. Even though the changes by the ratio of each disease were not great, particularly the patients who have traumatic brain injury, spinal cord injury, femoral neck fracture, cardiovascular disease and respiratory disease and need dialysis treatment had been admitted due to the direct damage and power cut caused by earthquake and tsunami. Patients who need HOT and dialysis or have stroke and spinal cord injury had been admitted to rehabilitation division of university hospital because they couldn't use the machines at home or hospitals due to power cut; Inpatients are required to have only 800 Kcal a day and it was clearly noticed that the victims who were newly admitted lost weight noticeably. Doctors working at medical office of the hospital investigated the rehabilitation facilities and damages in the northeastern areas and supported the treatment for rehabilitation of related hospitals.

The staff of local core hospitals devotedly performed their job by admitting the patients who were harmed by disasters to the hospitals. The rehabilitation staff of wrecked local core hospital supported the rehabilitation of victims around shelters and took efforts to prevent secondary disorders.

The government of Fukushima Prefecture contacted each hospital and completed the

transfers of over 100 rehabilitation patients to other hospitals and other facilities. In the Miyagi Prefecture, the medical office bureau was in charge of contacting each hospital by telephone; because there was no hospital that needs to transfer over 10 patients to other facilities, each hospital that has a few patients who need transfer was asked to get vehicles by itself. As for the hospitals that were not able to be contacted by telephone, the staff of medical office bureau and disaster prevention and healthcare bureaus of the Prefecture visited hospitals in person and checked whether they need to transfer rehabilitation patients; they reported that they finished the transfer of rehabilitation patients by the 7th day after the occurrence of disaster.

It had been reported that the hospitals in the damaged areas prescribed medicines together with the examination of victims; at that time, the food supply for victims was not sufficient and the lack of water and reagents prohibited medical staff from providing the examination that was necessary for victims. In this situation, to prevent blood clot and contracture, patients were guided to take water sufficiently and to exercise.

(2) The Rehabilitation of two months to three months after the occurrence of disaster

In the late March, the government of Miyagi Prefecture held the 1st Conference for the Rehabilitation Support for Miyagi Prefectures Damaged by the East Japan Great Earthquake at the conference room in Tohoku University, School of Medicine on April 12 by the request of the staff of related agencies and scholars to disasters and rehabilitation. In the Conference, the increase of coordinators to understand the rehabilitation needs of Ishmakitiku and Kensennumatiku, where the damages were great and it was difficult for supports to be delivered, and provide necessary services to them was demanded and the situation of volunteers who were actively involved in relief activities was discussed.

Next, it was reported that shelters in Ishmakitiku was reorganized. In May, two welfare shelters were installed and began to provide rehabilitation services including counseling, decision of whether to adjust to assistive devices and welfare equipments, ADL training and exercise coaching; one welfare center accepted persons of care level 4 to 5 and the other welfare center accepted persons of care level 3 and persons who required support. During the holidays in May, 10 Groups gave supports for the rehabilitation of the victims of the East Japan Great Earthquake.

On May 24, the 2nd Conference for the Rehabilitation Support for Miyagi Prefectures Damaged by the East Japan Great Earthquake was held; the rehabilitation needs to prevent secondary disabilities were discussed; because 30% of victims had disuse syndrome according to the research on the disuse syndrome and the rehabilitation needs, it was forecast that they needs the intervention for rehabilitation. At the 2nd shelters, the part of dining hall was used as the rehabilitation room to provide rehabilitation counseling and to introduce rehabilitation related devices, which was used as welfare shelters, was linked to medical association and each council and became the place to enable 10 groups to support rehabilitation of victims. The rehabilitation services at

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shelters were provided for free, but those at facilities were charged. Despite of this situation, the opinion that the needs of persons who were in care levels, but asked to return to home, should be taken care of was proposed by connecting the Association of Care Managers (Masahiro KOHZUKI 2012). To respond to those needs, the Promotion Council of IT Disaster Management Lifeline was organized. The Promotion Council of IT Disaster Management Lifeline was held on June 28, 2012. The Promotion Council of IT Disaster Management Lifeline was organized to review and distribute the information related to disaster management lifeline with the utilization of IT technology and to strengthen the linkage with other related agencies or persons and has provided the pertinent information to what the residents need to do (Prime Minister of Japan and His Cabinet 2012).

In South Korea, comparing the disaster mitigation system, no study on disaster rehabilitation has been conducted; it may be due to the Korea's geographical location that earthquake and tsunami rarely occur. When referring disaster in South Korea, it generally means flood damages. As for the disaster rehabilitation, there are the measures that the Ministry of Health and Welfare actively responded for the demand of medical rehabilitation services including the increase of the number of beds in the National Rehabilitation Center and the supports of oriental medical doctors (Ministry of Public Administration and Security 2010). In this situation, because the disaster rehabilitation is qualitatively and quantitatively insufficient and is mostly given too much emphasis on medical rehabilitation, almost no rehabilitation services in the aspects of daily living and mental health of victims has been provided.

IV. Conclusion

As for the disaster mitigation system in South Korea and Japan, the government of Japan has operated the comprehensive disaster mitigation system by linking with meteorological agency; the government of South Korea also has operated disaster mitigation system, but the meteorological system has not been taken advantage of. The pertinent Acts to disaster mitigation in South Korea have been more concentrated on the restoration from disaster than the prevention; disaster mitigation is included to the Framework Act on Civil Defense and there is no clause about the organization that is in charge of disaster mitigation. Therefore, it is suggested to install the organization to be exclusively in charge of disaster mitigation; when installing the organization, the enhancement of roles of disaster mitigation organization, the development of complete training program and the system and professionalism of disaster mitigation need to be considered.

In Japan, disaster rehabilitation consists of four stages, but because, in the study of Masahiro Kohzuki, one to three stage were dealt with for three months, only three stages

will be dealt with in this study.

The first stage is from the day when the earthquake occurs to third day.

During the first stage, it is needed to figure out the extent of damage, to cut the lifeline and to install the disaster countermeasure headquarter; the activities to link among hospitals, transfer patients, procure and supply emergency food and goods, take care of health and hygiene and prevent secondary damages and the expansion of disaster are performed. Based on the established system during this stage, the transfer of rehabilitation patients, sufficient supply of goods, the measures to prevent infections, the emergency situation management and medical supports of internal medicine are implemented.

The second stage is from fourth day to one month; during the second stage, wheelchair, welfare equipments and mattress preventing bedsores are supplied and the supports to prevent disuse syndrome and economy class syndrome are provided.

The third stage is from two months to six months; shelters are reorganized, welfare shelters are open and temporary housing is supplied; during this stage, home-visit rehabilitation services, the maintenance of housing, the response for the rapid increase of the needs of orthopedic treatment and the supply of vehicle for bathe are implemented.

Even though volunteers, university hospitals, medical research divisions, local core hospitals and other hospitals are connected for the rehabilitation supports, in reality the limitations have appeared as the support period has prolonged. Therefore, long-term efforts, for example, to strengthen the roles of coordinators who connect among organizations and give the leave to volunteers, need to be made. Until now, in the short run, the rehabilitation has been generally implemented by rehabilitation staff, related support agencies and the local councils, but the damaged region needs to be able to go into their rehabilitation independently by adding financial supports and manpower in the long run (Masahiro KOHZUKI 2012).

In South Korea, as for the disaster rehabilitation, there are the measures that the Ministry of Health and Welfare actively responded for the demand of medical rehabilitation services including the increase of the number of beds in the National Rehabilitation Center and the supports of oriental medical doctors. In this situation, because the disaster rehabilitation is mostly given too much emphasis on medical rehabilitation, almost no rehabilitation services in the aspects of daily living and mental health of victims have been provided. Therefore, to develop disaster rehabilitation, the awareness of disaster rehabilitation needs to be promoted and the aspects of mental health and daily living as well as medical supports need to be considered. In addition, the roles of disaster rehabilitation need to be improved, the organization to be in charge of disaster rehabilitation based on the cultivation of professionals needs to be built and disaster rehabilitation system needs to be established based on the reasonable manual.

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