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Public health practices to address natural disasters in Japan

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Abstract

Japan is among the countries with the highest occurrence of natural disasters worldwide and has a long history of addressing natural disasters. This paper outlines the public health practices related to natural disasters in Japan, focusing on the legislation for disaster management systems and relevant organizations to address the response to natural disasters, based on the legislation, and describes how the National Institute of Public Health (NIPH) contributes to the improvement of the public health practices that address natural disasters.

The "Disaster Relief Act," which stipulates how to facilitate emergency rescue during the acute phase after a disaster, was enacted soon after World War II. Further, the "Disaster Countermeasures Basic Act," which was enacted in 1961, forms the basis for a disaster management system, including the public health practice. Based on this act, the disaster management plan must be formulated by the national and local governments and other public institutions, including the National Hospital Organization, Japan Community Health care Organization, Japanese Red Cross Society, and Japan Medical Association. The "Basic Disaster Management Plan" prepared by the National Disaster Management Council is a comprehensive disaster management plan based on which other disaster management plans are formed. It has constantly been reviewed and revised based on the experiences from large-scale natural disasters, such as the Great Hanshin-Awaji Earthquake, the Great East Japan Earthquake, and the spread of the COVID-19 pandemic. In addition, the "Medical Care Act," which ensures the medical care delivery system, and the "Community Health Act," which guides the public health center and its health crisis management function, are also relevant to the public health practice for natural disasters.

In case of natural disasters, local governments, including prefectures and municipalities, are responsible for protecting the lives and health of residents. Further, prefectures struck by disasters should promptly request assistance from the national government or other local governments. However, if deemed urgently necessary, the national government may provide support even without requests from prefectures in disaster areas. The Disaster Medical Assistance Team (DMAT), Disaster Psychiatric Assistance Team (DPAT), and Disaster Health Emergency Assistance Team (DHEAT) offer substantial and effective support to affected local governments in public health practice. The DMAT has enough mobility to start working during the acute phase of a disaster, immediately after it occurs, provides medical care at disaster sites, and supports the medical treatment provided by hospitals in affected areas. Further, it coordinates wide area transportation and logistics. The DPAT supports psychiatric care and mental health services in affected areas. DHEAT supports the command and coordination of health crisis management in affected prefectures, establishes a

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health crisis management organization, develops a direction and coordination system, and coordinates the delivery of support by a healthcare team.

The NIPH contributes to the improvement of the public health practices related to natural disasters in Japan, from education and research aspects. Regarding education, the NIPH provides a three-month course to educate public health center directors and a short-term training program for health crisis management and contributes to the development of the knowledge and skills of professionals in the public health center and in the DHEAT, which play a central role in the public health practice related to natural disasters. Regarding research, the NIPH, as a research institute, conducts many research projects related to the health crisis management, including the response to natural disasters, and supports and enhances them as a funding agency for the Research Program on Health Security Control of the Health, Labour and Welfare Sciences Research Grants. The findings of these research have been used to develop and revise activity guidelines, develop human resources, and enhance the quality of activities for public health centers, DHEAT, DMAT, and DPAT.

keywords: natural disaster, health crisis management, public health center, Disaster Medical Assistance Team (DMAT), Disaster Health Emergency Assistance Team (DHEAT)

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I. Introduction

Japan is subject to frequent natural disasters, such as typhoons, torrential rains, heavy snowfalls, earthquakes, tsunamis, caused by geographical, topographical, and meteorological conditions [1]. Every year, people experience substantial health deterioration (death, injury, and aggravation of chronic diseases) in Japan due to natural disasters; therefore, public health practices are needed to prevent and reduce health damage.

Japan has been developing disaster management policies and systems for a long time, enabling the establishment of a network with cooperation among relevant entities, including the national and local governments, police, fire services, Self-Defense Forces, medical institutions, and volunteer groups. However, building such a system takes time; trial and error processes were repeated each time a natural disaster occurred, and the system was improved based on the lessons learned. These efforts in Japan may be useful for all foreign countries where natural disasters are likely to occur.

This paper outlines public health practices related to natural disasters in Japan, focusing on the legislation for disaster management systems and relevant organizations to address the response to natural disasters, based on the legislation. In addition, it describes how the National Institute of Public Health (NIPH) contributes to the improvement of public health practices related to natural disasters.

II. Framework of response to natural disasters in Japan

1. Legislation for disaster management system

Some laws and acts are related to the response to natural disasters in Japan. They address all disaster phases—prevention, mitigation, preparedness, emergency response, recovery, and reconstruction, with clearly defined roles and responsibilities among the national and local governments—and stipulate that implementing various disaster countermeasures requires the cooperation of relevant entities in the public and private sectors [1].

In 1947, after World War II, the "Disaster Relief Act" [2] was established. Thereafter, in response to the Typhoon Ise-wan in 1959, the "Disaster Countermeasures Basic Act" [3] was enacted in 1961, and a comprehensive and strategic disaster management system was formulated. The Disaster Countermeasures Basic Act is constantly reviewed and amended, following lessons learned from large-scale disasters.

In the succeeding sections, these acts are described in detail, with a focus on public health practices to protect the lives and health of people. In addition, acts related to the health and medical care of people and that are deeply related to natural disasters are also explained.

2. Disaster Countermeasures Basic Act

This Act aims to protect the national land, lives, bodies, and properties of citizens from disasters by formulating basic principles, establishing a necessary system that involves the national and local governments and other public institutions, and clarifying responsibilities regarding disaster management [3]. Further, this act formulates a basic policy on necessary disaster control measures, including disaster management plans, disaster management, emergency disaster control measures, disaster recovery efforts, and financial measures concerning disaster management; thus, it develops and promotes a comprehensive and systematic

disaster management administration and contributes to the preservation of social order and security of public welfare. In this Act, the term "natural disaster" refers to damage resulting from storms, tornados, heavy rainfall, heavy snowfall, floods, slope failure, mudflows, high tides, earthquakes, tsunamis, eruptions, landslides, or other abnormal natural phenomena [3]. Furthermore, "other public institutions" are commissioned by the prime minister, including research institutes related to disaster management as well as expressway, railway, telecommunication, electric, gas, oil, transportation, and retail companies, among other companies. Furthermore, the National Hospital Organization, the Japan Community Health care Organization, the Japanese Red Cross Society, and the Japan Medical Association are included as healthcare-related institutions.

The national and local governments must establish disaster management councils to undertake the overall coordination of a comprehensive and systematic disaster management administration and formulate a disaster management plan. Local governments in Japan can be grouped as municipalities, which are fundamental local governmental bodies, and prefectures, which are local governmental bodies covering a wider area that includes multiple municipalities. In addition, in this Act, the proper division of roles, mutual coordination, and cooperation among the national and local governments, other public institutions, and residents are emphasized.

3. Disaster Management Plan

Based on the Disaster Countermeasures Basic Act, national and local governments and other public institutions have developed several different kinds of disaster management plans. The Basic Disaster Management Plan is the highest level plan, based on which the disaster management activities are prepared by the National Disaster Management Council. The Disaster Management Operation Plan is made by other public institutions, and the Local Disaster Management Plan is made by each Prefectural and Municipal Disaster Management Council [4].

The Basic Disaster Management Plan is a comprehensive and long-term disaster management plan that forms a foundation for the Disaster Management Operations Plan and the Local Disaster Management Plan [4]. It stipulates provisions for establishing the disaster management system, promoting disaster management measures, accelerating post-disaster recovery and reconstruction measures, and promoting scientific and technological research on disaster management [4]. It comprises various plans for each type of natural disaster, where specific countermeasures are described. It has constantly been reviewed and revised since its first formulation in 1963. Specifically, a major revision was made in 1995, which was based on experiences from the Great Hanshin-Awaji Earthquake. In addition, some minor revisions were made in 2011, based on lessons learned from the Great East Japan Earthquake, and in 2021, for the disaster management in the condition of the spread of COVID-19.

4. Disaster Relief Act

While the Disaster Countermeasures Basic Act covers all the disaster management phase, the Disaster Relief Act is among the acts that guides emergency rescue response in the acute phase after a disaster. The Disaster Relief Act aims to protect disaster-affected people and maintain social order during a disaster through providing emergency relief by the national government, in cooperation with local public corporations, the Japan Red Cross and other organizations, and the public [2].

Based on the act, the rescue target entails those who need rescuing in the municipality where a disaster occurs. A prefecture with jurisdiction over the municipality conducts the rescue and, if necessary, delegates part of the rescue-related work to the municipality. The types of relief include establishing shelters; providing temporary housing; providing food and drinking water; providing or lending of clothing, bedding, and other necessities; providing medical care and midwifery; rescuing victims; repairing housing; providing school supplies; burying, searching for and disposing of corpses; and removing obstacles [2].

The criteria for the application of the Act are as follows:

(1) A disaster results in the loss of a certain number of dwellings, based on the population in the municipality.
(2) A disaster has caused or is likely to cause harm to the lives of a large number of people, and they need to evacuate, and be rescued, continuously.

Determining whether criterion (1) is met takes a long time; therefore, actively promoting the prompt application of the Act based on criterion (2) is recommended to achieve the purposes of the Act, that is, the protection of victims and the maintenance of social order.

A prefecture shall determine the degree, method, and duration of rescue, according to the criteria set by the national government. Moreover, the specific criteria vary depending on the type of relief described above. To provide treatments, procedures, surgeries, nursing, and so forth to those who have lost access to medical care because of disasters, first aid teams (hospitals or clinics if unavoidable) provide medical care as part of relief, on an emergency basis. The period during which medical care can be provided is defined as 14 days after the occurrence of a disaster.

5. Medical Care Act

This Act aims to contribute to the protection of the nation's health by safeguarding the interests of medical care recipients, ensuring that the system efficiently delivers good quality and well-suited medical care, and by providing the necessary matters to support well-suited choices regarding the recipients' medical care [5]. These include the necessary matters that ensure the safety of medical care; that concern the establishment and management of hospitals, clinics, and birthing centers; and that develop such facilities and promote the sharing of functions and cooperation among medical institutions [5].

In this Act, a prefecture shall provide a medical care plan to ensure the medical care delivery system in accordance with the actual conditions in the area, and medical care plans shall guide activities that ensure emergency medical care provision during disasters [5]. These activities include the function to mobilize to areas hit by disasters and provide emergency medical services promptly, provide medical services at evacuation centers and continue to provide medical care even after the disasters, and serve as a base for providing medical care in the disaster area.

6. Community Health Act

This Act aims to ensure the comprehensive promotion of strategies in the Maternal and Child Health Act and other laws related to community health measures in local areas, and thereby maintain and promote residents' health [6]. In addition, this Act specifies the establishment of a public health center [6], and it is especially necessary for public health centers to strengthen the function as a base for health crisis management, including response to natural disasters [7].

III. Public health practice in natural disaster settings

1. Outline of the public health practice for natural disaster

In case of a disaster, municipalities primarily engage in emergency response, as they are the closest to residents. Prefectures get involved when comprehensive wider-area measures are necessary. In case local governments are struck by a large-scale disaster beyond their capability, the national government will step in to support them and coordinate mutual support among them [4].

Local governments struck by disasters provide medical services at their own medical institutions (city hospitals, prefectural hospitals, etc.) and request cooperation regarding medical care from private medical institutions within their jurisdiction [4]. Since Japan has a large percentage of private medical institutions, cooperation among them is essential. In addition, municipalities should fully assess the health statuses of disaster victims and take appropriate measures, including establishing first aid stations, providing psychological care, and implementing mobile health counseling by public health nurses [4]. Specifically, special consideration should be given to the physical and mental health of those who require special care, including the elderly, disabled persons, infants, and others [4]. Furthermore, municipalities should install temporary toilets and manhole toilets as soon as possible to secure a good living environment at the evacuation centers, and they should take necessary measures for cleaning, urine disposal, collection and disposal of daily garbage to maintain sanitary conditions in the affected areas [4].

Prefectures struck by disasters should promptly request assistance from the national government or other local governments. In addition, if deemed necessary, the national government may provide assistance even without requests from prefectures in disaster areas. Support for local governments includes the dispatch of the Disaster Medical Assistance Team (DMAT), the Disaster Psychiatric Assistance Team (DPAT), the Disaster Health Emergency Assistance Team (DHEAT), and relief squads organized by the Self-Defense Forces. It also includes logistical support at, and wide area transportation to medical facilities outside disaster-stricken areas.

2. Public Health Center

A public health center is the frontline authority regarding public health, established by local governments, which includes prefectures, designated cities, core cities, and special wards in Tokyo Prefecture, among others [7]. The public health center provides a wide range of services to improve the health of local residents, from personal health services to environmental health services [6]. Currently, public health centers mostly emphasize health crisis management. After the Great Hanshin-Awaji Earthquake in 1995, a health crisis management system was built to take proper actions during health crises, and the public health center was specifically positioned as a base for local health crisis management [7].

After a natural disaster occurs, the public health center takes the following actions to respond to health crises [8]:

- Collection, compilation, and management of various types of information, such as the damage situation (e.g., places, date, and time of occurrence; symptoms of victims; and number of victims), response status (e.g., rescue status of victims and status of medical activities at the site), and status of medical services provision (e.g., status of vacant wards for patients at medical

institutions and status of pharmaceutical products' acquisition).
- Quick and appropriate provision of information to local residents, organizations concerned, and other parties, such as mass media.
- Coordination of health services provided to victims, their families, and other local residents.

In addition, a public health center takes the following actions to prevent further damage due to health crises [8]:
- Conducts public awareness activities (providing information on damage status, precautions, and other related information to residents)
- Secures safe drinking water and food
- Cares for individuals who are vulnerable to disasters
- Manages the health of victims, their families, and residents (e.g., medical checkups, health counseling, and psychological care, especially for post-traumatic stress disorder)

3. Disaster Health Emergency Assistance Team (DHEAT)

In 2011, some public health centers were affected by the Great East Japan Earthquake, and thus could no longer conduct health crisis management. To solve this problem, the DHEAT was formed in 2018, with substantial support from the National Association of Prefecture and Designated City Health Directors and the Japanese Association of Public Health Center Directors [7].

In case of a large-scale disaster, healthcare coordination headquarters should be established under the disaster countermeasures headquarters of the disaster-stricken prefecture and should be responsible for the overall coordination of health and medical care activities, including coordinating the dispatch of teams to support activities, coordinating information about the activities, and organizing and analyzing information related to the activities [9]. The DHEAT is dispatched to the healthcare coordination headquarters or public health centers in the disaster-affected prefectures to support their command and coordination functions. DHEATs are composed of personnel from prefectures and designated cities who have completed technical training to support the command and coordination of health crisis management in case of disasters. Each team consists of medical doctors, dentists, pharmacists, veterinarians, public health nurses, clinical laboratory technologists, registered dietitians, mental health welfare professionals, environmental health officers, food sanitation inspectors, other professions, and the administrative coordinator, with approximately five members. The standard period for DHEAT to operate is at least one week.

The roles of DHEAT are mainly as follows [10]:
- Establishing a health crisis management organization and developing a system of direction and coordination
- Collecting, analyzing, and evaluating disaster-related information and planning measures
- Coordinating the delivery of support by a healthcare team and integrating, directing, and coordinating countermeasures through meetings
- Reporting to healthcare coordination headquarters and public health centers, requesting support, and procuring resources
- Public relations
- Securing the safety of personnel in affected prefectures and managing their health

4. Disaster Medical Assistance Team (DMAT)

DMAT is defined as the team that has the mobility to start working during the acute phase of a disaster (generally within 48 hours) and has received specialized training and education [11]. The Great Hanshin-Awaji Earthquake in 1995 raised the issue of preventable disaster deaths due to delays in the provision of initial medical care as a major problem, and it has been recognized that medical doctors need to provide medical care at disaster sites, in parallel with rescue operations. Subsequently, the Japan DMAT was established by the Ministry of Health, Labour and Welfare in April 2005.

DMATs are organized by various entities, including the national government (Ministry of Health, Labour and Welfare and Ministry of Education, Culture, Sports, Science and Technology), the Japanese Red Cross Society, the National Hospital Organization, the Japan Community Health care Organization, prefectures, and municipalities. Further, public and private medical institutions may organize DMATs. Each DMAT consists of four members: one doctor, two nurses, and one administrative coordinator. The standard period for DMAT to operate is 48 hours. Generally, DMATs must gather at the base of operations established in the disaster area by themselves.

The roles of DMATs are mainly as follows [11]:
- To provide medical care at disaster sites, including triage, emergency medical services, and medical care under debris
- To support medical treatment provided by hospitals in affected areas
- To conduct wide area transportation, which entails transporting patients from the disaster areas using Self-Defense Forces aircraft and other aircrafts
- To transport patients by helicopters, ambulances, and so on from the disaster site to medical institutions in the affected area, or from medical institutions in the affected area to medical institutions in neighboring areas

- To coordinate logistics, including securing means of communication and mobility, medical supplies, and means of living related to DMAT activities as well as to coordinate and collect information necessary for DMAT activities.

In addition, DMATs should respond flexibly, according to the medical needs of affected areas. For example, medical care at evacuation centers and first aid stations are not originally the role of DMATs; however, they may provide support when needed.

After the DMAT has completed its activities, the affected prefectures need to continue providing medical services, with the cooperation of the Japan Medical Association, the Japanese Red Cross Society, the National Hospital Organization, the Japan Community Health care Organization, national university hospitals, the Japan Dental Association, the Japan Pharmaceutical Association, the Japanese Nursing Association, and private medical institutions [4].

5. Disaster Psychiatric Assistance Team (DPAT)

DPAT is a professionally trained team that provides support for psychiatric care and mental health services in affected areas where mass disasters such as natural disasters, aircraft or train accidents, and criminal incidents have occurred [12]. DPATs are organized by national and prefectural governments and the National Hospital Organization. Further, to organize a DPAT, cooperation from public and private medical institutions may be requested when necessary. Each DPAT consists of several persons, including psychiatrists, nurses, and administrative coordinators. In addition, child psychiatrists, pharmacists, public health nurses, mental health social workers, and clinical psychologists can be included as members of the DPAT, as appropriate to the needs of the affected area. Generally, DPATs, like DMATs, must gather at the base of operations established in the disaster area by themselves.

The roles of DPAT include providing psychiatric care in affected areas; offering professional support for mental health services in affected areas, affected medical institutions (including evacuation of patients), supporters such as medical personnel, emergency personnel, and local government officials working in the affected areas; and spreading public awareness of mental health care. [12]

Since DPAT needs to be active immediately after a disaster, and over a medium- to long-term period, the entity that forms DPAT should organize multiple teams and prepare them so that each team can take over the activities. The standard period for DPAT to operate is one week, and if necessary, the same entity will dispatch DPATs to the same disaster area for several weeks to several months continuously. First, an advance team that can operate in the affected prefectures within 48 hours after the disaster is dispatched mainly to conduct needs assessment and respond to acute psychiatric needs. Subsequently, it is replaced by another DPAT to continue conducting the abovementioned roles.

IV. Contribution of the NIPH to the development of public health practice for natural disasters

The NIPH is a research institute affiliated with the Ministry of Health, Labour and Welfare. The mission of the NIPH is to educate and train personnel engaged in public health, environmental health, and social welfare and to conduct research in these areas. The NIPH contributes to the improvement of public health practices for natural disasters in Japan, from education and research aspects.

1. Education and training related to natural disasters in the NIPH

Regarding education and training, the NIPH provides a three-month course for public health center directors. The course has produced approximately 20 graduates annually and contributes to the improvement of public health centers' performance [7].

In addition, the NIPH has held a short-term training program for health crisis management since 2006. This program aims to improve the ability of directors and management staff in public health centers to respond to health crises, which is a situation that threatens people's lives and health and is caused by various factors in a community, including medicines, food poisoning, infectious diseases, drinking water, crimes, radiation accidents, terrorism, and natural disasters. The training content included lectures aimed at understanding the status and issues of health crisis management, knowing how to respond to each cause, and exercises aimed at acquiring practical skills for responding to health crises.

In 2017, prior to the establishment of the DHEAT, the purpose and content of the training program for health crisis management changed significantly. The scope of health crises covered in the training was limited to natural disasters, and the target of the training program was limited to prefectural officials (including personnel of public health centers), who are candidates for DHEAT leadership positions. Subsequently, the program's subtitle was changed to the "high-level training program for the DHEAT's leaders." DHEATs are required to support management tasks that are conducted by affected prefectures; as such, the affected prefecture can rebuild the medical care delivery system and ensure a good health and living environment for disaster victims in evacuation centers, from the acute phase to the chronic phase, after a large-scale disaster. Therefore, this

program aims to develop the abilities necessary to play leadership roles during the development of the DHEAT in the local government and to manage the restoration of the health care system in disaster-affected areas. The content of this two-day program is as follows: collection, analysis, and evaluation of information during a large-scale disaster; support for public health practice; overall coordination of public health practice, including collaboration with medical institutions; acceptance of human resources, and so on. The specific behavioral objectives (SBOs) of this program were as follows:

(1) To explain the responsibilities and authority of the local government's health department in the Local Disaster Management Plan and the role of DHEAT based on the DHEAT activity guidelines
(2) To explain the characteristics and systems of the actions of relevant organizations involved in disaster relief
(3) To explain the basic concept of coordinating health services, medical care, and social welfare services during disasters
(4) To develop a plan for building and strengthening the organizational structure for dispatching and receiving disaster relief workers
(5) To formulate a human resource development plan for disaster relief activities.

Figure 1 shows the transition in the number of graduates from the short-term training program for health crisis management. Data were obtained from annual reports of the National Institute of Public Health from FY 2006 to FY 2020. The number of graduates was approximately 200 in FY 2006 and FY 2007, when the program started; subsequently, the number remained between 50 and 100 in each fiscal year. In FY 2018, that is, the year DHEAT was established, the number of graduates increased to over 100, aiming to accelerate the development of DHEAT leaders further, which was the new target of the program. However, in FY 2019 and FY2020, one of the two annual programs was canceled because of the COVID-19 pandemic, which has spread since January 2020—the second half of FY 2019. Further, most of the prefectural officials, who were the target of the program, were responsible for working on the infectious disease as well as natural disasters, and therefore, they could not find time to participate in the program. Consequently, the number of graduates decreased significantly to less than 50.

2. Research and development for the natural disaster in the NIPH

Regarding research and development, the NIPH not only conducts research related to health crisis management, including the response to natural disasters, but also plays a role as the funding agency for the Research Program on Health Security Control of the Health, Labour and Welfare Sciences Research Grants. NIPH is responsible for the assessment of research proposals and the progress management of research projects [13].

Many research projects on natural disasters have been carried out in the Health, Labour and Welfare Sciences Research Grants, including 27 research programs. The research projects that include "(natural) disaster" and "earthquake" in the title and that were completed by FY 2020 were searched for using the MHLW Grants System (https://mhlw-grants.niph.go.jp/), which commenced operation in FY 1997 to disclose the research results of the Health, Labour, and Welfare Sciences Research Grants widely to the public [14]. Consequently, 136 research projects were identified. Of the 27 research programs, the Research Program on Health Security Control was the most common, with 28 projects, followed by the Research Program on Region Medical, with 24, the Special Research Program, with 18, and the Comprehensive Research Program on Disability Health and Welfare, with 13.

Figure 2 shows the number of research projects by the fiscal year in which the research started. A number of re-

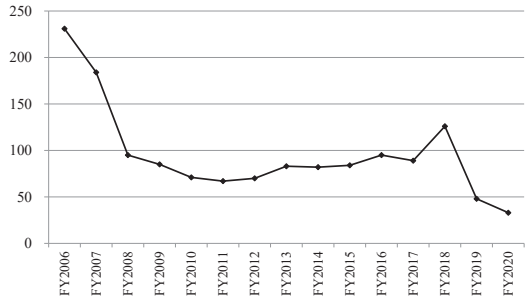

Figure 1 The number of graduates from the short-term training program for health crisis management held at NIPH by the fiscal year

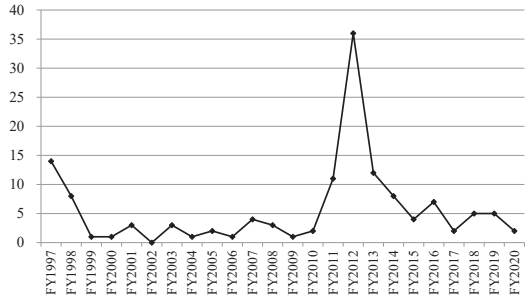

Figure 2 The number of research projects for natural disasters of the Health, Labour and Welfare Sciences Research Grants by the fiscal year the project started

Table 1 The number and percentage of research projects for natural disasters of the Health, Labour and Welfare Sciences Research Grants by the content that they primarily address

Content	N	(%)
Health status of disaster victims	36	(26.5)
Medical service delivery systems	31	(22.8)
Human resource development	20	(14.7)
Support for those who need special care	18	(13.2)
Post-traumatic stress disorder (PTSD)	10	(7.4)
Management of medical institutions	7	(5.1)
Management of dead bodies	4	(2.9)
Water supply and securing drinking water	4	(2.9)
Public health center	10	(7.4)
DHEAT	5	(3.7)
DMAT	14	(10.3)
DPAT	5	(3.7)

search projects were conducted in FY 1997, after the Great Hanshin-Awaji Earthquake, and from FY 2011 to FY 2013 after the Great East Japan Earthquake. This indicates that numerous research projects need to be conducted to examine the impact of large-scale natural disasters on the health of populations and the health and medical care system and to produce research findings that improve responses to future natural disasters.

Table 1 shows the number and percentage of research projects based on the content that they primarily address. Thirty-six projects (26.5%) were conducted to identify and assess the health status of disaster victims, including a cross-sectional survey of the health status of victims immediately after a disaster and a follow-up study to evaluate the changes in the health status of disaster victims, among other studies. Some of the projects assessed the health status of disaster victims by following them for 10 years in Miyagi and Iwate prefectures, which were severely damaged by the Great East Japan Earthquake.

Thirty-one research projects (22.8%) were related to medical service delivery systems for disasters, including wide-area transportation, logistics, and cooperation among medical institutions. Twenty projects (14.7%) were conducted to develop, implement, and evaluate the methods for the human resource development for health and medical care professionals (doctors, nurses, public health nurses, etc.) who respond to natural disasters at public health centers, DMATs, and so on. Eighteen projects (13.2%) were related to support for those who needed special care during a natural disaster, including the elderly, persons with disabilities, infants, pregnant women, and children.

Others included research on post-traumatic stress disorder (PTSD); research on management of facilities and equipment of medical institutions, including business continuity plan (BCP); research on management of dead bodies, including postmortem examination, identification, cremation, burial, and so on; and research on the maintenance and management of water supply and securing drinking water. In addition, two research projects have been conducted on the response to natural disasters, in the context of the spread of COVID-19.

The number of research projects related to the public health center, DHEAT, DMAT, and DPAT were 10 (7.4%), 5 (3.7%), 14 (10.3%), and 5 (3.7%), respectively. The results of these projects have been used to develop and revise activity guidelines, improve the knowledge and skills of the staff of public health centers and team members, and enhance the quality of activities.

V. Conclusions

In Japan, public health practices are essential to cope with the frequent natural disasters, and thus protect people's lives and health. Therefore, laws related to public health practices for natural disasters have been enacted for more than 70 years, and a legislative framework consisting of several acts, such as the Disaster Countermeasures Basic Act, has now been established. In addition, whenever a major natural disaster occurs, these acts are revised and improved to ensure a precise and rapid response to natural disasters. While it is best to avoid natural disasters, when they do occur, measures to cope with them must be constantly improved. Japan has developed a response to natural disasters by repeating this process.

Local governments, including prefectures and municipalities, are responsible for protecting the lives and health of residents in case of natural disasters. However, in Japan, many natural disasters cannot be handled by a single local government; therefore, support from other local governments and from the national government is essential. In principle, support is only provided when requested by the affected local government, but for a particularly severe natural disaster, the affected local government may not manage to request support. This has led to delays in providing support, which in turn has led to further damage. To solve this problem, a system is now in place to provide support even without a request from the affected local governments, and DHEAT, DMAT, and DPAT provide such support.

Human resource development as well as research and development are essential for local governments to improving public health practices during natural disasters, such as prefectures and municipalities, public health centers, DHEAT, DMAT, DPAT, and other public institutions. The NIPH has contributed to the improvement of knowledge and skills of professionals responding to natural disasters, especially through training programs for public health centers and

DHEAT. In addition, as a research institute and as a funding agency for the Research Program on Health Security Control of the Health, Labour and Welfare Sciences Research Grants, the NIPH has conducted and supported research on health crisis management and produced many research findings that have led to improvements in public health practice for natural disasters. The NIPH will continue to contribute to public health practices in responding to natural disasters through both education and research.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this article.

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＜総説＞

日本における自然災害に対する公衆衛生実践

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抄録

本稿では，日本における自然災害に関連した公衆衛生実践に関連する法律や関連組織を概説するとともに，自然災害時の公衆衛生活動の改善への国立保健医療科学院の貢献について論述する．

第二次世界大戦後まもなく，災害発生後の急性期における緊急救助を規定する「災害救助法」が，1961年に「災害対策基本法」が制定され，公衆衛生実践を含む災害管理システムが構築された．災害対策基本法に基づいて，国や地方自治体，国立病院機構，地域医療機能推進機構，日本赤十字社，日本医師会などの関係機関は防災計画を策定している．その中でも，中央防災会議が策定する「防災基本計画」は国全体の包括的な計画で，他の防災計画の基礎となっている．防災基本計画は，阪神・淡路大震災や東日本大震災，COVID-19の流行など，大規模な自然災害等の経験を踏まえて常に改訂されている．また医療提供体制の確保に関する「医療法」，保健所やその健康危機管理機能に関する「地域保健法」も自然災害に対する公衆衛生実践に関係している．

自然災害発生時には，都道府県や市町村などの地方自治体は住民の生命と健康を守る責任がある．被災した都道府県は速やかに国や他の地方自治体に支援を要請することができるが，必要に応じて，要請の有無に関わらず国が支援を行うことができる．被災した地方自治体の公衆衛生実践を効果的に支援する組織として，災害派遣医療チーム（DMAT），災害派遣精神医療チーム（DPAT），災害時健康危機管理支援チーム（DHEAT）が設立されている．DMATは災害発生直後すぐに活動を開始できる機動力を持ち，災害現場での医療活動，被災地の病院の医療活動の支援，広域医療搬送，ロジスティックスなどを実施する．DPATは精神科医療の提供，精神保健活動の支援，被災した医療機関への支援，被災地で活動する支援者への支援などを実施する．DHEATは被災した都道府県における健康危機管理の指揮調整機能を支援し，健康危機管理組織の立上げと指揮調整体制の構築，保健医療活動チームの受援調整などを実施する．

国立保健医療科学院は，教育と研究の両面から，自然災害に対する公衆衛生活動の向上に貢献している．教育に関しては，保健所長の養成を目的とした３か月間の専門課程（保健福祉行政管理分野）や，2日間の健康危機管理研修（DHEAT養成研修（高度編（指導者向け）））を実施し，保健所職員やDHEAT隊員の知識や技能の向上に貢献している．また研究に関しては，研究機関として関連する研究を実施するほか，厚生労働科学研究費補助金（健康安全・危機管理対策総合研究事業）の研究費配分機関として研究課題を支援している．これらの研究成果は，保健所，DHEAT，DMAT，DPATの活動要領の策定・改訂，人材育成，活動の質の向上に活用されている．

キーワード：自然災害，健康危機管理，保健所，災害派遣医療チーム（DMAT），災害時健康危機管理支援チーム（DHEAT）