研究実施責任者	プロジェクト名	期間	配分額(円)
看護学部・教授 木下　真里	マイノリティや社会的弱者の健康・生活情報の把握・活用方法に関する研究 -誰も取り残さない社会の実現を目指して-	R3-R4	500,000

研　究　概　要

本研究は、在留外国人、高齢者、障がい者、路上生活者、LGBTQ、感染症キャリアなどマイノリティや社会的弱者の、健康状態や生活状況などの情報を、氏名や住所、マイナンバー、出身地などの個人情報と切り離してデータベースに記録・保存し、公的機関や支援関係者間で共有する、新しい仕組みの開発を目的とする。この新しい仕組みが実現すれば、個人情報利用の同意取得が困難な事情のある人々の実態把握が容易となり、持続可能な開発目標（SDGs）の共通理念「だれも取り残さない」の実現を通して、複数のSDGの実現に貢献できる。

研究では、個人情報の代わりに、一人ひとりに無償で配布する固有のQRコードによって個人を識別する。日本語でのコミュニケーションが十分でない外国人とICTになじみのない高齢者に、固有のQRコードを配布して定期的に追跡を行い、何人の対象者がいつまで把握できるかを調査することによって、この仕組みの効果と実用可能性を検証するアクション・リサーチである。また、この調査で収集した個別のデータを自治体、支援団体と共有することにより、実際に活用できるかどうかを検証する。

研　究　成　果

研究者らは、大規模災害時、迅速に人的被害の全体像を把握する COACHES と呼ばれる仕組みの開発を行っている。本研究では、在留外国人や高齢者などマイノリティや社会的弱者を対象に、個人の権利を守りながらどのように安全、効果的にこの仕組みを活用できるかを明らかにすることを目的とした。専用アプリケーションを用いてこの仕組みを説明し、意見や感想を Focus Group Discussion (FGD)で聞き取るという研究である。

高齢者調査については、COVID-19 第６波、７波および役場担当者の交代などを背景に、当初予定していた中山間部での同意取得が難航し、２か所の候補地いずれからも協力辞退があり、実現しなかった。一方で、太平洋沿岸部に位置する地区については、先方から協力の連絡があり、令和４年に住民を対象とした調査が実施できた。

外国人調査については、プロジェクト期間を通して情報収集に努め、各学部プロジェクトメンバーからの専門的情報提供をもとに検討を続けた。最終的に、市内の外国人が集まる飲食店での調査可能性を数か月にわたって検討したが、プロジェクト終了までに責任者への説明機会が得られず、実施を断念した。

本研究プロジェクトの取組みによる成果は以下の通り。

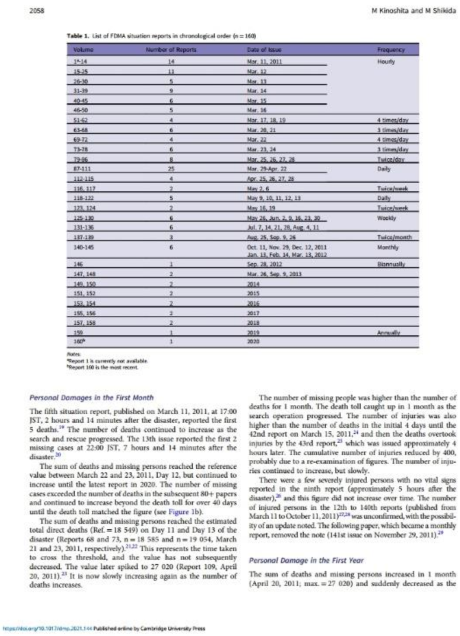
- SDGs の基本理念「誰も取りのこさない」を災害救援において実現するために、災害時にすべての被災者の安否、健康状態情報収集する仕組みの有用性および今後の課題があきらかになったこと。
- 地域特性による災害に対する備えや新しい技術に対する人々の受入れの違いに関する知見。
- 研究成果の学際的、国際的な発信。
- 良好な学部間協力が実現し、学際的連携の実績となったこと。

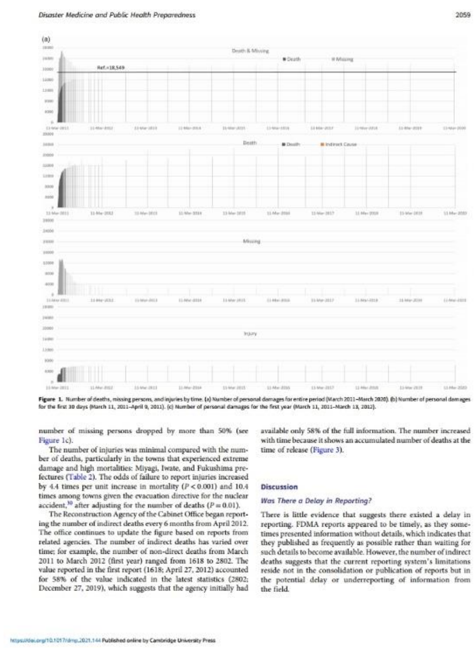
成　果　物　等

【論文発表（査読あり）】

・**<u>M Kinoshita</u>**, M Shikida. (2022) Measuring Personal Damage in a Large-Scale Disaster: A Review of the Reports Published by the Japanese Fire and Disaster Management Agency on the Great East Japan Earthquake and Tsunami. Disaster Med Public Health Prep 16: 2056-2064. doi: https://doi.org/10.1017/dmp.2021.144


Measuring Personal Damage in a Large-Scale Disaster: A Review of the Reports Published by the Japanese Fire and Disaster Management Agency on the Great East Japan Earthquake and Tsunami





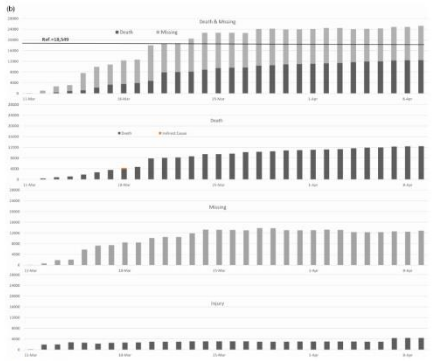


Figure 1b. (Continued)

When Was the Earliest Possible Timing for Estimating the Scale of Personal Damages?

The sum of deaths and missing persons reached the estimated total direct casualties (Ref.) only on Day 11 (Report 67 or 68, n = 18531 or n = 18585, March 21, 2011). However, it was technically impossible to predict the scale of personal damage because the value continued to increase far beyond the threshold. The second possible opportunity to predict total direct casualties was at approximately Days 300–400, when the number of missing persons became stable and before indirect deaths started to increase.

Under the assumption that there were no other causes of death other than the disaster, the number of missing persons reduced as the number of deaths increased (the number of discoveries of human remains). However, while the number of discovered deaths increased, the number of missing persons did not decrease at the same rate. Although there were thousands of aftershocks, including 11 earthquakes over M7.0 on the Richter scale,[18] there were few casualties. Therefore, it is likely that there was another factor underlying the increased number of deaths, and disaster-related indirect deaths are likely responsible. The disaster-related indirect deaths of survivors appeared to have caused a prolonged increase in mortality and made personal damage prediction more difficult.

Lack of Information

To reduce the number of indirect deaths and effectively use health professionals' efforts, it is necessary to know the health status of persons affected by a disaster. According to the reconstruction agency, among the 1263 disaster-related deaths observed in the first year of the disaster, 1223 (96.8%) appeared to be caused by physical or mental fatigue or stress.[12] Although little is known about the factors that cause indirect deaths, data on the affected population's mental health conditions, for example, will be necessary as some indirect deaths were suicide cases. However, information on the affected population's mental health status is usually unavailable, as the current system does not collect this information routinely. If one could assess the general health status of the affected population, some of these deaths could have been prevented.

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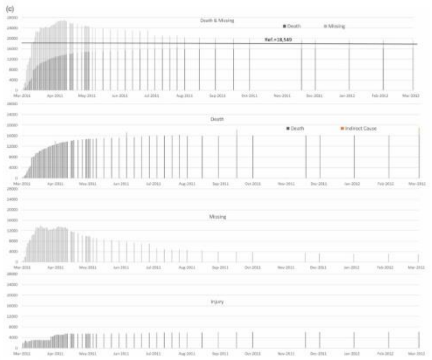

Figure 1c. (Continued)

Likewise, the current public system collects limited information on most people's health status, as injury is not a required field when applying for public financial aid for disaster victims under the Basic Act for Disaster Management. The Japanese culture also prevents people from complaining about their health conditions, as many Japanese people share social values of patience, keeping silent, and sacrificing themselves to save others. Therefore, collecting health information is proposed for all affected populations, including those undocumented persons who do not make health-related claims, and who are therefore considered in good health by default.

Are Data Reliable?

Overestimation of Missing Persons

An excess of missing persons for 1 month after the disaster was detected. There are 2 primary reasons: (1) Persons were dead but they had not been confirmed, or (2) persons were alive, but they failed to contact family due to confusion. Both reasons were likely responsible for the early spike in the number of missing persons. According to the NPA statistics, the body identification rate was low (42.3% of 1988 bodies in the first 3 days).[31] Their intensive efforts improved capacity in 1 month (83.6% of 13 051 dead bodies), but it required months to achieve identification of over 93% of bodies. Miscommunication is more likely responsible for the first increase in missing persons because it significantly decreased after 1 month. A joint operation among agencies for verification found a large number of double counts. Additionally, the closure of some shelters and the opening of temporary housing started, which increased the chances of reuniting separated families.

Underestimation of Injuries

The number of reported injuries was much smaller than the number of deaths. A possible explanation for the reduced number of injured persons is either high fatality rates or underreporting of injuries. The impact of earthquakes and tsunamis was extreme, and few people were able to survive. Further, some of the affected towns failed to report injuries, particularly among severely affected cities with higher mortalities or cities around the nuclear power plant where a large-scale evacuation was necessary. Some information suggested a failure to record and report injuries due to the severity of the chaos or damage. Although some who required health care were among the undocumented population, reporting injuries has no standardized format and is not a required field under the Basic Act on Disaster Management.[8] Therefore, underestimation is more likely to cause a reduced number of reported injuries, although a definite conclusion cannot be reached in this regard. Further study is necessary to verify the causes of the reduced number of reports.

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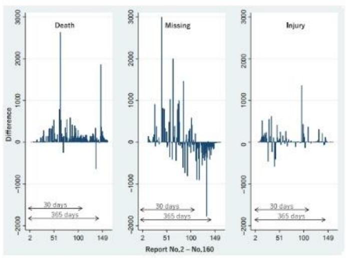

Figure 2. Differences in the number of deaths, missing persons, and injuries from the previous report.

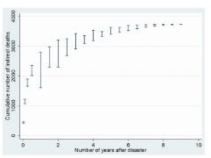

Figure 3. The range of reported numbers of indirect deaths (max–min).

What is the Next Step?

To enable early estimation of total casualties in disasters, it is necessary to know the excess number of missing persons and indirect deaths that cause inflation of casualty estimates.

The University of Kochi's team, in collaboration with the Kochi University of Technology, proposed a novel health assessment system (Figure 4) named *Community Oriented Approaches for Comprehensive Healthcare in Emergency Situations (COACHES).* It collects individual health data anonymously and records such data in a cloud-based database. The system runs on any personal mobile device (iPhone, iPad, Android) by scanning a personal identification code (QR code), distributed to every person in the area at multiple posts during a disaster. The code is the only item used to identify an individual. The system does not require any prior training or application downloads, as this system's intended use will be in unpredictable emergencies.

It is expected that residents with qualifications in health care, such as nurses, will run this system as volunteers, with the idea that they are ready to work during an evacuation. They do not need extra training because they have the necessary professional skills and knowledge and local knowledge (such as where the people live, names of places, or local languages) to minimize the lag in the wait for external relief. The idea is that someone first checks their family's health status then proceeds to their neighbors and produces as many records as possible. If the assessments and data collection occur in multiple places, the system will eventually cover the entire affected population. By standardizing each volunteer's assessment, the cloud-based database will provide helpful comprehensive information. External relief persons can take over the task as soon as they arrive so that local volunteers can return to their homes and families for reconstruction.

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Table 2. Towns that failed to report the number of injuries and numbers of actual deaths and missing persons in those towns (as of March 2020)

Prefecture	Town	Deaths	Missing
Iwate	Rikuzentakata	1606	202
	Kama Ishi	994	152
	Otsuchi	856	417
	Yamada	687	145
Miyagi	Ishinomaki	3552	420
	Kesennuma	1218	214
	Tagajo	219	0
	Yamamoto	701	17
	Shichigahama	79	2
	Onagawa	615	257
	Minamisanriku	620	211
Fukushima	Tomioka*	467	6
	Okuma*	140	0
	Futaba*	170	4
	Namie*	591	31
	Hirono*	48	1

Note: *Towns within 50-km range of the Fukushima-1 Daiichi Nuclear Power Plant.

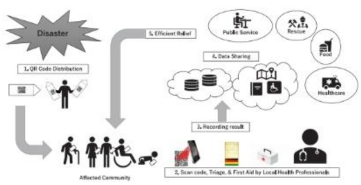

Figure 4. Flow of community oriented approaches for comprehensive health care in emergency settings (COACHES).

The data recorded in the cloud database would be shared among relief workers, health workers, and government officials to improve the efficacy, quality, and coverage of relief activities. The system requires a strict verification process to connect its database with any personal information other than a unique QR code for individuals. The details of the system will be discussed in future correspondence.

Conclusion

The study's findings depict how challenging it is to collect reliable public health data in times of disaster. A significant delay in reporting was not reported, but there was an overestimation of missing persons and possible underreporting of injuries. These findings explain the limitations of existing approaches to health assessment in extreme emergencies. Therefore, early and continuous evaluation of the whole affected population's health conditions is necessary to reduce preventable deaths from disaster-related factors. Then, comprehensive approaches that enable reliable health assessment and provision of records of the entire community in emergencies are proposed, such as COACHES, to achieve the concept of UNSDGs, "Leaving no one behind."

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/dmp.2021.144

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【講演】

・木下真里. (2022) 災害時にすべての被災者の安否と健康状態を把握し共有する仕組みCOACHES（コーチーズ）の提案. 土佐まるごとビジネスアカデミー(MBA)専科「シーズ・研究内容紹介」第１回. オンライン講座.

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【出版物】

Kinoshita Mari. (2023) Research for Community Oriented Approach for Comprehensive Healthcare in Emergency Situations (COACHES). Impact, Vol. 2023, Number 2, April 2023. p.09-11(3)

Impact Objectives

- Investigate healthcare risks in complex humanitarian emergencies
- Develop a Community Oriented Approach for Comprehensive Healthcare in Emergency Situations (COACHES) to detect the healthcare needs among disaster-affected populations

Real-time data help disaster response

*Disaster relief expert **Professor Mari Kinoshita** outlines her work as part of a team determining the specific healthcare needs of communities affected by natural disasters*

You have been working in disaster relief for many years. How did you become inspired to research this field?

Before I began working at the University of Kochi in 2019, I developed extensive experience working in the area of international public health with government organisations, Non-Governmental Organisations and an UN agency (UNHCR). Throughout this part of my career, I spent a significant amount of time and energy working on disaster relief and emergency relief activities. When I moved into my current position, it was the beginning of an attempt to pass on a legacy of my work to the next generation by codifying the lessons I have learned from my time in the field.

Generally, what type of research are you carrying out at the University of Kochi?

I am involved in a mixture of different research, including cross-sectional field studies that are mostly targeting people in the community. Usually, I start with qualitative research followed by a questionnaire survey. Action research is ongoing to develop a system to detect the healthcare needs among disaster-affected populations, while my cross-sectional research activities are designed to detect healthcare risks in complex humanitarian emergencies.

From your perspective, what is the ultimate impact of your studies?

Ultimately, relief work during disasters will become more effective and efficient as a result of our work. This benefits all parties for obvious reasons, but the disaster-affected population as a whole will be the major beneficiaries.

Can you talk about some of the challenges you had to address through this research?

Finding a local partner agency for applying collaborative research funds has been the biggest challenge - we missed several funding opportunities due to being unable to find local business partners. Some companies have shown interest in the projects, but very few of them participated in the bidding. In relation to the COVID-19 pandemic, the demand for communication services is increasing and the IT business is booming. However, the local private company involved lacks the human resources necessary for this project.

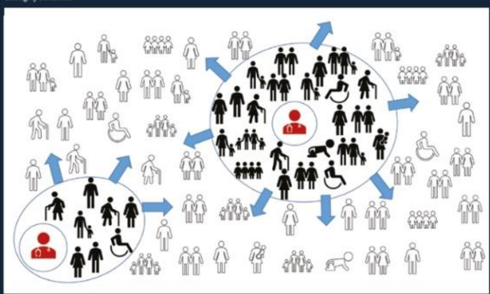
What type of reactions have you had to your research from the community?

We had two different types of reactions from the communities and the local governments. Enthusiastic and supportive reactions full of suggestions are from individual government officers and residents in the coastal area where large-scale disaster damage is warned by the government. Mild and conservative reactions tend to be from the residents in the inland communities, where the risk of disaster is not high or localised. A similar reaction is observed in an official comment from the local government agencies, regardless of the location.

Finally, what are your plans for the next stages of this research?

The main priority is expanding the collaborations we are engaged with. More specifically, we want to work with private sectors for technical solutions, local governments for field testing and community involvement, and research partners in different academic fields to facilitate a multidisciplinary approach. In a few years, we will develop a practical model and proceed with field testing in real disaster situations. At this point we hope to make a real difference to the lives of people and communities affected by disasters. ▸

Coverage of COACHES



Helping Japanese communities affected by natural disasters

*A team based at the **University of Kochi** in Japan is conducting research that seeks to develop a Community Oriented Approach for Comprehensive Healthcare in Emergency Situations (COACHES). The findings will help to provide more efficient and optimised relief to those affected by emergencies and disasters*

Japan has a high prevalence of natural disasters. There are several reasons why this is so, including the weather resulting from Japan belonging to the Asian monsoon climate region; its terrain - with some 70 per cent of Japan's land mass being covered by mountains or hills; and urban development - where because of population growth and urbanisation, the non-mountainous areas in Japan are often expanded through reclaiming coastal areas. However, the location of Japan is arguably the most important reason why natural disasters occur so often when compared to other countries and regions around the world. Given all of this, it is essential that local and national governments, as well as other organisations, develop effective means of handling the impacts of disasters and the emergencies that are a direct result from these.

THE WHOLE PICTURE

It is with this in mind that a research team with faculty members from different fields at two universities has embarked on its current studies. The team is led by Professor Mari Kinoshita, who has helped to propose a system known as the Community Oriented Approach for Comprehensive Healthcare in Emergency Situations (COACHES). It is hoped that through research and development, COACHES will be implemented across Japan and lead to more effective and efficient responses to the effects of disasters and emergencies.

Kinoshita describes how currently neither public agencies nor relief workers start organising emergency relief with real-time and reliable information about the disaster-affected population. She says they usually count on an estimation based on data collected in the past or unreliable information reported by non-professionals through a variety of sources, and they do not attempt to fully enumerate the affected population as they do not have proper measures available. 'There are attempts to collect information by self-reporting systems, but they may fail some of the urgent needs because some are ignorant of their conditions, or some are uncomfortable reporting their conditions too urgently,' explains Kinoshita. 'As a consequence, relief efforts give priority to larger, visible and the closest populations.' The COACHES project is designed to detect hidden or missed data and provide a whole picture of the situation to be able to provide more optimised relief.

DATA WITHOUT COMPROMISING PRIVACY

Put simply, COACHES works by providing information to relief personnel that is vital in an emergency situation. Importantly, it provides data on where the affected people are located, but also how they are doing at the present time. This enables the rescue and relief teams to determine a list of priorities in terms of who requires attention urgently and those who might be able to wait a little longer. 'The system records everyone's data so that it can be viewed later and analysed; this facilitates a process of continuous improvement, where responses can be fine-tuned and made better for the next incident,' observes Kinoshita. The system directly collects data from all affected individuals on an anonymous basis.

> *This anonymous system reduces the time and risks of data collection, thereby providing peace of mind to individuals and encouraging them to use the system*

During a disaster, data-collecting volunteers check the health conditions of those around them, including themselves, their families, neighbours and anyone they meet on the way to the evacuation shelter. This information is then recorded on an exclusive database using a web-based application which is then shared among public and private agencies and rescue organisations to check the real-time situation. 'For the protection of privacy, the COACHES system does not collect personal identity, but instead, an individual is identified by scanning the personal identification codes with the data collector's mobile devices,' highlights Kinoshita. 'The QR codes will be distributed by local authorities with the help of community volunteers to every individual in a disaster-affected area. This anonymous system reduces the time and risks of data collection, thereby providing peace of mind to individuals and encouraging them to use the system,' she says.

TOGETHER EVERYONE ACHIEVES MORE

As it stands, the system is currently still in the planning phase and therefore cannot yet be tested in a real-life situation. However, the research has shown a huge amount of promise so far and once it has been fully developed it will provide a much-needed solution. There are some technical challenges that need to be overcome to make the system feasible and cost-effective, specifically damage to communication infrastructure and power supply disruption. 'The power supply can be manageable by batteries and generators, but for the communication networks, we need collaboration with partners that are capable of providing communication technologies during disasters and emergency situations,' outlines Kinoshita. 'Another challenge is how to find volunteers in the disaster-affected community in an early phase of an emergency, especially given that the system heavily relies on volunteers. The essential part of the system does not run and cover the whole area without volunteers for the distribution of personal ID (QR) codes and data collection,' she comments.

Despite these challenges, Kinoshita and the team are confident that with the help of members of society and various collaborative efforts they will soon be able to overcome the present hurdles and deploy a system that helps individuals and communities who are affected by disasters. Indeed, they believe that the public sector needs to be involved from an early stage because they will play a leading role in introducing the system to their respective communities. It will only be through using the system that people gain confidence in it, so success is expected to snowball in the future. ●

Sample front page of COACHES App. (iPhone)

Project Insights

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COLLABORATORS
- Kochi University of Technology
- Nakatosa Town, Kochi, Japan
- ELP Co., Ltd.
- Fujitsu

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Mari Kinoshita is a professor of disaster and international nursing. She advances programmes and research that improves quality of care in complex emergencies and relief of affected populations in the community. Kinoshita's research interests include rapid health assessment, healthcare risks in disasters, refugee healthcare and community level infectious disease care.

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ELP


COACHES活用案
抗アレルギー食や医薬品、
消耗品などの要望
かぜ薬
MILK
COACHESを使って
クラウドに記録
COACHES
災害拠点薬局などに協力依頼
被災地外で情報を把握
物資をドローンで運ぶ
QRコードで
本人確認し、
物資を受取


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