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Contributions to the Local Community Through the University

Edited by Shinichiro Maeshima

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Meet the editor

Shinichiro Maeshima, MD, Ph.D., is a physiatrist who graduated from Fujita Health University, Japan, in 1986 and completed his graduate studies in 1992. He worked as an assistant professor at the Department of Neurological Surgery, Wakayama Medical University, Japan, and then studied at the Department of Rehabilitation Medicine, University of Washington (1996) and the Royal Rehabilitation Centre Sydney (1996–1997). After returning to Japan, he served as a professor at several Japanese universities, including Kawasaki University of Medical and Welfare (2004–2007), Saitama Medical University International Medical Center (2007–2013), and Fujita Health University School of Medicine (2013–2018). He is currently the president of Kinjo University (2018–). Dr. Maeshima works on stroke rehabilitation and prevention of frailty and dementia. He has published numerous papers in peer-reviewed journals.

Contents

Preface

Universities have two roles: education and research. In other words, as an educational institution, a university develops human resources with advanced expertise, and as a research institution, it promotes the investigation of issues in researchers' specialized fields. In addition to these functions, the role of universities has recently expanded to include contributing to the local community. A social contribution made by a university should not merely be free labor or the lending of facilities but should make full use of its characteristics as a center of knowledge. Universities should engage in social contributions by returning the knowledge acquired through their educational and research activities to the local community through related activities such as joint research and technology transfer as part of industry-academia-government cooperation, and improving the lives and welfare of local residents, leading to vitality and the formation of a prosperous society. This is a social contribution that universities should make. In this book, we introduce the contribution activities that our university has carried out in connection with the community for more than 20 years since its establishment.

Section 1 includes one chapter that describes the history and roles of universities in foreign countries and Japan, especially the need to contribute to the community.

Section 2 introduces the seven projects that our university is implementing to contribute to the community, collectively called the Kinjo Dream Project (KDP). The community health and longevity project described in Chapter 2 (Hiko K., et al.) began in April 2017 with a survey of people who have achieved healthy longevity with the aim of preventing people from becoming bedridden and improving the health of local residents. In this chapter the authors use qualitative and quantitative data to analyze the current status of those who have achieved healthy longevity, aged 90 years and older, living in Nonoichi City. The goal of the "Yuu-yuu Health Circle" described in Chapter 3 (Kamiya A., et al) is to interact with residents of the community through its activities and to expand its knowledge and information. In addition, the government and the university will work together to develop and introduce an effective health promotion system that actively supports the physical and mental health of each resident. Students can learn how to use greetings and language appropriate to a given situation, how to present themselves as medical professionals, and how to respond to residents with sincerity. The "Yugaku Hiroba" program for creating vitality for local older adults described in Chapter 4 (Ito Y., et al.) is an intergenerational communication program established between local older adults and university students that began in 2006. It consists of two programs. The first invites older adults to campus to participate in an activities program (creative activities, gardening, games, etc.). The second is an off-campus program for the prevention of long-term health problems. In the future, students who will work in nursing or social work will often have opportunities to plan and implement such activity programs. This program also provides students with a great opportunity to communicate with older adults. The Keep the Brain Young Club, "Brain Wakawaka Club," described in Chapter 5 (Kouno M., et al.)

is important for preventing dementia at the community level. The faculty members of this project travel to each local community with students of the Faculty of Health Sciences to check older adults' cognitive function and to conduct cognitive function maintenance exercises. It is expected that this activity will continue to contribute to the prevention of dementia among the aging population in the community. The health class and consultation project described in Chapter 6 (Maitani K., et al.) that our university's School of Nursing has been implementing as part of community collaboration since 2017 aims to help older adults living in the Hakusan foothill area maintain a healthy lifestyle. First, we opened the "Mountain Infirmary" for those who could participate in the community salon and conducted a health survey of older adults in the foothill area. Next, we provided education and exercise guidance to help this population maintain a healthy lifestyle. The foot health education project described in Chapter 7 (Kojima S., et al.) is a community collaboration project that works closely with kindergartens, nursery schools, elementary schools, junior high schools, and high schools, mainly in Hakusan City, to investigate the feet of infants, school children, and students, and to improve the health of their feet through changes over time. This project was launched in 2014 and is a collaborative venture between the faculty and students at the university and industrial institutions. The "Club Activity Support Project" described in Chapter 8 (Nagai S. and others) is a project to support the club activities of junior high and high school students in the prefecture since 2016. This project provides support for students to improve their athletic performance and prevent injuries from occurring and recurring in club activities by utilizing the knowledge and skills of our university's Faculty of Health Sciences.

In addition to these projects, the book presents in Section 3, Chapter 9 a special report on the preventive strategies carried out by our staff at the medical university against the outbreak of the coronavirus infection over the past two years (Maeshima S., et al.). This report mentions the need to prevent infections from various angles so that we can maintain maximum student activity and provide a safe learning environment at all times. Chapter 10 presents another report, which covers the comprehensive agreement with the community at our university (Kibayashi T., et al.). Universities are centers of intellectual activity in society and places for the training of human resources with advanced expertise. For administrators and corporations, universities are also a valuable resource for the vitalization and promotion of local communities, industries, and so on. For this purpose, multifaceted cooperation and collaboration with universities are necessary. The major objectives of these agreements are to develop the local community by solving regional issues and developing human resources.

This book is a compilation of the various activities that have been practiced by health and welfare universities to contribute to the community in current times. It is a useful resource for university faculty members considering community contribution.

Shinichiro Maeshima
President,
Kinjo University,
Hakusan, Japan

Section 1

The History of Universities and Their Contributions to Society

Chapter 1

Perspective Chapter: Contribution to the Local Community at the University

Shinichiro Maeshima

Abstract

In 2020, Japan had nearly three million students enrolled in 795 universities, representing 54.4% of the student population—the highest in the nation's history. However, the number of private universities has grown dramatically, while the population of 18-year-olds has dropped due to Japan's declining birthrate; as a result, one-third of private universities are now under-enrolled, making it difficult for many of them to operate. Universities have a long and storied history, and their function and mission have changed over time. Amid competing visions for what a university's primary focus should be, the roles universities are expected to play are also changing. To meet the demands of local communities and society, as well as the diverse needs of students, universities should provide an education that draws on students' individuality. Recently, universities' contributions to the development of society have started being emphasized; together with research and education, social contribution needs to be perceived as the so-called third mission of the university, and analysts are calling for more industry-academia-government collaborations. This chapter focuses on universities' social contribution, and describes the connection between local communities and the social contribution activities that universities have carried out for the past 20 years.

Keywords: local community, university, project

1. Introduction

1.1 What is a university and its historical background?

Universities are the core educational institutions of higher education. They convey a wide range of knowledge as a center of academia; teach and research specialized arts and sciences; and develop intellectual, moral, and applied skills (the School Education Act) [1].

Modern universities had their origins in medieval Europe. The oldest university in Europe is said to be the University of Bologna [2] in Italy, which began when a guild of law students organized a "*universitas magistrorum et scholarium*," roughly meaning "community of teachers and scholars," as an autonomous organization in 1088. In 1150, the University of Paris was founded, which originated from a group of teachers

(*collegium*) who had been running private schools. In both cases, they were organizations created when people with the common purpose of learning gathered to protect their positions and interests [3]. The University of Bologna was a student guild specializing in law, while the University of Paris was a teacher's guild that seemed to have had a high reputation for theology.

On the other hand, in Japan, the University of Tokyo was founded in 1877 as the merger and reorganization of Tokyo Kaisei Gakko and Tokyo Medical School [4]. There was no autonomy as in medieval European universities, and it was a powerful state-led bureaucracy training institution. However, in Japan, a bureaucratic training organization called "Daigaku-ryo" had already been established more than a thousand years earlier (670) during the reign of Emperor Tenchi—it was created by the government to learn about the systems and cultures of China and to create an organization as a nation, and it differs greatly from the university organizations in Europe created by the teachers and students themselves [3].

The number of universities doubled from 389 schools (75 national schools, 33 public schools, and 281 private schools) 50 years ago (1971) to 795 schools (86 national schools, 94 public schools, and 615 private schools) as of 2020 (**Figure 1**), and the number of students also increased, from 1,469,000 to 2,916,000 in 2020. This was greatly influenced by an increase in the population of 18-year-olds. The population peaked in 1966, when the postwar "baby boomer" generation reached the age of 18, at 2.49 million. By 1992, when the generation of their children reached the age of 18, the total stayed fairly steady at 2.05 million. In addition to promoting decentralization, the government announced the deregulation of university establishment standards [5]—that is, the government's policy of restraining the increase in the capacity of universities and faculties was abolished. As a result, private universities increased from 378 private schools in 1991 to 615 private schools in 2020. The percentage of students advancing to universities has improved dramatically, and the percentage of students advancing to a four-year university reached a record high of 54.4% in 2020, compared with 25.5% in 1991 (**Figure 1**).

Meanwhile, the population of Japan began to decline after peaking in 2008 (128 million people). Due to the declining birthrate, the population of 18-year-olds has

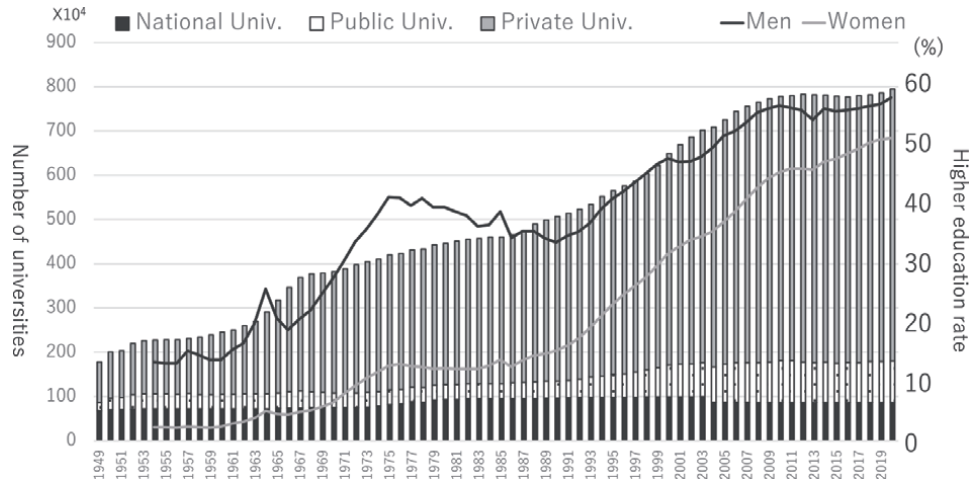

Figure 1.
Number of universities and higher education rate in Japan.

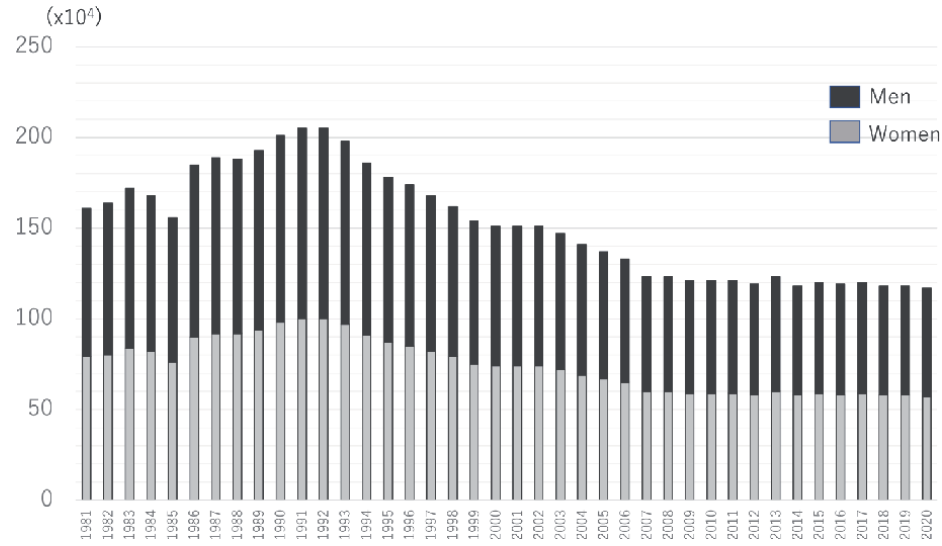

Figure 2.
18-year-old population in Japan.

continued to decline; it is currently at 1,167,000 (**Figure 2**). Because of this, and because of the increase in the number of universities due to deregulation, one-third of private universities are under-enrolled [6]. The decline in the quality of university education due to insufficient academic ability and the shortage of students make it difficult for universities to operate. To meet the demands of local communities and society, as well as the diverse needs of students, there should not only be a limited number of universities but many universities should provide education that draws on students' individuality and attributes, so that a wide variety of educational approaches could be provided in Japan as a whole [7]. For universities to remain seats of learning, teachers and staff should work together to consider their roles, while the administration stabilizes the business foundation.

2. The role of universities: from education and research to contributing to local communities

Modern universities began with the idea envisioned by Wilhelm von Humboldt (1767–1835), the founder of the University of Berlin. He defined universities as institutions that integrate education and research, and emphasized not only lectures but also seminars and practicums, and laboratories of different sorts. That is, he thought that scholarship was something always being produced anew, created by both the professor and the student [3]. This educational philosophy is based in the humanities, and it rejects the idea that vocational education takes precedence over general cultural education. Karl Theodor Jaspers (1883–1969) also described the mission of universities as "the search for truth in a community of researchers and students" [8]. Here as well, research is a basic requirement for universities, and although it is impossible to separate research and teaching, research is regarded as the most important element. In contrast, José Ortega y Gasset (1883–1955) developed a theory of university reform in his book *Mission of the University*, written in 1930, and

stated that it was the fundamental mission of the university to teach the liberal arts (*Kulturdisziplinen*) and conduct university education by categorizing both specialized vocational education and scientific research [9]. Jaspers believed that the target audience should be a small number of the best students, while Ortega stated that a university education should begin with average students [3]. How a university education should be conducted remains a universal problem. Knowledge and information are important, as professionals respond to the rapid changes and demands of society, and liberal arts and vocational education cannot be conducted by separating the two. On the other hand, the roles universities are expected to play are also changing. Recently, universities' contributions to the development of society as a whole—local communities, economic societies, and international societies—have started being emphasized [10]. Education and research certainly provide social contributions from a long-term perspective. However, more direct contributions through public lectures and industry-academia-government collaborations are being sought. Perhaps we are in a time where such social contributions need to be perceived as the so-called third mission of the university.

3. Our universities and the Kinjo dream project

Kinjo-Yugakkan, which became the basis for Kinjo University, was established in 1904. At that time, there was no school in Ishikawa Prefecture where girls who graduated from higher elementary school could advance to higher education, and to improve girls' education, Kokichi Kato, a teacher at the prefectural normal school, founded the school with his own money [11]. The educational philosophy of the school was "leading by example," and "frugality and diligence." "Leading by example" means doing things before others do, to become a model for such actions, while "frugality and diligence" refer to working and studying hard without extravagances. When it started as a private school, Kinjo-Yugakkan had 29 students, including eight boys. In 1908, a school building was established in Honda-machi, and in 1924, the school was approved as a five-year high school for girls. Furthermore, Kinjo Junior College was founded in 1976. In 1996, the Kinjo Women's Senior High School was renamed Yugakkan High School and became co-ed.

Kinjo University opened in 2000, and the Faculty of Social Work's Department of Social Work was established. In 2007, the Department of Physical Therapy was established in the Faculty of Health Services, and in 2013, the Department of Occupational Therapy was added. In addition, in 2015, the Department of Nursing was established in the Faculty of Nursing, and the Graduate School of Rehabilitation was created; with these, Kinjo has become a university specializing in medical and welfare. There are five departments in three faculties, and there are about 1200 students aiming to become medical welfare and childcare/early childcare education professionals. Physical therapists, occupational therapists, nurses, social workers, and care workers are not licensed unless they have taken and passed the national examination. For this reason, medical and welfare universities must provide vocational and professional education also in addition to a liberal arts education and community contributions, which are considered to be the essence of universities.

In reality, since the establishment of our university, many faculty members and students have made social contributions by becoming involved with the community with undergraduate and seminar units. These activities have been useful for regional revitalization and student education, but have rarely led to teachers' research

activities. Therefore, these activities were made into a university-wide initiative, promoting teachers' research activity. In this era, universities also require "brand power." The Kinjo Dream Project (KDP) is aimed at developing a system for the promotion of both research and branding by restructuring some established regional collaboration projects while contributing to the community in a more developed manner.

This book therefore focuses on social contribution—one of the proposed roles for universities—and describes the connection between local communities and the social contribution activities that have been carried out over the past 20 years until the establishment of KDP.

Conflict of interest

The authors have no conflict of interests.

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Section 2

What Is the Kinjo Dream Project?

Chapter 2

Community Health and Longevity Project

Kiyomi Hiko, Katsue Tanaka, Masayo Kume, Masahiro Noguchi, Tomoko Kawaguchi, Tomoko Okabe, Keisuke Machino and Shizuo Hanya

Abstract

This project began in April 2017 with a survey of people who have achieved healthy longevity with the aim of preventing people from becoming bedridden and improving the health of local residents. The purpose of this survey was to contribute to the achievement of healthy longevity among older adults. We analyzed the current status of those who had achieved healthy longevity, aged 90 and over, living in Nonoichi City from qualitative and quantitative data. As a result, we have gradually been able to better understand the factors related to the achievement of healthy longevity, including (1) lifestyle history, (2) the assessment of cognitive functions, (3) frailty status, and (4) daily living functions. These results were published at several conferences in 2018 and 2019. Furthermore, we prepared a leaflet containing "four suggestions for living a long and healthy life," which uses the results of previous surveys as evidence and promotes health promotion and care prevention activities for local community residents.

Keywords: oldest old(90+), community health, health promotion

1. Introduction

According to World Health Organization (hereafter, called WHO), Japan has the highest life expectancy in the world in 2019 and the average life expectancy (84.3 years old) in Japan increased up by 5 years in the past 20 years. Healthy life expectancy (hereafter called, HALE) is a new index of life span WHO proposed. It is the period excluding "period of long-term care need such as bedridden state or dementia" from "average life expectancy." Because the average life expectancy relates to HALE, usually counties, which have high rates of the average life expectancy, have high rates of HALE, too. However, differences between HALE and the average life expectancy in Japan were still more than 10 years despite that HALE increased up to 74.1 years [1].

In Japan, a social insurance program as a system supporting the elderly in need of nursing care and their family by the entire society started since 2000. According to

"Report on insured long-term care service business (2018)" in Ministry of Health, Labour and Welfare, certification rates of needed support and long-term care in young-old were about 10%, but the rates in old-old were over 30% [2]. In the past 20 years, total cost of care insurance has been increasing every year [3]. It should be said that it is really difficult to continue this system as is. Therefore, it is necessary to establish the system that can function for additional extension of HALE in addition to the average life expectancy in the region and to restrain care costs. Japanese government sets "extension of HALE exceeding the average life expectancy as one of the growth strategy and aims for 3 years over extension of HALE by 2040." Fortunately, the elderly over 100 years old(centenarians) are increasing rapidly in our country, Japan, and the number of them went up from 153 people in 1973 to over 80,000 in 2020 [4]. Until 90 years old, they are not only long-lived but also active, and their degree of independence is high in daily life. Therefore, they can be a model of healthy longevity.

In surveys aiming at the elderly in various districts, the percentage of the centenarians living an independent life ranges from about 15 to 40% [4–6]. About 97% of the centenarians had some intractable diseases as physical features, but they had a low prevalence of diabetes [7]. In addition, the analysis from multiple viewpoints was conducted such as relating a low of inflammatory maker to a high of cognitive functions and activities of daily living [8], the relationship among chewing power and walking speed, cognitive functions [9–11]. As for lifestyles, 70% of them consciously ate three meals a day with regularity since middle age. On the other hand, as for a fitness habit around 70 to 80 years old, the rate of doing it almost every day and the one of doing it rarely were 40% each [8]. Therefore, the association between the fitness habit and HALE was not cleared. In the mental side, a subjective sense of happiness was not decreased and even their physical functions were not declined [12]. Because objectively oldest-old adjusted psychologically to difficult situations by seeking an existential meaning and value [13], it can be said that they had a power to feel a sense of happiness and a flexible ability to respond toward various changes. Besides, having hobbies and taking part in recreational activities related to mental stability: living the independent life and maintenance of cognitive functions [4, 6, 14]. Hence, it is important to have circumstances they can be active for healthy longevity.

The factor of community level, "circumstances" such as economy and society, had a great impact on health [15]. It can be said that whether or not the area has strong social capital is the important factor. In this project, the authors wanted to clarify the capital in preparation for healthy longevity based on regional characteristics. Sharing of the capital preparing for health and longevity of local elderly people in collaboration with municipality can be used for making care prevention plans suiting for the area. Incidentally, the number of the centenarians has already reached to 919 of which is over the national average per capita in Ishikawa where population ratio of young people is high now.

2. Objective

The purpose of the project was to investigate main items assuming casual connection with healthy longevity aimed at achievers of health and longevity. As a result, secrets of healthy longevity were analyzed for the elderly living the area, and using them to help accomplishment of the elderly's healthy longevity.

3. Methods

3.1 Survey area: nonoichi city, ishikawa prefecture, japan

Nonoichi City is located in the center of Ishikawa Prefecture and the northeast of the alluvial fun of Tedori river blessed with fertile land and groundwater of good quality. The area of Nonoichi City is 13.56 km^2; the city has many commercial facilities and the excellent traffic network, and it is said that Nonoichi City is easy to live. Historically, Honmachi district the old Hokkoku-Kaido road is passing through was once-flourishing as a post station in Edo era. There currently remain houses as national important cultural properties and buildings with history as cultural properties designated by the city in Honmachi district.

The population of Nonoichi City at the time of the survey (September 2018) was 52,512(male: 26536, female: 25976) in total. The ration of population by three categories of age was follows. The young population (0 to 14 years old) was 19.3%; the productive population (15 to 64) was 64.5%; and the elderly population (over 65) was 19.3%. Because the population around the age of 20 is especially great, hence there are two universities within the city, and Nonomura City has the lowest aging rate in Ishikawa. However, Nonoichi City is expected to be the city where aging will advance rapidly because people immigrating into out-of-town new towns become the elderly at once. In "long-term visions of revitalization of Nonoichi City" [16] made in fiscal 2020, it is estimated that the population of the city will reach its peak in 2040 and be declined slowly afterward. In doing so, it is also estimated that Nonoich City will be super-aging society around 2020 and the productive population will be greatly declined with the elderly population growth.

3.2 Survey framework

This project tried to find factors of the accomplishment of healthy longevity *via* "health surveys by interviews": "examination of frailty and fitness" and "surveys of dementia and activities of daily living: studies of ADL."

The targeted area was Nonoichi City in Ishikawa Prefecture. The subjects of the survey were the elderly over 90 years old who could communicate and live in the independent life. With the introduction from Care and Longevity division in Nonoichi city hall and care managers in the city, we gained their approval of participating the survey.

3.3 Ethical considerations

This project was conducted with the approval of Kinjo university research ethics review board (Informed number 29–14).

4. Interviews health surveys by interviews

4.1 Purpose

As factors about health and longevity, it is said that physical health degree: mental health degree, characters, circumstances, family environments and generic factors, etc., are compositely related. The purpose of this survey was to grasp physical aspects,

personal ones, familial ones, social and environmental ones of the oldest-old and the centenarians, and to find the factors related to healthy longevity.

4.2 Methods

Period: Between May 2017 and September 2018.

Interviews: Visiting the subject's residence (house or nursing facility), the interview was conducted based on hearing from each one subject by two or three researchers (including students) using questionnaires. At the interview, the family, officials in charge in Care and Longevity division and long-term care specialists in charge sat with the subjects as desired. The interview was also done with the family and the specialists if communication with the subjects was difficult. The time of the interview was about 40 to 60 minutes considering burdens of the subjects. In the construction of researchers, one person (teacher) became the interviewer and one or two persons (student) became recorders. The contents of the interviews were recorded with the approval of the subjects before by use of IC recorder.

4.3 Survey items

An inquiring question was "How do achievers living in the independent life live or have their creed about daily lives?" Along this question, semi-structured interview was conducted about four aspects such as 1. physical factors: 2. personal ones: 3. familial ones, and 4. social and environmental ones.

4.4 Specific question items

1. Physical factors: Medical history, current treatment and medication situations, swallowing condition, dental status, the presence or absence of dysphagia, etc.

2. Personal factors: Fitness habits, health behaviors, how to spend a day, sleeping condition, the presence or absence of appetites, the presence or absence of likes and dislikes, excretion condition, character, hobbies, purpose of life and beliefs.

3. Familial factors: Health conditions or age of death of parents and siblings; family structure.

4. Social and environmental factors: Academic background, career, residence, the environment they have been lived, utilizing medical and care services, usage situation of social sources, relationship and social relations, etc.

4.5 Methods of analysis

Descriptive statistic was done by interview items about the features of achievers of healthy longevity. Besides, qualitative and inductive analysis was conducted with creeds related to the life of the achievers. Descriptions such as thoughts, values, and persistence about lives were extracted and encoded from the contents and verbatim reports of the interview. Considering semantic contents by sex, similar codes were collected sub-categorized. After that, sub-categories excluded separately were integrated and categorized.

5. Examination of frailty and fitness

5.1 Purpose

Aging and various diseases cause reduction in skeletal muscle mass and muscle weakness, and brought a decline of the ability to active in daily life and quality of life (QOL). These conditions are defined as sarcopenia and have a great influence on current HALE of Japan. According to previous studies, it is reported morbidity of sarcopenia in the elderly over 65 living in Japan was 11.5% in males and 16.7% in females [17]. However, there are few data about the oldest-old over 90 and the centenarians over 100 in Japan. Sarcopenia precedes frailty showing frail states of the elderly. To extend HALE from the aspects of motor functions, it is vital to prevent sarcopenia and keep good motor functions, and not to make the frail state. Hence, the purpose of this survey was to investigate current situations about frailty and sarcopenia in the oldest-old and the centenarians living in Ishikawa *via* measurement of muscle mass: strength, walking ability that become components of sarcopenia, and survey about current status of sarcopenia.

5.2 Methods

Subjects of this examination were oldest-old over 90 living in Nonoichi City in Ishikawa Prefecture who could be measured about the motor functions in the "health surveys by interviews" antecedently done. In addition, the subjects included the ones who could only take one of the measurement in the "health surveys."

5.3 Survey items

Sarcopenia is defined as reduction in the skeletal muscle mass, muscle weakness, and decreasing gait speed. Therefore, measurement of the skeletal muscle mass and circumference of limbs for the reduction on the muscle, the measurement of grasping power for the muscle weakness, and the measurement of walking speed for decreasing the speed. As for physical frailty, Short Physical Performance Battery (SPPB) was measured.

5.4 Details of measuring items and specific measuring methods

1. Measurement of skeletal muscle mass: Skeletal muscle mass (SMM) is the total amount of skeletal muscle inside the body. Body constituent analyzer, InBody430 (made in InBody Japan Co., Ltd., Tokyo) was used to measure. This was done safely with observing by the tester on their side or on their back.

2. Measurement of circumference of lower limbs: Max abdominal muscle of lower limbs was measured to know the degree of muscle atrophy. Using measuring tapes, the measurement was conducted on the bed or sitting on the chair. Permission of undressing was gained verbally if the exposure of the skin was necessary.

3. Measurement of grasping power: Grasping power was measured in a sitting position by the use of grip dynamometer. Making a team of two persons, one person supported the maintenance of sitting position and another one examined.

The grip dynamometer was Smedley-type hand dynamometer (T.K.K.5401, made in Takei Scientific Instruments Co. Ltd.) using general physical test.

4. Measurement of walking speed: The measurement was conducted for only the subjects who could walk. Whether or not they can walk was judged by interviews or checking with the subjects or their family by physical therapist. The places they walked were corridor in house or nursing facility. They walked a distance of five meters without running.

5. Measurement of Short Physical Performance Battery (SPPB): SPPB is a test battery that tests balance and walking functions, and five-repetition sit-to-stand test compositely. SPPB evaluates physical frailty by total 12 points (four points for each test). The measurement of balance and walking functions, and five-repetition sit-to-stand test were conducted with observation by the helper beside them.

6. Surveys of dementia and activities of daily living: studies of ADL

6.1 Purpose

It is known that cognitive functions of the centenarians relates to the activities of daily living (hereafter, called ADL), physical functions, and social life [18]. To assist accomplishment of HALE, surveys of cognitive functions and ADL were done aimed at the elderly.

6.2 Methods

The subjects of the survey were the elderly who could be subject to the survey based on conditions of communication of "health surveys with interviews." Hearing from the subjects or their family was conducted. Besides, the subjects included the ones who could only take one of the measurement in the "health surveys."

6.3 Details of items of measurement and specific measuring methods

1. Measurement of MMSE (Mini-Mental-State-Examination):

   It is the examination of cognitive functions. The total score is 30 points, and there are 11 items such as orientation: memorial power, calculation ability, linguistic competence, and special perception. If possible, the subjects took a sitting position and answered questions of the researchers (the requiring time of measurement was about 10 minutes).

2. Measurement of NM scale (Nishimura-type mental state scale for the elderly): It is the examination about cognitive functions. Seeing practical mental functions (conditions of dementia) of the elderly and dementia patients in daily life from various viewpoints, NM scale is a behavior rating scale that scores and evaluates the conditions. Using N-ADL (Nishimura's Activities of Daily Life scale for the elderly) concurrently can capture the practical functions comprehensively in the aspects of daily life.

The items are (1) housework and putting affairs, (2) interests and interaction increasing motivation, (3) communication, (4) memorization, and (5) orientation. Each item is 10 points, and the total score is 50 points. In the case of the subject being bedridden state, the score of (3) communication, (4) memorization, and (5) orientation is 30 points in total. The definition of bedridden state is defined as the persons who are under one point in "walking and sitting up in bed" in N-ADL. The interview was done with the subjects and their family about each items (the requiring time to measure was about 7 minutes).

3. Measurement of N-ADL:

   It is the examination about ADL. The items are (1) walking and sitting up in bed: (2) living area, (3) wearing and undressing, (4) feeding, and (5) excretion. Each item is 10 points, and the total score is 50 points. The interview was done with the subjects and their family about each items (requiring time to measure was about 7 minutes).

4. Measurement of BI (Brthel Index, functional assessment):

   It is the examination of ADL. It evaluates ADL on "self-help," "partial assistance," and "total assistance." The items are (1) meals: (2) moving from wheelchair to bed, (3) "bathing," (4) adjusting clothes, (5) bathing, (6) walking, (7) stepping the stairs, (8) changing clothes, (9) control of defecation, and (10) control of urination. There are 10 items in total. The total score is 100 points. The interview was done with the subjects and their family about each items (the requiring time to measure was about 6 minutes).

5. Measurement using cognitive functional balancer Pro, A2101 made in LEDEX Co. Ltd., Tokyo:

   In the case of obtaining the subject's consent for additional research, the examination of cognitive functions was done another day by visiting their house again. In the examination, the cognitive functional balancer Pro was used. It is a device that can evaluate easily with a touch-screen computer. Twelve kinds of tasks such as orientation, visual search, and memorizing cards were done, and five aspects of cognitive functions such as planning ability, memory, attentiveness, orientation, and spatial ability were assessed. If possible, the subjects took a sitting position and answered the questions. If it was difficult to operate by fingers, researchers operated the computer instead of the subjects (the requiring time was about 30 minutes).

7. Results

7.1 Interviews health surveys by interviews

1. Features of achievers of healthy longevity

Attributes of the subjects are shown in **Table 1**. The subjects were 27 elderly people (males were 6, and females were 21). Residents living at home were 19, and the ones of nursing home were 8. As for the degree of care needed, there were two

Sex			
	Men	6	22.2
	Women	21	77.8
Age			
	90–94	12	44.4
	95–99	14	51.9
	100-	1	3.7
Residence			
	Home	19	70.4
	Nursing home	2	7.4
	Group home	2	7.4
	Assisted living residence	2	7.4
	Fee charging old people's home	2	7.4
Care-level			
	Frailty	2	7.4
	Requiring help 2	1	3.7
	Long-term care level 1	7	26.0
	Long-term care level 2	5	18.5
	Long-term care level 3	4	14.8
	No certification	8	29.6
Proportion of users by home care service (multiple answer)			
	Prevention of long-term frailty service	4	14.8
	Senior Day Care Center	11	40.7
	Home-visit long-term care	4	14.8
	Home-visit nursing	2	7.4
	Home-visit rehabilitation	1	3.7
	Not use	7	26.0
Activity of Daily Living(n = 9)			
	Self-support	1	
	J2	1	
	A1	2	
	A2	5	
Hospital visit			
Yes		22	81.5
Causes of hospital visits (multiple answer)			
	Hypertension	13	
	Diabetes	3	
	Herat disease	5	
	Articular disease	9	

Sex			
	Constipation	5	
	Gastrointestinal disease	3	
	Respiratory disease	3	
	Cancer	2	
	Other causes (eye disease, skin disease, etc.)	13	
No		2	7.4
Unknown		3	11.1

Table 1.
Participant characteristics ***n*** *= 27.*

subjects with frailty: one with support care level 2, seven with nursing care level 1, four with nursing care level 2, four with nursing care level 3, and 8 without any problem (a good condition). Although everyone saw a doctor regularly with some diseases, they could do supervised administration by supports, etc. Living conditions of the subjects are shown in **Table 2**. Twenty-five subjects (93%) cleaned their denture and had a good appetite without having likes and dislikes. Everyone went to the washroom themselves and 17 subjects (63%) slept well (**Table 2**). The subject's personal history is shown in **Table 3**. Nine subjects had a very good childhood health condition: 11 subjects had a good one, three subjects had a sort of bad one, and one subject had a bad one. Nineteen subjects (70.4%) had a work experience. Eight subjects (30%) felt a strong fulfillment in the current life; 17 ones (63%) felt a fulfillment, and 24 ones (88%) had a hobby. The characteristics of the achievers of health and longevity from the survey were compiled below:

i. About 70% of the subjects had a good childhood health condition.

ii. 80% of them saw a doctor regularly, but they could supervise administration.

iii. Their denture was cleaned, and their oral condition was good.

iv. They had a good appetite without having likes and dislikes.

v. They could do excretion themselves.

vi. The felt fulfillment in the current life.

2. Creeds related to lives of achievers of health and longevity

Extracting thoughts about lives and descriptions such as values and persistence from collected data, the findings were analyzed qualitative and inductively. The results of the analysis are shown in **Table 4**. As a result, 20 codes and six subcategories were extracted in male groups. About 107 codes and 21 subcategories were extracted in female groups. Next, subcategories extracted from both male and female groups were integrated and analyzed. As a result of the analysis, six categories were extracted. The categories were "living everyday with awareness of health": "acting

Excretion behavior			
	Self-support	26	96.3
	Partial assistance	1	3.7
Sleep conditions			
	Good	17	63.0
	Insufficient	4	14.8
	Unknown	6	22.2
Appetite			
	Good	25	92.6
	No	2	7.4
Likes and dislikes			
	Yes	2	7.4
	No	25	92.6
Denture			
	Yes	23	85.2
	No	3	11.1
	Unknown	1	3.7
Denture conditions			
	Very good	8	29.6
	Good	7	26.0
	Slightly poor	8	29.6
	Poor	0	0.0
	Unknown	4	14.8
Regular check of denture			
	Yes	7	26.0
	No	8	29.6
	Unknown	12	44.4
Dry mouth symptoms			
	Yes	0	0.0
	A little	1	3.7
	No	22	81.5
	Unknown	4	14.8
Difficulty of swallowing			
	Yes	0	0.0
	A little	1	3.7
	No	24	88.9
	Unknown	2	7.4
Choke up(Subjective experience)			
	Yes	0	0.0

Excretion behavior			
	Sometimes	1	3.7
	No	24	88.9
	Unknown	2	7.4

Table 2.
Characteristics of life and oral functions ***n*** *= 27.*

Childhood health status			
	Very good	9	33.3
	Good	11	40.8
	Slightly poor	3	11.1
	Poor	1	3.7
	Unknown	3	11.1
Longevity of parents and siblings			
	Yes	10	37.0
	No	6	22.2
	Unknown	11	40.8
Work experience			
	Yes	19	70.4
	No	7	25.9
	Unknown	1	3.7
A sense of satisfaction in the current life			
	Very strong	8	29.6
	Moderate	17	63.0
	A little weak	2	7.4
	Weak	0	0.0
Hobbies			
	Yes	24	88.9
	No	2	7.4
	Unknown	1	3.7
Zest for life			
	Yes	17	
	Somewhat little	9	
	A little	0	
	Unknown	1	

Table 3.
Social backgrounds ***n*** *= 27.*

aggressively", "caring", "accepting without resistance", "having a positive mind," and "spending peacefully." The categories, "having a positive mind" and "caring" were confirmed in male groups, but they were not recognized in female ones.

Category	Subcategory	Women	Men
Living every day with health in mind	Walking and moving	○	○
	Live with caution so as not to fall	○	
	To cherish that eat	○	
	Use one's head	○	○
	Act with health in mind	○	
Act positively	To challenge	○	○
	Do what I want to do	○	
	Engage with people	○	○
Live in peace	Live at will	○	
	Live calmly and leisurely	○	
	Live with gratitude	○	
	Live properly	○	○
	Avoid accumulating stress	○	
Have a positive feeling	Have a goal	○	
	Feel happy	○	
	Feel glad	○	
Accept without resisting	Do not worry	○	○
	Accept the status quo	○	
Be caring	Do not bother people	○	
	To respect the opponent	○	
	Spend without saying anything extra	○	

Table 4.
Creeds about life: Comparison of men and women.

Six categories were extracted as creed about the life of the achievers, of which "having a positive mind" and "caring" confirmed in only female groups could be construed as things-related characteristics. This resembled the report [19] that there was a difference between male and female in features of the character of the centenarians. To achieve healthy longevity, things keeping in mind to live were different in men and women and at the time, it is considered that the concepts found out from this project become helpful.

7.2 Examination of frailty and fitness

The characteristics of the subjects are shown in **Table 5**. The subjects were 21 people (five men and 16 women). There was no obese person, and BMI was average about 21 in both men and women. The skeletal muscle mass (SMM) was 19.2 ± 2.5 kg in men and 14.8 ± 2.7 kg in women. Skeletal muscle mass index (SMI) was 6.1 ± 1.0 in men and 4.9 ± 1.2 in women. In the physical functions, grasping power was 17.9 ± 2.87 kg in men and 11.9 ± 3.7 kg in women, walking speed was 0.69 ± 0.16 m/s in men and 0.71 ± 0.24 m/s in women, and Short Physical Performance Battery(SPPB) was 6.00 ± 1.00 in men and 5.94 ± 2.38 in women. Therefore, physical depression was confirmed in many subjects.

	All (n = 21)			Men (n = 5)			Women (n = 16)		
Age (y)	**95.8**	**±**	**2.8**	**96.2**	**±**	**2.2**	**95.7**	**±**	**3**
Height (cm)	144.6	±	7.2	151.4	±	6	142.4	±	6.3
Weight (kg)	44.9	±	9.4	50.3	±	7.7	43.2	±	9.4
BMI (kg/m^2)	21.4	±	3.7	21.9	±	2.7	21.2	±	4
SMM (kg)	15.9	±	3.2	19.2	±	2.5	14.8	±	2.7
SMI (kg/m^2)	5.2	±	1.2	6.1	±	1.0	4.9	±	1.2
Maximum circumference of lower leg (cm)	29.5	±	4.1	30.6	±	4.2	29.2	±	4.1
Grip strength (kg)	13.3	±	4.3	17.9	±	2.8	11.9	±	3.7
Gait speed (m/s)	0.71	±	0.22	0.69	±	0.16	0.71	±	0.24
SPPB	5.95	±	2.1	6.00	±	1.00	5.94	±	2.38
Frailty: Sarcopenia (Number of applicable participants)	20	:	16	5	:	4	15	:	12

BMI, body mass index; SMI, skeletal mass index; SMM, skeletal muscle mass; SPPB, Short Physical Performance Battery.

Table 5.
Characteristics of the participants.

The subjects who had frailty and sarcopenia were 20 out of 21, of which the ones who had sarcopenia were 16. In males, all five men had frailty, and four men had sarcopenia. In females, 15 out of 16 women and 12 women had sarcopenia. As a result, the number of subjects with sarcopenia was more than the ones with frailty. Although the subjects without sarcopenia had frailty, they comparatively kept their skeletal muscle mass index (SMI).

7.3 Surveys of dementia and activities of daily living: studies of ADL

The subjects were six men and 20 women, and their average age was 95.0 ± 3.0 years old. The result is shown in **Table 6**, and the abstract was compiled below.

1. The average score of MMSE was 21.9 ± 5.4 points (13 to 30), 11 subjects had a suspicion of being mild dementia, and another 11 had a suspicion of being dementia.

2. The average score of NM scale was 36.1 ± 10.2 points (15 to 50), 11 subjects were normal, seven were mild dementia, and eight were moderate dementia.

3. N-ADL was 41.1 ± 6.2 points (29 to 50), and 21 subjects were between mild and normal.

4. BI was 89.2 ± 10.6 points, and 21 subjects were over 85 points (level of self-support).

	Average values (Minimum to Max)	**Results (number of persons)**
MMSE(score) Mini-Mental-State-Examination	21.9 ± 5.4 (13 to 30 points)	28 to 30 (Normal) 4 24 to 27 (Mild dementia) 11 Under 23 (Possibly dementia) 11
NM scale (score)	36.4 ± 10.2 (15–50 points)	43 to 50 (Normal) 11 31 to 42 (Mild dementia) 7 17 to 30 (Moderate dementia) 8
N-ADL (score)	41.1 ± 6.2 (29 to 50 points)	Over 35 (Mild to Normal) 21 17 to 30 (Moderate) 5
BI (score)	89.2 ± 10.6 (70 to 100 points)	Over 85 (Self-support) 21
Cognitive functional balancer Pro	Third class (First to fifth)	More than standard (special to second) 9 Standard (Third) 10 Less than standard (fourth and fifth) 6 *One subject aborted due to fatigue.

MMSE: Mini-Mental-State-Examination; NM scale: Nishimura-type mental state scale for the elderly; N-ADL: Nishimura's Activities of Daily Living evaluation scale for the elderly; BI: Barthel Index; Cognitive functional balancer Pro.

Table 6.
Cognitive functions, surveys of ADL ***n = 26.***

5. In the measurement by the cognitive functional balancer Pro, nine subjects were more than normal (between special class and second one), 10 were normal (third class), six were less than normal (fourth and fifth class), and one was aborted due to fatigue.

6. There were 14 subjects with good cognitive function (MMSE 24 points or higher). Of the 14 subjects, 11 (78.6%) had a daily routine. Specific daily routines include "going out" 3 people, "reading newspapers" 2 people, "handicraft" 2 people, "calculation" 1 person, " four-character idiom" 1 person, "go game" 1 person, "coloring book" 1 person, "watching baseball on TV"1 person.

In this time, the result of cognitive functions varied, and it was difficult to conclude the relationship between maintenance of cognitive functions and healthy longevity. It was found that 80% of subjects with good cognitive function have a daily routine. The daily routine included contents that used the brain and hands, such as "reading newspapers," "handicrafts," and "calculations." It was suggested that the presence or absence of daily routines is necessary for achieving healthy longevity.

In ADL, many subjects were between needing a light assistance and self-support. Consequently, it is suggested that maintenance of ADL is necessary to achieve healthy longevity and backed up Arai's report [20].

8. Discussion (leaflet)

Using the survey result as evidence, leaflets compiled "four suggestions to live longer" were made to promote local care prevention activities for local community residents.

This leaflet was stated as the result of collaborative researches with Nonoichi City and Kinjo-university, and made into a familiar suggestion for local residents by putting a lot of thought. The title of the leaflet was decided as "Findings from Results of Surveys of Health and Longevity: Secrets of healthy longevity." The ideas to live a long healthy life were suggested *via* four aspects such as (1) strength: (2) nutrition, (3) brain, and (4) state of mind from four aspects.

1. As for the strength, walking everyday: self-checking whether or not they felt dull and measurement of the weight were suggested. Those tell the importance of maintenance of muscle power and ADL. Although the achievers of health and longevity were physically frail, many of them kept the muscle mass comparatively and became self-support in ADL *via* examination of ADL and strength. Hence, motivating them to be able to do self-control was suggested. In addition, the measurement of weight was easy to do, and weight loss of the elderly led to notice their muscle weakness early. Thus, the measurement of weight was included into the suggestions because it was considered to be effective as an index to judge the subjects for themselves.

2. As for the nutrition, chewing well and eating without being fussy were suggested. Those were chosen because many achievers of healthy longevity cleaned denture and had a good appetite without having likes and dislikes from the interviews. Eating regular meals becomes the basis of a livelihood and leads to be life's pleasure, a sense of fulfillment. However, it is necessary to create a good oral environment to have a meal firmly. It should be appreciated to value teeth, even the teeth are denture, and it is important to keep conditions of the denture available by doing maintenance regularly.

3. As for the brain, finding a daily schedule (Everything they can do every day such as reading newspapers and solving a four-character idiom). Finding the daily schedule was included into the suggestions because the subjects whose cognitive functions were good had a daily routine using their brain or hands such as reading newspapers and solving a four character idiom and calculation problems, doing handicrafts and coloring books, playing game of go, etc.

4. As for the state of mind, some words such as "I won't worry" and "sometimes do as you like and feel at ease with positive feelings", etc., were suggested. Those were the words many subjects told in the interview. The examples of their words were below,

"It's easier to forget a bad thing. Just take things easy" (95 years-old woman),
"The goal is to live till 100! I want to see Tokyo Olympic" (95 years of man),
"It is important to get involved with others and enjoy it" (93 year-old woman),
"I try not to overdo it. It's no use crying over milk. I should nature my mind" (98 years- old woman),
"I try new things" (93 years-old woman),
"I do what I want at my own pace. It's fun to go to a place where people gather. Then, I let it all hang out. That's the secret of longevity" (93 years man).

It was considered that many of the achievers of healthy longevity tried to keep their mind in peace and acting aggressively perhaps due to their gender or individual characters.

As stated before, there are many young people in Nonoichi City as the targeted area, and Nonoichi City has the lowest population aging rate in Ishikawa Prefecture. However, it is expected that rapid aging will advance in Nonoichi City; therefore, it is important to enlighten the local residents on healthy longevity. Thus, using the leaflet made this time, visiting lectures such as senior-oriented classes and salons for the elderly are opening. Although using the results surveyed in the world or Japan are effective, utilizing the survey results gained from predecessors who achieved health and longevity living in the same city brings a sense of affinity to the local elderly people. Besides, all suggestions this time are not difficult to do and can be adopted into the daily life. Some subjects told that they can do that, too. We want to aim to regional contribution widely and to deploy care prevention activities such as salons for the elderly on the ground of the survey results gained by collaboration between Nonoichi City and Kinjo University in the future.

As of July, 2021, survey areas are expanding to Hakusan City next to Nonoichi City, and the survey is continuing. Hakusan City consists of a vast area from the coast to the foot of Mt. Hakusan and has a higher aging rate than Nonoichi City and different features from Nonoichi City. We consider to continue the survey and find the relationship between regional characteristics and health and longevity.

8.1 Limitations of this project

The possibility that there was bias of the subject cannot be denied because the subjects were few; this survey was not complete enumeration for every old people over 90 living in Nonoichi City, choices of the subject were not randomized, but were introduced by care managers (snowball sampling).

However, it is considered that the surveys of the achievers of healthy longevity who could take "interviews" and "investigations of strength" at the survey were generally conducted.

9. Conclusions

To maintain health, find frailty early, and prolong healthy life expectancy, secrets of health and longevity were explored with aiming at the elderly over 90 in collaboration among Kinjo University and Nonoichi City. Utilizing the secrets of longevity of the achievers to care prevention activities is expected to help as health promotion closely related to the residents in the same area.

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Conflict of interest

The authors have no conflicts of interests.

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Chapter 3

The Yuu-yuu Health Circle as a Place for Learning and Playing

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Abstract

The Yuu-yuu Health Circle is a place for students to learn and deepen their understanding and interest by putting into practice the knowledge and skills they have gained in class at the university. This chapter introduces its maintenance and promotion activities for older adults in the community that were participated by students of the Departments of Physical Therapy and Occupational Therapy at Kinjo University before and during the coronavirus pandemic. The activity method and contents changed significantly during the pandemic. However, as a medical and welfare university, its job to develop human resources that deal with people has not changed. As an educational method toward such purpose, the activities helped students, who need to actively communicate with people of different ages and improve their interpersonal communication skills even during the pandemic.

Keywords: education, university, student, contribute to society, coronavirus disaster

1. Introduction

The National Institute of Population and Social Security Research revealed that the population of people aged 65 years and older comprised 20.2% of the population in 2005 and was expected to increase to 40.5% by 2055 [1]. This finding points out the aging of the population as a major problem for Japan in the coming decades. With an increase in the population of older adults, problems such as a rise in the social security budget and a decline in labor population are expected to grow in importance. Other problems include the increasing economic burden on people of working age and caregiver deficiency.

In response to this social situation, the Departments of Physical Therapy and Occupational Therapy of the Faculty of Health Sciences of Kinjo University has hosted the Yuu-yuu Health Circle since January 2009 with the support of Hakusan City. The meaning of "Yuu-yuu" is learning, which is a long process that involves seeing the world from a wide perspective. Its activities' purposes are as follows: (1) The university maintains its role as a hub of knowledge in the community; (2) there should be collaboration between industry, government, and academia; (3) universities should contribute to community development; and (4) the university provides opportunities for students to learn and study.

To achieve these goals, teachers and students develop volunteer activities to maintain and improve the health of older adults in the community. Examples of these activities are health lectures and low-load machine training (e.g., chest press, leg extension). Recruitment of older adults living in the area is conducted mainly through a public relations magazine published by Hakusan City with the cooperation. Participating students are mainly first- and third-year students of the Departments of Physical Therapy and Occupational Therapy because of curriculum reasons. By interacting with older adults living in the community, students can practice not only basic communication skills but also specialized ones, such as medical interviews, vital signs check (e.g., blood pressure), and mental and physical function measurements. In this way, Yuu-yuu Health Circle has become a good "learning square."

This chapter introduces the activities of the Yuu-yuu Health Circle before and during the coronavirus disaster, as well as its significance as a place for students to learn and prospects for activities after the coronavirus disaster.

2. Yuu-yuu Health Circle's on-campus activities

On-campus activities had been carried out for 2–3 periods a year or a total of 30 periods from January 2009 to December 2019. The content of one period consisted of physical fitness measurement, vital signs check, preparatory exercises, health lectures, low-load machine training, home exercise guidance, and cooling down exercises. A period lasted for two and a half months, and each 120-minute program was held once a week, for a total of 10 times (**Table 1**). Participants were aged over 65 years. The typical number of participants was 15, but this either increased or decreased depending on each period. The number of students was about 30. Approximately five faculty teachers were involved in the management. As of this writing, the total number of older adult participants was 497 and that of students was 1082. These numbers are expected to increase as it is a long-term activity.

Week	Contents
1	Vital signs checking, confirmation of physical condition, and enjoy talking (about 30 minutes) Warm-up exercises by students (about 10 minutes) Physical function evaluation before activity programs (about 80 minutes)
2 to 9	Vital signs checking, confirmation of physical condition, and enjoy talking (about 30 minutes) Warm-up exercises by students (about 10 minutes) Lectures regarding the maintenance of general health or instructions to practice the program at home (about 20 minutes) Low-load machine exercises for the elderly (about 50 minutes) Cool-down exercise by students (about 10 minutes)
10	Vital signs checking, confirmation of physical condition, and enjoy talking (about 30 minutes) Warm-up exercises by students (about 10 minutes) Physical function evaluation after activity programs (about 80 minutes) Certificate completion ceremony

This table outlines a total of 10 activity programs for one period of the Yuu-yuu Health Circle. Conduct 10 times at a pace of once a week. Physical function evaluations are conducted for the first and final rounds. One activity is for about 120 minutes.

Table 1.
Outline of the Yuu-yuu Health Circle activity program.

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Physical fitness measures included body composition, walking speed, six-minute walking distance, timed up and go test, quadriceps femoris muscle strength, and center of gravity sway distance. Preparatory exercises incorporated rhythmic exercises that move the body while singing songs that are well known in Japan and enhanced the activity of muscles and respiratory circulation. In addition, while using a towel, the joints and muscles of the whole body were moved to prepare for exercise (**Figure 1**). In health lectures, teachers and students gave a lecture about health concerns (e.g., talking about the risk and prevention of heatstroke, effects of exercise on mind and body). Low-load machine training (**Figure 2**) mainly used six types: leg press, trunk flexion, leg extension, chest press, hip abduction, and rowing. Participants exercise while counting numbers so as not to hold their breath. The load amount was set to be in the range of "slightly tight" to "easy" in terms of subjective intensity. Six types of training machines were usually carried out one set at a time (one set comprised 10 repetitions and lasted for about 80 seconds). Home exercise guidance for participants included lectures on exercises that can be carried out at home with the aim of maintaining and increasing their exercise habits as much as possible. In a previous study of participants in the Yuu-yuu Health Circle, an improvement in the walking/balancing ability of late-stage older adults was more likely to occur than muscle weakness [2]. Therefore, a walking instruction (e.g., way to walk, time, and intensity) was incorporated into the home program. Cooling down exercise was carried out through a whole-body stretching.

2.1 Effects of the Yuu-yuu Health Circle on older adults

The results of our research [3] examining the effects of the Yuu-yuu Health Circle are introduced below. We targeted 64 community-dwelling older adults who participated in the Yuu-yuu Health Circle program. Their average age was 70 $\pm$ 6 years, average height was 157.7 $\pm$ 7.7 cm, and average weight was 57.7 $\pm$ 7.8 kg. Thirty-three males and 31 females joined this program. Before and after the program, we evaluated participants' flexibility, muscle strength, walking ability, standing balance, and

Figure 1.
Preparatory gymnastics. Students conduct and demonstrate the gymnastics in front of the participants.

Figure 2.
Exercising using a training machine. Low-load machine training mainly uses six types: leg press, trunk flexion, leg extension, chest press, hip abduction, and rowing. Participants exercise while counting numbers so as not to hold their breath.

quality of life using the 36-item Short Health Survey (SF-36) version 2 in Japanese. After the program, many physical function tests were significantly improved. In the SF-36 questionnaire, the "general health perception" significantly improved (**Table 2**). **Table 3** shows an example of comments and impressions after the end of the activities for the participants. The communication between older adults and young students positively stimulated the former and improved their motivation to participate in the activities. The older adults who participated in the activities mentioned, among others: "I smile when I have an activity with young students" and "I got the power of the young students."

2.2 Effects of the Yuu-yuu Health Circle on the students

As we aim to develop human resources that can play an active role in the medical field, we provide students with opportunities to interact with older adults in the community from their first year of university. Intergenerational exchanges require language usage, self-grooming, appropriate behavior, attitudes to interact with people, communication skills, and the ability to brighten up the atmosphere. Generally, in students, it is often meaningful to reinforce these interpersonal communication skills from an early stage because of their lack of experience. If students use basic medical skills, such as measuring blood pressure and conducting health interviews for older adults in the community, they will be able to acquire practical skills early. In addition, for third-year students who have undergone various on-campus studies, we implement advanced contents. For example, students integrate risk information of the target person and use it for exercise guidance; alternatively, they propose a home program for older adults based on the results of prior physical evaluation.

This activity assigned students to five groups: management, gymnastics, evaluation, training machines, and public relations. Student leaders were appointed for each

	Before	After	*p*	*n*
Flexibility				
The sit-and-reach test (cm)	18.7	20.5	*<0.05*	64
Spinal hyperextension test (cm)	21.3	22.8	*<0.05*	62
Muscle strength				
Grip strength (kg)	28.6	29.6	*<0.05*	42
Knee flexion (N)	48.9	53.4	*<0.05*	61
Walking ability				
Test for time needed to stand up and go (s)	6.6	6.3	*<0.05*	62
The time taken to walk 10 m (s)	5.1	4.8	*<0.05*	62
Distance during a 6-min walk (m)	498	512	*<0.05*	62
Balance of standing				
Functional reach test (cm)	26.8	27.9	*<0.05*	64
SF-36 questionnaire version 2 (Japanese)				
General health perception*	47.5	47.5	*<0.05*	28

**The value is the median.*

Table 2.
Comparison of results before and after the Yuu-yuu Health Circle activity program.

Participant's comments and impressions
Instead of leaving my physical condition to the doctor, I became conscious of managing my own health.
I got a power of young students.
It was a good training because I could move my head and body.
I'm glad that I do not usually have many opportunities to talk with students and move my body.
I got a smile when I have a activity with young students.
I got viger.

A translation of the comments and impressions obtained from participants.

Table 3.
Participants' comments and impressions of the Yuu-yuu health circle activity program.

group. By allocating leaders in separate groups, the burden on students was distributed, roles were clarified, and responsibilities were given to each group and individual. The management group oversaw the entire activity and acted as the moderator so that the activity would flow smoothly. For the gymnastics group, preparatory gymnastics and cooling down exercises were carried out. The evaluation group summarized the results of the pre- and post-physical fitness tests. The training machine group handled the training machine and instructed older adults in the home program. The public relations group was responsible for taking activity photos and updating blogs.

Students participating in this activity were in their first to third year and, thus, differed in specialized knowledge and interpersonal support ability. This made uniform management difficult. Therefore, we have prepared "goals and self-assessment

Goal of the Yuu-yuu Health Circle:					
Students strive to promote a safe and smooth the Yuu-yuu Health Circle and contribute to the health promotion of participants.					
Goals of the students:					
Students acquire 1. Risk and operation management, 2. Student's participation attitude, 3. Performing own group's roles, 4. Measurement skills, and 5. Teaching skills. These abilities necessary for the operation of the Yuu-yuu Health Circle strengthen with uniting under the leaders and teaching each other. Let us increase these abilities and whether it can be 80% or more by self-evaluation.					
	1. Risk and operation management	2. Student's participation attitude	3. Performing own group's roles	4. Measurement skills	5. Teaching skills
easy ▲	Get information about participants' risks (such as blood pressure) in charge.	Keep the meeting time.	Recognize the role of your group.	You can ask questions along the form.	You can give simple advice. (e.g., Close your eyes or take off your shoes.)
	Explain information about participants' risks.	You can communicate smoothly and bring out the smiles of the participants.	You can smoothly achieve the role of your own group.	Vital measurement can be performed smoothly.	Explain the points and precautions of exercise.
▼ difficult	Be able to understand and explain the risks of all participants.	Have a broad perspective to cooperate with and help leaders.	You can understand the overall role, help each other, and give advice to each other.	Participant's dysfunction can be mentioned	You can check the home program and give correction advice.
English translation of the questionnaire. This is excerpted and modified for illustration purposes. Each ability has about 10 items ranging from easy to difficult.					

Table 4.
Goals and self-assessment for students.

for students" that show the goals and required abilities of this activity step by step. By visualizing the different activity objectives and roles of each student, students could set their own goals according to their own abilities and work with self-discipline. **Table 4** presents a summary of these goals and self-assessment. A previous self-assessment survey of students investigated the goal attainment level of our diploma policy; the related question item was "Have a broad perspective to cooperate with and help leaders." The results showed that 28% of first-year, 64% of second-year, and 82% of third-year students had reached the goal and gradually recorded a high degree of achievement with progress [4]. **Table 5** shows examples of students' comments and impressions and indicates their positive opinions, such as having improved their communication skills.

3. Yuu-yuu Health Circle's off-campus activities

The Yuu-yuu Health Circle also conducts off-campus activities. About four times a year, students and teachers visit the community where older adults in the community

Student's comments and impressions
Communication skills have been improved.
The anxiety about dealing with the elderly has disappeared.
Vital measurement is now possible.
I enjoyed interacting with different generations.
When I went to the off-campus practice, there was doing the similar way of Yuu-yuu Health Circle, so I was able to do it easy.
By knowing healthy elderly people, I was able to compare them with hospitalized elderly people.

A translation of the comments and impressions are obtained from students.

Table 5.
Student's comments and impressions.

gather and hold one-off courses. Local older adults often gather at a public community center in each district and hold regular meetings. To find the activity destination, usually, we are directed to senior citizen groups in each district or receive referrals from the person in charge in Hakusan City. The key difference of the off-campus activities from on-campus ones is the lack of a training machine at the community center that is useful to participants. To ensure that the participating older adults enjoy the activities even in an environment without tools, we implement a dual task exercise, such as combining training of cognitive ability with a whole-body movement. When third-year university students can join the Yuu-yuu Health Circle at a community center, they measure older adults' physical functions, such as muscle strength, range of motion, and balance, and provide feedback to them on the spot. For students who want to become physical or occupational therapists, this activity serves as a practice for them to improve their measurement skills, which have started between students at the university (**Figure 3**). Students are motivated and work hard, even though they feel nervous and anxious. Students can deepen their understanding and interest by putting into practice the knowledge and skills they have gained in class at the university.

4. Yuu-yuu Health Circle activities during and its prospective activities after the coronavirus disaster

Since 2020, the coronavirus disease has seriously impacted global health and economies. In Japan, the prime minister issued the first state of emergency in mainly large cities from April 7 to May 31, 2020; the second, from January 8 to March 21, 2021; the third, from April 25 to June 20; and the fourth, from July 12 to as of this writing. Under these circumstances, face-to-face activities of older adults who are invited to the university have been canceled. Self-restraint at home has been found to have resulted in an increase in sitting activity time and an unhealthy eating behavior, such as snacking [5], a 58.2% reduction in walking time [6], and increased depression and stress [7]. In particular, there have been concerns about the deterioration of mental and physical functions of older adults due to physical inactivity.

Osawa et al. [8] developed the National Center for Geriatrics and Gerontology Home Exercise Program for Older People (NCGG-HEPOP2020) as an exercise program for older people. This is an introduction to programs that can be safely

Figure 3.
Individual measurement by a third-year university student. When third-year university students can join the Yuu-yuu Health Circle at a community center, they measure older adults' physical functions, such as muscle strength, range of motion, and balance, and provide them feedback on the spot.

implemented at home by dividing them into various aspects, such as physical activity, nutrition, oral function, and cognitive function for older adults. The unique flowchart makes it easy for older adults to select their optimal exercise content [8, 9]. In collaboration with the NCGG-HEPOP creation committee, we created videos of the NCGG-HEPOP2020 programs to make them easier to perform (**Figure 4**). Our

Figure 4.
The created gymnastics video. The videos can be seen on the National Center for Geriatrics and Gerontology's (NCGG's) website at: https://www.ncgg.go.jp/hospital/english/index.html or in the Kinjo university You Tube channel at https://www.youtube.com/channel/UCb-4GZTt9dKlgJB8rkXHjhg/videos.

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faculty teachers supervised the management and video editing, and students oversaw gymnastics demonstrations, video telop creation, and narration. The created Japanese and English versions of the video were released on YouTube [10]. Through this activity, the students had a good opportunity to seriously think about the content of gymnastics, how to show it, and how to convey it as a teacher of gymnastics.

As another initiative, we conducted a trial activity *via* the web that connected a public community center where the older adults gather and the university online. The usual face-to-face on-site lectures were difficult to conduct in terms of infection control considering the coronavirus pandemic. Therefore, the students made a demonstration of gymnastics at the university and delivered the images and sounds in real time through the monitor of the public community center. Some problems included the difficulty in adjusting the load during gymnastics because it was difficult to see the faces of the participants. However, using online tools, students and participants were able to enjoy doing the gymnastics while counting together, even if they were far away from each other. In addition, we provided a learning environment that enhances gymnastics and interpersonal communication skills while reducing the risk of infection for students (**Figure 5**).

Regarding the outlook for activities after the coronavirus pandemic, we plan to increase the frequency of interaction between older adults and students by combining face-to-face activities and online communication. Specifically, problem-solving learning can be practiced through multidisciplinary collaboration by having students from multiple departments form a team and collaborate with the problem of maintaining and increasing the exercise time of older adults. The elimination of valuable time loss due to commuting time is worth noting. However, older adults being unaccustomed to and having difficulty using the Internet poses a problem. Therefore, providing ICT support, such as tapping family members, self-help groups in local communities, and university teachers, is necessary. Maintaining and increasing exercise habits and

Figure 5.
Health promotion activities of the university and community center. The Kinjo University and community center provided a learning environment for students to enhance their gymnastics and interpersonal communication skills while reducing the risk of infection.

physical activity are expected to positively affect the mind and the body and may help the immune response against the new coronavirus [11]. The activities mentioned above can have a meaningful contribution to the community and, at the same time, provide learning opportunities for students.

5. Conclusions

This chapter introduces the activities of the Yuu-yuu Health Circle. The Yuu-yuu Health Circle's activity method changed significantly during the coronavirus disaster. However, as a medical and welfare university, its job to develop human resources that deal with people has not changed. As an educational method conducted toward such purpose, the activities helped students, who need to actively communicate with people of different ages, improve their interpersonal communication skills even during the coronavirus pandemic. For that purpose, ensuring that learning opportunities are available amid infection control measures through ICT, such as online communication, is important.

Conflict of interest

The authors declare no conflict of interest.

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Chapter 4

Perspective Chapter: "Yugaku Hiroba" Intergenerational Exchange Program

Yuka Ito

Abstract

In this paper, we discuss the Yugaku Hiroba intergenerational exchange program activities that have been carried out to date with community-dwelling older adults and university students, as well as the results of questionnaires completed by the participating older adults and students who ran the activities. We also interviewed 10 participating older adults to determine what significance a gathering place, such as that provided in the intergenerational exchange program, has in their daily lives. The results revealed that participating in intergenerational exchange activities led to feelings of usefulness and satisfaction, as well as enjoyment in their daily lives as a result of connecting with others and interacting with students from a younger generation. Support is needed to help continue these activities and provide opportunities for intergenerational exchange activities that allow people to live their lives in their own way with a sense of reassurance.

Keywords: intergenerational exchange, care prevention, activity

1. Introduction

The older population is growing every year in Japan. As the birthrate continues to decline and the population continues to age, the aging rate is expected to hit 33.4% in 2035, meaning that one in three people will be 65 or older. This presents a serious problem. Japan's policy involves implementing programs for measures such as strengthening long-term care prevention and building community-based integrated care systems to enable older adults to live out their lives in the communities that they know well. Support activities led by community residents are also being discussed, and activities in which the community protects the livelihoods of its older members are being implemented.

Following revisions to the Long-Term Care Insurance System in 2012, a new comprehensive long-term care prevention and daily life support program was created. The long-term care prevention measures to be adopted going forward purport to develop living environments aimed at creating places and opportunities for older adults to feel a sense of purpose and play a role in the community. Another objective is to create a region that will allow people to continue living in the community with a sense of purpose and provide them with roles to play even after they begin needing long-term care. In addition, the program recommends the pursuit of community-building by

holding resident-led activities, such as exercise programs, throughout the region and continuing to create and expand gathering places where people can connect.

Since the 2016 academic year, intergenerational exchange activities have been held for healthy adults aged 65 and older who live near the university. These activities are mostly led by students in the College of Social Welfare who aspire to be care workers and their teachers. Intergenerational exchange activities include crafts (such as making pressed flower cards or lanterns), light exercise, and games. The participants interact with the students during the activities so that the latter can deepen their connections with older adults in the community. The students oversee the program planning with the assistance of their teachers. They review the day's program after it has finished and make improvements to create even better programs in the future. The following is a report on the main activities.

2. Objectives of the activities

The main objective for the students' activities is for them to improve their communication skills and acquire planning and management skills for activities and programs.

The objective for the older adults participating in this program is to provide activities that are intended to help them continue living in the communities that they know well and to create places they can drop by easily. For older adults, continuing to live in the communities that they know well and participating in community activities may lead to the creation of new roles for them to play, a greater sense of purpose, and a more stimulating social life.

3. Recruitment of participants

Participants are recruited by the placement of posters in local community centers and other public facilities to help spread information about the events more widely.

As a measure for controlling COVID-19 infections, posters have not been put up in public facilities since the 2020 academic year; instead, repeat participants have been sent postcards and asked to book activities in advance.

4. Activity report

4.1 Past activities

Activities were also held at campus festivals, such as posting activity reports and setting up a traditional game area for students to interact with local residents (**Table 1**).

4.2 Results of post-activity questionnaires for participants

Participants were given questionnaires after every event to evaluate the activities. They responded positively every time, saying that the activities were "Good" or "Excellent." In the free comment space, they left feedback such as the following to express how much they enjoyed the activities and spending time with the students: "The exercise made me feel refreshed and energized," "I had so much fun surrounded by wonderful students," "I'm very happy that the activities are always fun," "I hope I'll

Year	No. of sessions	Activities	Total no. of peoples
2006	1	Flower seedling planting	15
2007	6	Walking rally, *Tanabata* festival, *Hyakunin Isshu* poem card game, etc.	94
2008	8	Nursing care class, pétanque, flower seedling planting, etc.	124
2009	6	Newspaper *kana* search, dementia *karuta* card game, tea party, etc.	133
2010	4	Flower seedling planting, Christmas party, New Year decoration making, etc.	67
2011	4	Intro quiz game, ball toss, paper fan making, New Year greeting card making, etc.	53
2012	6	Picture postcard making, rock painting, traditional games, etc.	82
2013	7	Health sports competition, small stand making, mini Christmas tree making, etc.	122
2014	7	Treasure hunt, pressed flower card making, summer festival (stalls), etc.	134
2015	7	*Teru teru bozu* doll making, stalls, coaster making, *fukuwarai* game (pin features on a face) and votive horse tablet making, etc.	143
2016	7	Keychain making, *Tanabata* festival paper strip making, flower seedling planting, fan the balloon game, etc.	135
2017	7	Mini sports competition, strikeout game, *washi* paper balloon making, *kanji* character puzzles, etc.	130
2018	7	Scavenger hunt, telephone game, marbled postcard making, winter sports competition, etc.	136
2019	7	Flower seedling planting, windmill making, hand bath and foot bath experience, yoga, etc.	167
2020	4	Tote bag decorating, flower seedling planting, wreath making, etc.	55
2021	6	Small hanging scroll making, summer festival (balloon yo-yo fishing, ring toss, and cutouts), etc.	86

Table 1.
Past intergenerational exchange activities.

be healthy enough to take part again next year too," "The exchange event with students made me feel energized," "I enjoyed playing the traditional games," "I enjoyed the hand bath and foot bath experience," "Thank you for teaching me some nursing care techniques," and "I had been looking forward to it."

4.3 Results of post-activity questionnaires for students

Sixteen students planned and ran the activities held in the 2020 academic year. The questionnaire results indicate that 69% improved their communication skills, 69% improved their planning skills, 88% gained a deeper understanding of older adults,

and 94% gained a feeling of satisfaction from the activities. In addition, 87% of the students said that continuing the Yugaku Hiroba activities is essential. The fact that comments such as the following were left in the free comment section proved that the students had reflected on what they learned in the activities: "The most motivating aspect was the joy it gave the participants," "I learned about the difficulty of planning and running activities and about the importance of preparation," "I can be more proactive now," and "I learned from how other students interacted and approached the participants." They also saw the Yugaku Hiroba activities as providing "an opportunity for exchanges," "an opportunity to gain a deeper understanding of older adults and to grow," "an opportunity to interact with older people in the community," and "a place for older people and students to interact as well as a place for older people to meet at Yugaku Hiroba and develop friendships." This shows that, while running the activities, the students saw the Yugaku Hiroba as a place to learn through exchanges with local residents and a place to interact.

5. Results and discussion of interviews about the program as a means of providing a gathering place for older adults and students

Interviews were held to determine what significance a gathering place such as that provided in the intergenerational exchange program has for community-dwelling older adults in their daily lives.

5.1 Subjects and survey methods

Ten men and women who have been participating in the university's intergenerational exchange program (Yugaku Hiroba) for 3 years or more were interviewed individually after their consent had been obtained during the period from July 21 to October 20, 2017. Three of the subjects were men and seven were women. Three were in their 70s and seven were in their 80s.

5.2 Analysis methods

Using a qualitative design, we described the data obtained in the interviews systematically, with data that could be grouped together under certain meanings through association being categorized into analysis worksheets. Each categorized worksheet was given a concept title and definition.

6. Analytical results

In **Table 2**, we showed the resulting analysis worksheet.

6.1 Agreement of mutual benefit

One of the older adults said that the program offers a good opportunity for both the older participants and the students.

When asked if he interacts with younger people other than his grandchildren in everyday life, he responded by saying, "These opportunities are good for the students too and they prevent dementia in older people" (87-year-old man).

	Concept title	Definition
(1)	Agreement of mutual benefit	The older adults do not usually interact with younger people other than their grandchildren and they see the intergenerational exchanges as providing a good means of interaction for both themselves and the students.
(2)	The only place to meet younger people	Although the older adults regularly interact with their grandchildren and other young people, they have few opportunities to interact proactively and they look forward to having a chance to interact with the students.
(3)	Being able to talk and be heard	The older adults enjoy the students paying attention to them and listening to their stories and they gain satisfaction from being heard.
(4)	Acting as a kind of resource for younger people	The older adults feel positive about being a kind of resource for the younger generation and feel useful.

Interactions between older adults and students (excerpts from the raw data).

Table 2.
Interactions between older adults and students.

6.2 The only place to meet younger people

Nine of the older adults said that they do not interact with younger people other than their grandchildren anywhere else. One said that she interacts with her grandchildren but not with other young people "except when coming here" (78-year-old woman). When another older adult who said he "has no interactions with younger people" was asked how he feels about interacting with them, he responded by saying, "I enjoy it" (85-year-old man).

6.3 Talking

Seven of the older adults said that they felt positive about talking. Their comments included the following: "I think it's nice that we can talk about different things" (87-year-old man); "I think it's good that we can talk freely" (82-year-old woman); and "I often talk to young people and they listen to me, but it's quite fun to talk in our own way" (79-year-old man).

6.4 Acting as a kind of resource for younger people

Two of the older adults talked about conveying their wisdom to younger people. He said, "I come to the intergenerational exchange activities because I think it's good if I can be useful to young people. I think it's good if our experiences flourish even just a little bit. When I talk to young people, I sometimes hear things I didn't know" (79-year-old man).

7. Discussion based on the analysis results

When the participating older adults talked, the students listened attentively. Having younger people listen to them may give the older adults a chance to think about certain things and pass on their culture to the younger generation. According to N. Henkin [1], exchanges between older adults and the generation that will lead the future can boost the sense of community and become a kind of new resource through

cooperative activities, leading to a better quality of life for all generations. This suggests that participating in intergenerational exchange activities as the only opportunity to meet younger people may be mutually beneficial and help turn older adults into a kind of resource that contributes to the students' lives. In addition, as the only place where older adults can talk and be heard, the program may lead to the development of new communities and improve the quality of life. Furthermore, talking and having someone empathize with them may be comforting to the older adults and give them more energy in their everyday lives.

It can be difficult for older adults to enter the types of places that young people gather in ordinary settings. Since teachers are also involved in the intergenerational exchange program, older adults may feel safe participating in it. According to Nitta [2], the benefit of having coordinators involved is that they can organize and record experiences gained in the exchange activities, share those experiences with other care staff, ensure a stable continuity of activities, and encourage collaborations with various people and organizations. This suggests that having teachers act as coordinators to secure collaborations with various organizations and ensure a stable continuity of activities may be one source of security that helps older adults participate in the intergenerational exchange activities.

8. Conclusions

We found that intergenerational exchange opportunities allow older adults to connect with others and enjoy talking to students and being heard. Gathering places provide important opportunities (places to belong) for older adults.

For students, interacting with older adults fosters communication skills and teaches many other skills related to the running of programs. We will continue holding these meaningful activities.

9. Photos of activities

Activity photos were taken with participants and students, including gymnastics, creative activities, hand bathing, and yo-yo fishing. Also included is a group photo taken during the activity.

Acknowledgements

We would like to thank all of the older adults from the community that participated in this project and everyone who participated in the interview surveys.

Conflict of interest

The authors declare that they have no competing interests.

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Chapter 5

Promotion of Cognitive Function Maintenance Exercises in the Community: "Brain Wakawaka Club" Activities to Keep the Brain Young

Mitsunobu Kouno, Tomoko Kawaguchi, Masashi Yoshitake and Naoki Sakano

Abstract

According to estimates by the Japanese Cabinet Office, there will be approximately 6.02 million elderly people with dementia in 2020, and the prevalence of dementia among those age 65 years and above will be very high at 16.7%. Therefore, it is important to prevent dementia in local communities. However, even though exercises for physical strength maintenance are conducted in many local communities, there are very few exercises to prevent declines in cognitive function. Thus, the "Brain Wakawaka Club" makes tours to local communities with the students of the Department of Occupational Therapy, and conducts cognitive function evaluation and maintenance exercises for elderly people. This activity is expected to contribute to the prevention of dementia among the elderly in the community.

Keywords: community, cognitive function evaluation, cognitive function maintenance

1. Introduction

The Annual Report on the Aging Society (2017) by the Japanese Cabinet Office [1] estimated that, in 2020, there will be 6.02–6.31 million elderly people with dementia, and the prevalence of dementia among the elderly aged 65 years and above will be 16.7–17.5%, while in 2030, there will be about 7.44–8.30 million elderly people with dementia, and the prevalence of dementia among the elderly aged 65 years and above will be 20.2–22.5%. In other words, in the near future, one in five people will be suffering from dementia. In addition, it was estimated that there will be 4 million people with mild dementia [2], so in addition to early detection and early treatment of dementia, support measures for dementia prevention to suppress the increase in the number of dementia patients are also important.

On the other hand, in an attitude survey (2020) regarding aging anxiety among individuals aged 20 and above [3], 83.8% of participants responded feeling anxiety over aging, and 48.2% of participants responded feeling anxiety over dementia. This result shows that society has a high level of interest in dementia prevention.

In light of this social background, in accordance with the Five-Year Plan for the Promotion of Dementia Measures (Orange Plan) (2012) and the Comprehensive Strategy to Accelerate Dementia Measures (New Orange Plan) (2015) by the Ministry of Health, Labor and Welfare, elderly individuals in the community have started to carry out group activities in the local community, such as the Fureai Salon. However, even though exercises for the purpose of physical strength maintenance and muscle strengthening are often conducted in many local communities, exercises for cognitive function maintenance and cognitive decline prevention are rarely conducted [4]. In fact, "not knowing what type of exercises to incorporate" is an opinion also often heard from local communities. Therefore, it is believed that enlightenment activities that incorporate exercises for cognitive function maintenance and cognitive decline prevention in the program of each local community are important.

At the same time, in recent years, an exercise that stimulates cognitive functions while exercising for dementia prevention (cognicise) has attracted much attention [5–7], and the effects are anticipated. Thus, the activities of the "Brain Wakawaka Club" aim to contribute to the prevention of decline in cognitive function among the elderly in communities by conducting cognitive function evaluation, as well as cognicise and left-right asymmetrical upper limb movement as cognitive function maintenance exercises for the elderly in local communities over time.

2. Activity contents

Teaching staff of Kinjo University, who are occupational therapists, and students of the Department of Occupational Therapy participated in local community activities once a week for five consecutive weeks and performed cognitive function evaluation and guidance for cognicise on the elderly. Cognitive function evaluation was performed once during the 5 weeks on the elderly individuals who participated in this activity. Then, the elderly individuals checked the cognitive function evaluation results with the teaching staff at Kinjo University once a year and recognized changes in their own cognitive function over time.

Cognicise was performed with the elderly when cognitive function evaluation was not conducted. The contents of cognicise performed in the 5 weeks were continued as an activity in the local communities.

The specific contents of the cognitive function evaluation and cognicise are as follows.

2.1 Cognitive function valuation

After measuring the blood pressure of the elderly participants in local communities, and checking their physical condition that day, evaluation of cognitive function was conducted by Mini-Mental State Examination (MMSE), Frontal Assessment Battery (FAB), and CogEvo® (Total Brain Care Co., Ltd.) (**Figures 1** and **2**) [8–12].

In the evaluation by CogEvo®, five types of tasks shown in **Figure 2** were performed using a tablet. This evaluation is an application that enables fun task

Figure 1.
A look at cognitive function evaluation.

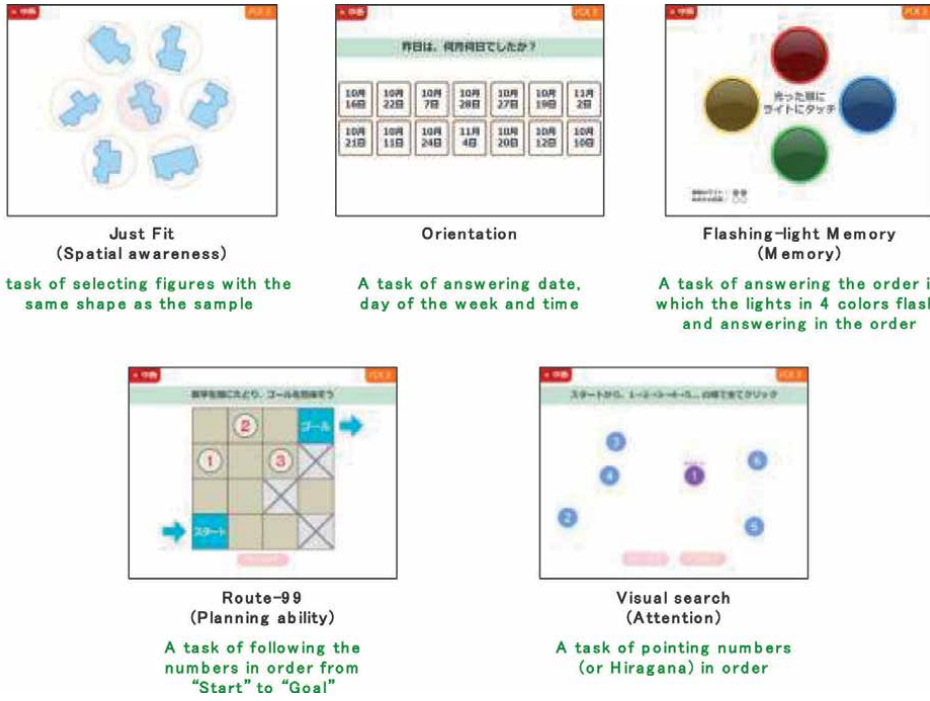
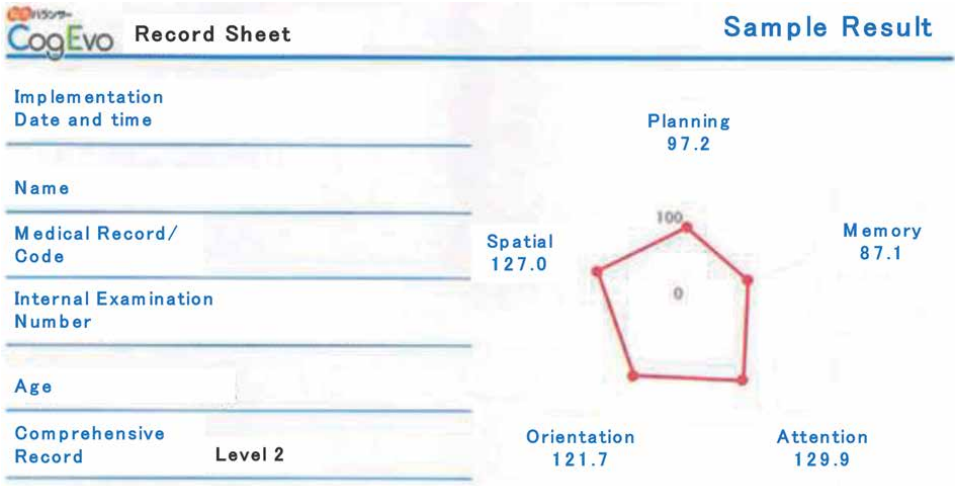


Figure 2.
Contents of cognitive function evaluation by CogEvo® [12]. CogEvo® is an application in which five types of tasks are performed using a tablet, and the five aspects of cognitive functions, namely planning ability, memory, attention, orientation and spatial awareness, can be evaluated based on execution time and number of errors (adapted from the Total Brain Care Co., Ltd. website with partial modification).



Task Name		Score	Judgment	Index	Total Times	Accuracy Rate
Just Fit	Spatial Awareness	354	Level 1	127.0	77.6sec	100%
Orientation	Orientation	262	Level 1	121.7	45.0sec	67%
Flashing-light	Memory	340	Level 3	87.1	71.3sec	70%
Route 99	Planning Memory	182	Level 3	97.2	110.7sec	100%
Visual Search	Attentaion	262	Level 1	129.9	132.7sec	100%

Figure 3.
Results of cognitive function evaluation by CogEvo® (sample). The results of CogEvo® were displayed as the score and judgment results based on the task execution time (total time) and accuracy rate for the five aspects of planning ability, memory, attention, orientation and spatial awareness, and were shown in a radar chart.

execution by game sensation, and enables the evaluation of the five aspects of cognitive functions, namely planning ability, memory, attention, orientation, and spatial awareness, from the execution time and accuracy rate of the tasks [12].

The results of the cognitive function evaluation on elderly individuals were mainly recorded using the CogEvo® record sheet shown in **Figure 3**.

2.2 Cognitive function maintenance exercises including cognicise

The tasks performed included reading Kanji indicating colors (the color of the characters and that of the Kanji indicating the color are different) displayed on the screen while walking or stepping, an exercise involving moving four limbs according to instructions while singing (**Figure 4**), and an exercise involving moving the left and right hands at the same time with different movements. In addition, the exercises were mainly guided by the students of the Department of Occupational Therapy.

In 2020, when the spread of COVID-19 infection was remarkable, activities in local communities were restricted, and only cognitive function evaluation could be conducted in local communities. Thus, for cognitive function maintenance exercises (**Figure 5**), manuals describing methods to perform the exercises, and DVDs

Figure 4.
Exercise following the movement of the leader while singing. The leader is the student on the right. The student on the left follows the exercise of the leader, while singing the lyrics displayed at the top of the figure at the same time.

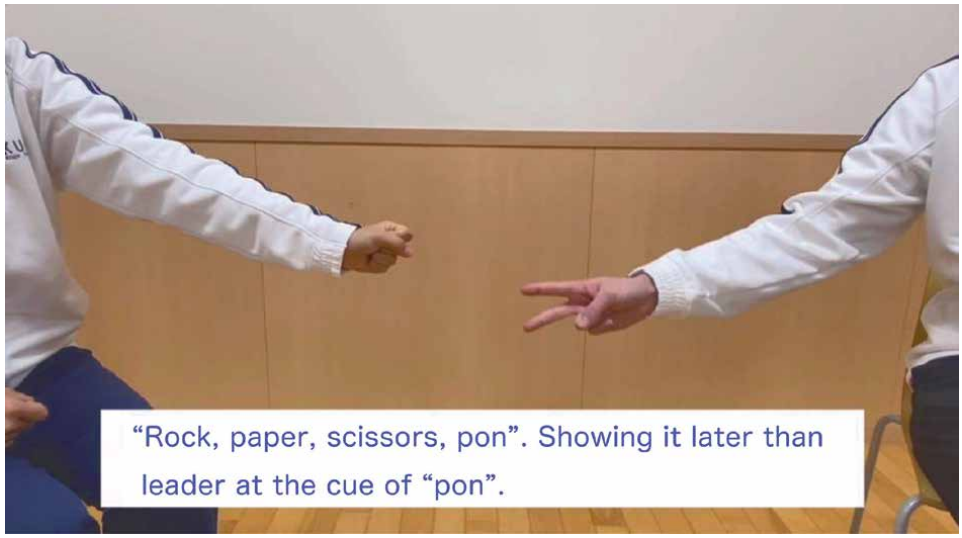


Figure 5.
Exercise where one waits to see one's the opponent's move before doing anything to ensure victory against the leader in rock-paper-scissors. The leader is the student on the right. The student on the left shows their hand after the leader to ensure victory.

introducing the exercise methods were produced (**Figures 4** and **5**). These were then distributed to local communities to provide exercise guidance to the elderly. Nine types of exercises were prepared for the cognitive function maintenance exercises. These were filmed while changing the exercise difficulty level and exercise speed. Then, the videos were edited so that the elderly could understand them easily, such as by adding subtitles to the videos filmed, and DVDs explaining the content of the exercises were produced.

3. Results of activity

We herein report the activity contents in one local community where the "Brain Wakawaka Club" activities could be continued for 3 years.

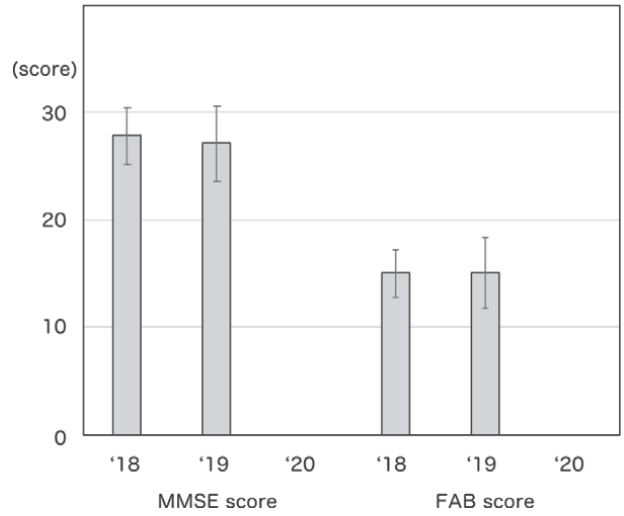


Figure 6.
Changes in MMSE and FAB scores over time. There were no significant changes in the MMSE and FAB scores over time. (It could not be conducted in 2020 due to the shortening of the cognitive function evaluation time caused by the spread of COVID-19 infection).

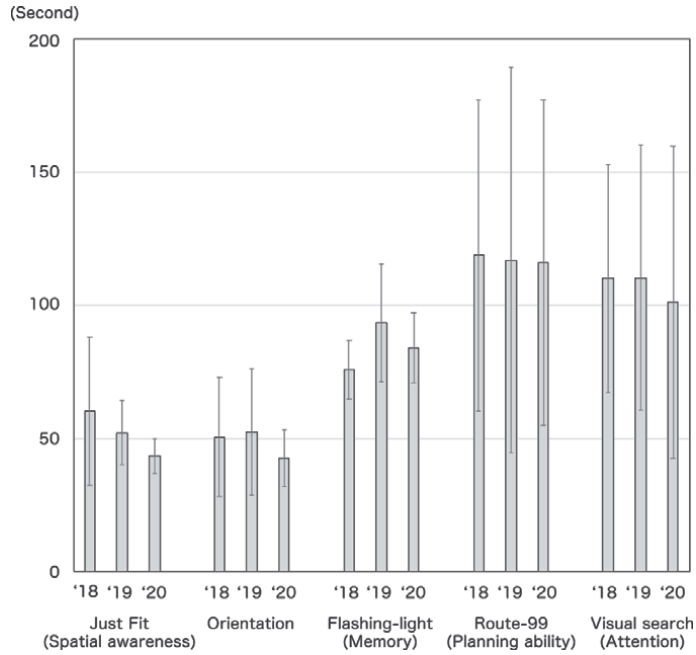


Figure 7.
Changes in time required for the five types of tasks by CogEvo® over time. Changes in the average time required were observed for each task, but there were no statistically significant changes over time in all five tasks.

A total of 23 elderly people participated in our club, including 5 men and 18 women (mean age of 71.9 ± 7.2 years: 58–86 years). Among them, a total of 13 elderly people participated every year, including 3 men and 10 women (mean age of 70.9 ± 8.1 years: 58–86 years). The results of their cognitive function evaluation by MMSE, FAB, and CogEvo® were compared over the years, and it was found that none showed significant changes (**Figures 6** and 7). With regard to cognitive function maintenance exercises, the local community representative reported that exercises performed during the "Brain Wakawaka Club" were carried out as a continuous activity.

4. Discussion

Cognicise is expected to improve cognitive function and suppress the progression of cerebral atrophy by activating the brain, compared to exercises where one only moves the body [4–8, 13]. Due to the small number of subjects, the very short guidance regarding cognitive function maintenance exercises at 5 weeks out of a year, and the inability to confirm the continuous implementation of the guided exercises in local communities, this activity of the "Brain Wakawaka Club" has many issues in terms of verification. Thus, it cannot be said that the activity of our club contributes to the prevention of cognitive decline.

On the other hand, the elderly individuals participating in the "Brain Wakawaka Club" provided comments such as "I am grateful because I can check my own cognitive function every year and understand my own condition," "It is fun to be able to exercise with the young students," "I feel lonely and sorry that I could not meet the students due to COVID-19 this year," "I really wish to exercise with the students next year", and "I am grateful because DVDs were made as a measure against COVID-19, and we can exercise while reviewing ourselves from now on." Thus, as the local community responded well to the activity of our club, we expect that this activity will contribute to activities for the health maintenance of the elderly in the community.

In addition, the participating students expressed thoughts such as "By knowing the exercises for cognitive function maintenance, I came to understand that various cognitive functions are related to casual human movements," "This became a practice for speaking with patients in a clinical setting," "I understood that talking speed is also important when providing explanations to the elderly so that they can understand me easily," and "I realized the embarrassment when talking with patients in the clinical setting," and it was thought that a learning effect can also be expected for occupational therapists in clinical settings.

In the future, we would like to expand the "Brain Wakawaka Club" range of activities and verify the same of our club in the community.

Conflict of interest

The authors declare that they have no competing interests.

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Chapter 6

Perspective Chapter: Mountain Health Care Room

Kuniyo Maitani, Yoko Takeuchi, Ayano Miyazaki, Mitsue Iso, Hiromi Tamura, Katsumi Yamase, Haruko Ida, Yuki Kamatani, Noriko Suzuki, Kanae Taniguchi, Kanako Kawagata and Takako Kajii

Abstract

The Kinjo University Faculty of Nursing has been running a project since 2017 as part of its community collaboration activities to help Hakusanroku residents maintain good health. First, we opened the Mountain Health Care Room for community salon participants and conducted a basic survey of Hakusanroku healthcare supporters and community residents. We then provided health education and recreational activities to help older adults maintain good health. Since 2020, we have been unable to hold community activities due to the COVID-19 pandemic, and have been attempting to determine the day-to-day circumstances of residents. In addition to in-person community activities, there is a need for new initiatives such as online activities to help people connect and help older adults living in Hakusanroku to maintain good health.

Keywords: community collaboration, healthcare supporters, community residents

1. Introduction

The Kinjo University Faculty of Nursing is in the city of Hakusan [1], which is located in the southwestern part of Ishikawa Prefecture, Japan. Hakusan is the largest municipality in the prefecture by land area, covering a variety of terrain from hilly and mountainous zones to flat urban areas with many shopping facilities (**Figure 1**). With a population of 113,291 (June 2021), it is the second-largest city in the prefecture. The hilly and mountainous zone is called the Hakusanroku region, comprising five districts: Kawachi, Yoshinodani, Torigoe, Oguchi, and Shiramine. The Hakusanroku region covers 86% of the municipality's land, but just 4.7% of its population. With an aging rate of 42.8% (June 2021), it faces serious problems as the younger age group shrinks and the older age group grows due to population decline.

Some such problems are the weakening of district communities, a shortage of medical care, welfare, and nursing care specialists compared to the city center, and resulting depletion of social welfare resources for medical and nursing care. Hakusanroku is covered in the prefecture's program for promoting independence in underpopulated areas. In 2015, the City of Hakusan conducted a questionnaire

Figure 1.
City of Hakusan map.

survey on residents [2, 3] and found that people in the Hakusanroku region resided there longer and had a stronger desire to settle down there compared to other regions. However, revealed that they were concerned about medical care and welfare and felt that transportation there is inconvenient. Compared to other regions, there was also a higher ratio of people who gave the lush natural environment and the friendliness of the people as reasons why the Hakusanroku region is a pleasant place to live.

To continue programs to help Hakusanroku community residents improve and maintain their own health as depopulation progresses, there was a need to create a learning space where residents could continue lifelong learning and a place for in-person consultations. The region needed to establish and flexibly run a place where community residents could easily come with their problems that also functions like a school nurse's office and place of healing.

We, therefore, decided to open a Mountain Health Care Room for all ages to help Hakusanroku residents improve and maintain their health. A field survey was conducted in 2016, and the Mountain Health Care Room program was launched in August 2017.

2. Activities at the Mountain Health Care Room

2.1 Basic survey on opening a Mountain Health Care Room (January 2016–March 2017)

From February to October 2016, the Yoshinodani Clinic, which provides health-care services to Hakusanroku community residents, and other relevant facilities and

hospitals were visited and surveyed on their roles and functions in the Hakusanroku community. Specifically, we joined visiting-care visits to groups' homes, joined house calls, participated in self-help community meetups (called "salons"), held interviews on community center activities, visited dementia cafés, intensive nursing-care homes and public hospitals, and interviewed local chief Buddhist priests.

The Hakusanroku Service Cooperation Council is a system for nursing-care facilities and clinics in Hakusanroku, the aim of which is to cooperate and protect the health of residents. In May 2016, questionnaires about the lifestyles of Hakusanroku residents from an expert's perspective were given to doctors, nurses, long-term care support specialists, occupational therapists, social workers [4], and other professionals. In addition, starting in November 2016, questionnaires were given to residents in two districts of Hakusanroku to determine their health status and daily living needs [5]. In order to gather information to use in developing activities that reflect their inclinations, Hakusanroku supporters and residents were also asked for their opinions on what the Mountain Health Care Room should provide.

2.2 Launching of the Mountain Health Care Room project

On August 24, 2017, the Mountain Health Care Room held a joint kickoff event with the Oguchi District Sokusai Community Salon (**Figure 2**). Sokusai is primarily run by seven people, including the main representative, and has about 30 members. It is a self-help group that meets twice a month with the primary purpose of prolonging healthy life. The kickoff event was attended by 16 residents, 5 senior caretakers, and 6 students, and 10 faculty members from Kinjo University.

At the event, students first measured participants' blood pressure. Next, they introduced the Mountain Health Care Room and the faculty members gave a 30-minute talk on sleep. The event ended with leg-stretching exercises provided by Hakusan and a hand-holding game with participant-student pairs. Participants commented that they looked forward to the interesting lecture and interaction with the students and appeared to enjoy the Mountain Health Care Room activities, providing hints for what to do in the future.

2.3 Main Mountain Health Care Room activities

The main activities were Mountain Health Care Room events at activity spots in the community, outreach lectures held jointly with the community general support center,

Figure 2.
"The Mountain Health Care Room" held a joint kickoff event/lecture and recreation.

running of Odekake Hustle Saturday events hosted by the Yoshinodani Community Center, participation in culture festivals run by the Yoshinodani Community Center, participation in Hakusanroku Service Cooperation Council meetings, and a symposium to discuss integrated community care in Hakusanroku (**Table 1**).

Month	Year		
	2017–2018	**2018–2019**	**2019–2020**
April			April 17—Mountain Health Care Room Outreach lecture* (Kawachi Federation of Senior Citizens' Clubs)
May			May 15—Hakusanroku Service Cooperation Council
June			June 6—Mountain Health Care Room Outreach lecture* (Yoshinodani Health Management Center)
July			July 12—Outreach lecture* (Kamiyoshitani Momijikai)
August	August 24—Kickoff event (jointly with the Sokusai Community Salon)	August 7—Mountain Health Care Room Outreach lecture* (Ichihara Community Salon) August 23—Odekake Hustle Saturday (Faculty of Nursing, Kinjo University)	August 6—Mountain Health Care Room Outreach lecture* (Ichihara Community Salon) August 21—Service Coordination Meeting August 22—Odekake Hustle Saturday (Faculty of Nursing, Kinjo University)
September	September 20—Hakusanroku Service Cooperation Council September 21—Mountain Health Care Room (jointly with the Sokusai Community Salon)		
October	October—5 Mountain Health Care Room Outreach lecture* (Hotto Work Chugu Community Salon) October 18—Mountain Health Care Room Outreach lecture* (Yoshinodani Community Salon Michinosato) October 29—Participation in the Yoshinodani Culture Festival Mountain Health Care Room booth	October 12—Mountain Health Care Room Outreach lecture* (Kamiyoshitani Momijikai) October 28—Participation in the Yoshinodani Culture Festival Mountain Health Care Room booth	October 7—Participation in the Yoshinodani Culture Festival Mountain Health Care Room booth
November	November 11—Participation in a symposium to discuss integrated community care in Hakusanroku	November 10—Participation in a symposium to discuss integrated community care in Hakusanroku November 15—Mountain Health Care Room (jointly with the Sokusai Community Salon)	November 9—Symposium to discuss integrated community care in Hakusanroku November 7—Mountain Health Care Room Outreach lecture* (Hotto Work Chugu Community Salon) November 27—Hakusanroku Service Cooperation Council Special Lecture

Month	Year		
	2017–2018	2018–2019	2019–2020
December	December 15—Mountain Health Care Room (jointly with the Oguchi Community Center Mahjong Competition)		
January		January 16—Hakusanroku Service Cooperation Council	January 15—Service Cooperation Meeting
February			
March	March 6—Mountain Health Care Room (jointly with the Oguchi Community Center Mahjong Competition) March 15—Mountain Health Care Room (jointly with the Sokusai Community Salon)	March 14—Mountain Health Care Room (jointly with the Sokusai Community Salon)	March 19—Odekake Hustle (jointly with the Sokusai Community Salon)

**Canceled due to the COVID-19 pandemic.*

Table 1.
Mountain Health Care Room activities from 2017–2018 to 2019–2020.

2.3.1 Mountain Health Care Room events at activity spots around the community

In 2017–2018, the kickoff event was followed by Mountain Health Care Room events held jointly with Sokusai Community Salon in September and March and with a mahjong competition ran by the Oguchi Community Center in December and March. At the Sokusai Community Salon, students measured participants' blood pressure and ran recreational activities that they had planned. All participants ate lunch together and got involved in everything from preparation to cleanup. By spending time together, participants, students, and faculty members interacted closely, providing a look into the everyday behavior of participants. Twenty-two people attended the event including the senior caretaker, and 6 students, and 7 faculty members participated (**Figure 3**).

The Oguchi Community Center's mahjong competition took place as a social event for residents in winter when there are no farming activities. While the community salons had more female participants, the situation was the opposite at the mahjong competition – there were more males. On this day, there were 8 competitors, 2 Oguchi Community Center staff members, and 3 faculty members. Before the mahjong competition and between matches, body measurements such as blood pressure and body composition were taken, and health consultations were provided.

In 2018–2019, Mountain Health Care Room events were held jointly with the Sokusai Community Salon. After students took blood pressure measurements, a faculty member gave a lecture on high blood pressure and important lifestyle points with an exercise component. Participants found this topic particularly interesting, and they actively engaged in discussion about their own health management. Moreover, they were highly amicable during the recreational activities ran by

Figure 3.
"The Mountain Health Care Room "events held with Sokusai Community and the Oguchi Community Center.

the students. There was a break time in which health consultations were provided while participants enjoyed tea, snacks, and casual conversation. The event was attended by 20 participants including the senior caretaker, as well as 6 students and 5 faculty members.

In 2019–2020, the joint program with the Sokusai Community Salon that had been planned for March was canceled due to the COVID-19 pandemic.

2.3.2 Outreach lectures and Mountain Health Care Room events held jointly with the community general support center

The community general support center shared information about outreach lectures desired by each district's salons with the Mountain Health Care Room, and the Mountain Health Care Room group provided outreach lectures when possible. The basic structure of outreach lectures is a two-hour program comprising measurement of participants' blood pressure and other health measurements, a short lecture, and exercise or recreational activities. A tea break is provided for participants to socialize and in consideration of fatigue and concentration ability. One or two faculty members oversaw each session and students took part when needed.

Outreach lectures were held in two places in 2017–2018, two places in 2018–2019, and in five places in 2019–2020 (**Table 2**).

Lecture topics were decided after discussion with community salon senior caretakers and community general support center staff. Care was taken to avoid overlap of topics when the lecture was provided for a salon more than one time. Group participation was emphasized, and the events proceeded with consideration given to the participants' conditions (**Figure 4**). Outreach lectures enabled direct confirmation of residents' health status and health concerns.

2.3.3 Odekake Hustle Saturday event

On one Saturday a month, the Yoshinodani Community Center holds an activity called Hustle Saturday for local elementary and junior high school students to do crafts and outdoor activities. The Mountain Health Care Room ran a program in conjunction

Target	2017–2018	2018–2019	2019–2020
Hotto Work Chugu Community Salon	Lecture: "Being able to swallow helps you live longer" (thickened food tasting), fun quiz		Lecture: "How to practice relaxation—Breathing techniques to help yourself" (performing breathing techniques with respiratory rehabilitation tools)
	14 residents took part		24 residents took part
Yoshinodani Community Salon Michinosato	Introduction to community general support center activities, introduction to Mountain Health Care Room activities, lunch get-together		
	18 residents took part		
Ichihara Community Salon		Lecture: "Living a rich life during old age—Preventing frailty"	Lecture: "Preventing heat illnesses," social gathering for participants and students
		14 residents took part	10 residents took part
Kamiyoshitani Momijikai		Lecture: "Talking about sleep," exercise for brain	"Heat illnesses and oral rehydration solutions"
		20 residents took part	15 residents took part
Kawachi Federation of Senior Citizens' Clubs			Lecture: "High blood pressure and important lifestyle points"
			40 residents took part
Yoshinodani Health Management Center			Lecture: "Eating safely—Swallowing basics and approach" (repetitive saliva swallowing test)
			23 residents took part

Table 2.
List of results of outreach lectures.

with these activities in which Hakusanroku elementary and junior high school students, as well as older adults, were invited to Kinjo University to try nursing-care techniques and to interact with the university students. This event was called Odekake Hustle Saturday, and took place once in 2018 and once in 2019. The event began at 10:00 am with a stamp rally in which the participants went to four practical training rooms at the university and tried nursing-care techniques. The university students and faculty members joined the attendees for lunch altogether. In the afternoon, the participants split into groups to compete in games planned by the university students. This event ended with tea time and reflection on the day's activities, finishing at 3:00 pm.

In the nursing-care technique practice, the participants gave a bath to a baby doll, tried a wheelchair, practiced hand washing, and used a stethoscope to listen to sounds in the body. Children and older participants alike enjoyed the event. Activities took

Figure 4.
Outreach lectures by "The Mountain Health Care Room".

into account fatigue and the burden on older participants, as well as the creation of a safe environment. In 2018, 15 elementary and junior high school students, 16 older adults, and 10 staff members came to the university, and 11 university students and 10 faculty members ran the program. In 2019, 11 elementary and junior high school students, 14 older adults, and 9 staff members came to the university; 14 university students and 10 faculty members ran the program. Visiting the university was a special experience for older adults and children alike. Participants rated the program highly, saying they were able to experience something different from the usual and greatly enjoyed interacting with the students (**Figure 5**).

2.3.4 Participation in the culture festival held at the Yoshinodani Community Center

The Yoshinodani Community Center holds a culture festival every year on the last sunday in October. It is one event for all age's residents look forward to and features craft presentations as well as booths opened by local residents.

The Mountain Health Care Room took part in the Yoshinodani culture festival in 2018 and 2019 and opened a Mountain Health Care Room booth in a room in the Community Center where people could take various health measurements. University students and faculty members took blood pressure and body composition measurements, measured grip and back strength, and measured oral cavity hydration. Meanwhile, visitors could try handwashing, crafts, and hand massages. About 60 people of all ages visited and developed community connections through health (**Figure 6**).

2.3.5 Participation in Hakusanroku Service Cooperation Council meetings and a symposium to discuss integrated community care in Hakusanroku

The Hakusanroku Service Cooperation Council is run by people involved in medical and nursing care in the Hakusanroku community. Aiming to help Hakusanroku residents live with peace of mind in the community they know well, it holds various programs once every other month.

The objective of the Hakusanroku Service Cooperation Council is to build face-to-face connections. To boost awareness of home-based medical and nursing care, it chooses its own topic for each meeting, assesses the social resources in the community, exchanges information, discusses problems in multidisciplinary collaboration

Figure 5.
"Odekake Hustle Saturday" event/nursing experience and breaks.

Figure 6.
Participation in cultural festival held at Yoshinodani Community Center/health check and hand massage.

and solutions for them, and holds seminars to share case reports. Local issues raised by the Service Cooperation Council are discussed by the Hakusan Home Healthcare Cooperation Support Council, which is the umbrella organization and is used in policy formation, reflecting them in long-term care insurance program planning. The Hakusanroku Service Cooperation Council comprises 17 facility offices and has over 30 members. The Mountain Health Care Room has been participating since February 2016 as a member of both the Council and its preparatory committee.

In November 2017 and 2018, the Council held a symposium to discuss integrated community care in Hakusanroku. The goals of the symposium were to introduce current activities and initiatives underway to enable residents to continue living with peace of mind in the Hakusanroku community they know well and to provide

a platform for residents to discuss the future of Hakusanroku community activities. About 100 people took part, including community residents and related individuals, as well as students and faculty members from Kinjo University. During the symposium, a health measurement booth was also set up, and university students were in charge of health measurement and venue reception.

2.4 Activities during the COVID-19 pandemic (April 2020–March 2021)

In 2020–2021, COVID-19 infections spread rapidly and all activities that had been carried out before were canceled. The Mountain Health Care Room was held on September 17 in collaboration with the Sokusai community salon, which is the only self-help group resuming activities, with sufficient infection control measures in place. It was attended by 23 participants including senior caretakers, as well as 2 university students and 4 faculty members. The program comprised a practical lecture on the correct way to wash your hands and recreational activities led by university students (**Figure 7**). To prevent infection, the program was shorter and did not include tea time.

With the COVID-19 pandemic expected to continue for some time, there is concern that less intervention into the health-related activities of Hakusanroku residents may lead to a decline in how they maintain their own health. As such, the Mountain Health Care Room collaborated with the Kinjo University Faculty of Health Sciences' Yuyu Health Club to determine the effects of online health classes. One feature of the Mountain Health Care Room was intergenerational exchange among Hakusanroku residents and university students. Even without an in-person meeting, online classes could potentially foster connections online and lead to self-initiated health maintenance activities. The program was for 20 people who take part in the Sokusai community salon.

An online outreach lecture took place on March 4, 2021 (**Figure 8**).

Participants listened politely to the lecturer on the screen, but they began smiling and laughing when the university students called on them to do health exercises, and they began exercising together. After it ended, they commented that it was fun, indicating that online outreach lectures have the potential to support health. Online activities are a new challenge for older adults, and may also serve as good stimulation and an important way for them to recognize their own ability to carry out all sorts of activities.

Figure 7.
" The Mountain Health Care Room " was held while taking measures against infection.

Figure 8.
Online outreach lectures.

2.5 Educational aspect of university student participation

University student volunteers also took part in Mountain Health Care Room activities. Interaction with Hakusanroku residents was a form of intergenerational exchange for the students, serving as an opportunity for them to create mutually supportive relationships and grow at a social level. It was also a chance for them to think about health issues from physical, psychological, and social perspectives through health measurement and health consultations. Furthermore, their experience of planning and running recreational activities helped them develop their creativity, coordination skills, and execution capabilities.

3. Mountain Health Care Room challenges and future prospects

Although online activities are planned, it will be difficult to continue programs if circumstances that prevent meeting in person continue. Even with online activities, many people lack Internet access, so careful planning is needed.

The Mountain Health Care Room has been focused on providing health support in a place where people gather, taking advantage of the community's strength. Although the basic activities will not change, a challenge going forward will be to consider ways to support individuals. To achieve the Mountain Health Care Room goals of providing a place for lifelong learning and a place where local people can feel free to consult face to face, we must value the endeavors undertaken to date while also incorporating new methods in flexible ways. Possible examples include creating a package for outreach lectures and developing health management tools that use information and communication technology. In this light, we will consider ways to provide Mountain Health Care Room activities to Hakusanroku residents that are available anytime, anywhere, for both groups and individuals.

Conflict of interest

The authors declare that they have no competing interests.

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Chapter 7

Perspective Chapter: Improving Children's Foot Health and Shoe Education from the Foot Health Education Project

Satoshi Kojima, Tomoyuki Maruo and Tomoko Kawaguchi

Abstract

With the aim of improving the foot health of infants and school-age children, Kinjo University in Japan has established the *Foot Health Education Project* in 2014, under which university faculty members, students, and industrial organizations have conducted joint activities. The results of surveys on approximately 3000 children to date have shown high prevalence rates of bunionette, undeveloped foot arch, floating toes, and a paucity of wearers of right-size shoes. Under such circumstances, a follow-up survey has been conducted to examine whether changes in foot morphology can be reversed by wearing right-size shoes. The results have suggested that wearing right-size shoes facilitated the development of foot arch and improved floating toes. We plan to continue surveys and share the trends obtained from survey results and possible measures with community residents. In addition, we plan to establish scientific evidence that is useful for education and that contributes to the healthy development of children's feet.

Keywords: children, shoes, foot arch, floating toes, shoes education

1. Introduction

Recent studies have reported various changes in the feet of infants and school-age children [1, 2]. Notable changes include hallux valgus, bunionette [1, 2], floating toes, and undeveloped foot arch [3]. However, fact-finding surveys on different age groups have been lacking, whereas surveys on small populations in limited areas have been reported. Therefore, surveys to determine changes and their prevalence among children over time are required.

Much has remained unknown about the cause of these changes in foot morphology. Measures recommended for the proper development of the feet include playing outdoors [4], exercising with bare feet [5], and wearing shoes properly [2, 6]; however, these measures lack evidence. Therefore, elucidating the causes of such morphological changes and proposing specific measures for prevention and correction have become necessary.

To tackle these issues, Kinjo University in Japan has established the *Foot Health Education Project* in 2014 with the objective of improving the foot health of infants and school-age children. This joint project has been conducted by university faculty members, students, and industrial organizations toward the following goals:

i. To survey foot-ground contact and toe deformities and share findings with children, guardians, and educators;

ii. To increase children's knowledge about and interest in their feet and provide them with useful knowledge, such as how to choose the right shoes, the proper way of wearing shoes, and how to acquire good exercise habits;

iii. To accumulate data and present scientific evidence useful for education;

iv. To widely disseminate trends and measures based on survey results to the community and academic societies; and

v. To provide education on foot maintenance, how to select shoes, and how to wear shoes.

To date, this project has conducted fact-finding and annual surveys on approximately 3000 children. The subsequent text summarizes the findings from these surveys and discusses common changes in foot morphology among children and possible measures for prevention and relief.

2. Fact-finding surveys on children's feet and shoes

This project has been conducting fact-finding surveys on feet and shoes in infants and school-age children since 2014. **Table 1** presents the incidence rates of abnormal findings among children aged 3–8-years. Hallux valgus (first metatarsophalangeal angle ≥ 16°) tended to increase from 6 years of age, whereas bunionette (digitus quintus angle ≥ 12°) was found to be highly prevalent among 3-, 6-, and 8-year-old children (approximately 40%, 50%, and 75%, respectively). Moreover, foot arches were not formed in approximately 40% of 8-year-old children (third grade in elementary school). Floating toes (i.e., toes are not in contact with the ground when standing) were common among children from an early age, where children with 10 toes touching the ground were fewer than those who did not [7]. A cross-sectional

		3 y/o	4 y/o	5 y/o	6 y/o	7 y/o	8 y/o
		(n = 566)	(n = 545)	(n = 560)	(n = 274)	(n = 266)	(n = 150)
Hallux valgus	(%)	6.6	6.2	4.2	13.4	25.1	24.0
Bunionette	(%)	39.6	38.8	39.1	52.1	68.1	74.7
Undeveloped foot arch	(%)	50.6	49.2	37.0	42.1	39.2	39.3
Floating toes	(%)	65.4	63.6	63.3	68.8	76.7	79.3

Table 1.
Incidence rates of abnormal findings.

		Elementary school students (n = 119)	Middle school students (n = 44)	High school students (n = 160)
Hallux valgus angle	(°)	10.5 ± 5.4	12.0 ± 4.7	10.8 ± 5.1
Digitus quintus angle	(°)	13.6 ± 4.9	14.7 ± 4.7	15.2 ± 5.0*
Floating toes	(%)	68.1	75.0	78.1

**Tukey-Kramer test; vs. elementary school students, $p < 0.05$.*

Table 2.
Toes angles and floating toes in students.

survey [8] on elementary school, middle school, and high school students has demonstrated that the digitus quintus angle in high school students was greater than that in elementary school students. Moreover, the prevalence of floating toes increased with age by 68.1%, 75.0%, and 78.1% in elementary school, middle school, and high school students, respectively (**Table 2**). These fact-finding surveys have revealed that children today exhibited high prevalence rates of bunionette, undeveloped foot arch, and floating toes, which supported the findings from previous studies [9, 10].

Furthermore, a survey on the difference in size between feet and shoes was conducted on infants, elementary school students, middle school students, and high school students. **Table 3** summarizes the results. Japan Engineering Standards stipulated that shoe size indicates the foot length that can fit in the shoe; therefore, appropriate shoe size should be equal to the foot length. A survey on measured foot lengths and shoe sizes revealed that 48.0% and 23.5% of infants and elementary school students, respectively, and 10% of middle school and high school students were wearing right-size shoes, whereas older children tended to wear shoes larger than the right ones [7, 8]. When guardians, middle school students, and high school students were asked about the reason for purchasing particular shoe sizes, their most common responses were: "did not know what the right size was," "intentionally selected a larger size given the further growth of the feet," and "thought the purchased one was the right size."

These results indicated that people tended to purchase oversized shoes due to a misunderstanding of the right shoe size; the assumption that loose-fitting shoes are the right size; or an overestimation of the growth speed of children's feet. In Japan, no opportunities practically exist to measure the size of feet, such that many people are unaware of the size of their feet. Thus, people must rely on how the shoes feel when putting on shoes or have children put on their shoes to determine the appropriate size. Moreover, opportunities to learn about shoes in Japan are lacking, and the Japanese shoes

		Infants	Elementary school students	Middle school students	High school students
		(n = 952)	(n = 119)	(n = 44)	(n = 160)
Undersized shoes	(%)	5.2	2.5	0	0
Right size	(%)	48.0	23.5	2.3	7.5
Oversized shoes	(%)	46.9	73.9	97.7	92.5

Table 3.
Size difference between feet and shoes.

		Right size	Inappropriate-size	p value
		(n = 308)	(n = 321)	
Percentage	(%)	49.0	51.0	—
Hallux valgus	(%)	6.7	4.7	0.14
Bunionette	(%)	33.5	38.2	<0.05
Undeveloped foot arch	(%)	44.5	48.6	0.16
Floating toes	(%)	52.6	74.5	<0.05

Chi-square test.

Table 4.
Changes in foot morphology by shoe size.

culture prefers shoes that are easy to wear and remove [11, 12]. These examples are a few of the reasons why children and their guardians fail to select appropriate shoe sizes.

3. Impact of inappropriate shoe size on feet

Changes caused by wearing inappropriate shoe size constantly include hallux valgus, bunionette, and keratonosis of the skin, such as calluses [13, 14]. Especially, many studies reported a correlation between keratonosis and pain [15]. Interestingly, several studies observed that complaints about pain are more common in people wearing oversized shoes than in those wearing undersized shoes [16].

In terms of morphological changes related to the toes, bunionette and floating toes were frequently observed in individuals wearing inappropriate-size (oversized) shoes than in those wearing appropriate-size shoes (**Table 4**) [17]. Thus, the constant use of oversized shoes is likely to promote toe deformities and injuries in addition to other risks of wearing shoes [18, 19].

4. Right-size shoes help the feet to fulfill their function

This project conducted a one-year follow-up study to examine whether the use of appropriate-size shoes alleviated the changes in foot morphology [20, 21]. We provided 120 students (n = 35, 17, 17, 25, and 26 in 1st, 7th, 8th, 10th, and 11th grades, respectively) with shoes fitted to their foot lengths and widths. The students were requested to wear them as indoor shoes in their schools for 1 year. The result indicated significant increases in the arch-height ratio (the height from the floor to the navicular bone/foot length) and significant decreases in the number of floating toes (**Table 5**). These findings suggested that using right-size shoes facilitates foot arch development, improves floating toes, and helps toes to fulfill their original function.

5. Shoes education for children

In Europe, people are accustomed to selecting the right-size shoes and wearing them properly to protect foot health [12]. As previously described, no such custom

		Elementary school students (n = 35)		Middle school students (n = 34)		High school students (n = 51)	
		First time	After 1 year	First time	After 1 year	First time	After 1 year
Arch–height ratio	(%)	9.6 ± 5.2	13.6 ± 8.0	12.4 ± 3.5	13.7 ± 3.1	11.8 ± 2.7	12.6 ± 3.4[a]
Percentage of floating toes	(%)	77.1	68.6	70.6	55.9	84.3	52.9
Total number of floating toes	(Number)	92	67[b]	71	34[b]	103	41[b]

[a]*Chi-square test; $p < 0.01$.*
[b]*Paired t-test; vs. first time, $p < 0.05$.*

Table 5.
Changes in arch–height ratio and floating toe at 1 year follow-up.

exists in Japan, such that selecting appropriate shoes is difficult for many Japanese people due to the lack of awareness about their foot size.

This project conducted a two-year longitudinal study on five-year-old children to examine the educational effects of providing knowledge on feet and shoes, how to select right-size shoes, and how to wear them properly [22]. However, the study observed no notable differences in the fitness of shoe size and changes in foot morphology. The results suggested that education should be initiated as soon as children are beginning to wear shoes. Moreover, education on how to wear shoes, instead of the size of shoes and whether shoes have any strap, was more influential among pre-school children. Thus, future studies should continue the education on the proper selection and wearing of shoes. Furthermore, an assessment of educational effects should be conducted.

6. Conclusions

In this project, we surveyed the common changes in the foot morphology of children and shared the trends observed from the results. We also presented possible measures to community residents. We plan to continue surveys and hope to characterize the effects of selecting appropriate shoes and wearing shoes properly on foot development. In addition, the fact remains that various foot changes are occurring in children today as demonstrated by previous studies and the surveys in this project. Despite these individual differences, we hope to build scientific evidence useful for education toward the healthy development of children's feet.

Conflict of interest

The authors received 213 pairs of educational shoes from the Japan Education Shoes in 2017 and 2018. There is no conflict of interest to be disclosed for other studies.

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Chapter 8

Perspective Chapter: The Club Activities Support Project (CASP)

Shota Nagai and Takuya Yamamoto

Abstract

Since 2016, we have been implementing the "Club Activities Support Project" for junior high and high school students in Ishikawa Prefecture. This project provides support to students, helping them improve their athletic performance and preventing injuries from occurring or recurring during club activities by utilizing the knowledge and skills of our university's Faculty of Health Sciences. Faculty members and students from our university visit nearby junior high and high schools to observe club activities and evaluate the muscle strength and flexibility of club members. Based on these evaluations, we have developed strength training and stretching programs. We also developed a functional training program based on individual athletic characteristics and provided additional specialized training using the facilities of our university.

Keywords: sports physical therapy, community contribution, club activities

1. Introduction

Knowledge obtained through research at universities is generally returned to society through patents and commercialization. However, in the case of a university such as ours that trains physical therapists, this knowledge can be returned directly to local residents in the form of exercise and training programs conducted as part of health promotion and health care activities. Providing such exercise programs is one way in which universities that train physical therapists should contribute to society. Yet, there is no curriculum that requires universities with physical therapy departments in Japan to contribute to the community in this manner. If the curriculum of university physical therapy departments were to include physical therapy interventions for local residents, it would provide a beneficial opportunity for active learning in which university students could learn to solve actual problems.

2. A place to practice sports physical therapy is required for university students in the physical therapy departments to contribute to the community

Japan has both an aging population and a declining birthrate, which is unparalleled around the world. As a result, the elderly tend to be the large majority of physical therapy patients. However, younger people may also sometimes need physical

therapy. According to the results of a questionnaire survey of 35 undergraduate students in our department, the most common reason that they needed physical therapy was an injury sustained during club activities (**Figure 1**).

In addition, most students answered that the area of physical therapy they were most interested in when they entered university was sports-related physical therapy (**Figure 2**). When we asked about the level of satisfaction with sports-related lectures at our university, the most common response was that the contents were insufficient, and the students indicated that they were interested in further opportunities to practice in the field of sports (**Figure 3**).

In addition to contributing to the local community, the "Club Activities Support Project (CASP)" gives undergraduates the opportunity to practice what they have

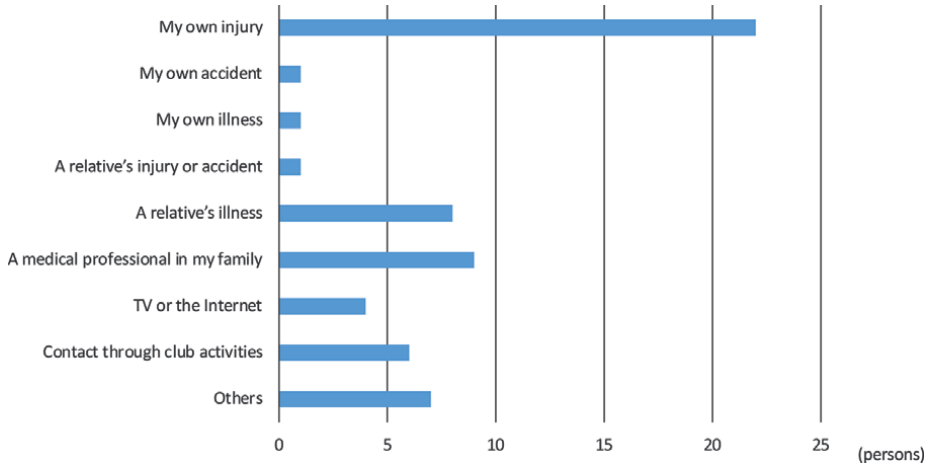

Figure 1.
Results of responses on what made students want to become a physical therapist.

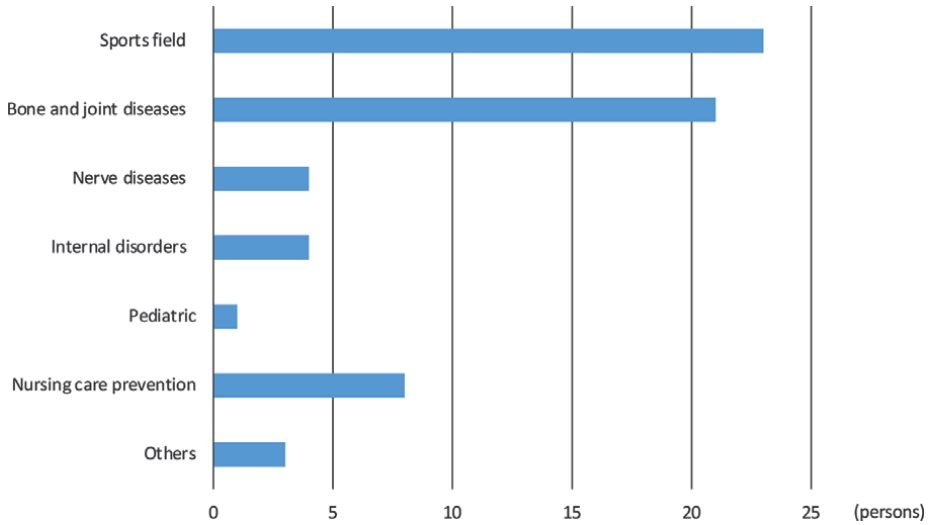

Figure 2.
Areas that students reported being most interested in when they entered university.

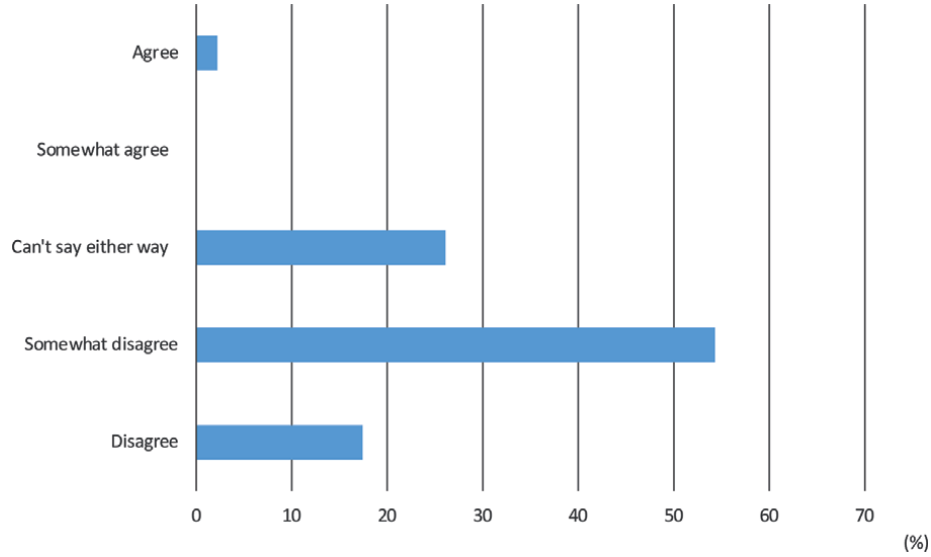

Figure 3.
Students' responses to the question, "Do you think that sports-related education at this university is sufficient?".

learned about sports in the club activities of local and junior high and high schools, which is of great interest to our students.

3. What is CASP?

3.1 Overview of CASP

CASP is a program that supports junior high and high school students, helping them improve their athletic performance and preventing injuries from occurring or recurring during club activities by utilizing the specialized knowledge and skills of our university's Faculty of Health Sciences. The main activities are conducted to evaluate body composition and flexibility as well as provide a menu of strength training and stretching exercises based on individual athletic characteristics.

3.2 Specifics of CASP

The following specific procedures are followed. All of the procedures are carried out by students of the university under the guidance of faculty members.

1. Visit nearby junior high and high school clubs that have agreed to participate in CASP.

2. University students give lectures on sports injuries and traumas that can occur in each athletic event.

3. Conduct muscle strength, flexibility, and performance tests for junior high and high school student athletes to determine their individual characteristics (**Figure 4**).

Figure 4.
Performance testing.

Figure 5.
Stretching instruction.

4. Provide the necessary stretching, strength training, and functional training based on the identified characteristics (**Figure 5**).

4. Impressions from high school students who participated in CASP

A total of 32 high school students who had participated in CASP were asked about their impressions of the course through a questionnaire survey.

The responses to the question "Do you think you could actually feel the effects of the strength training and stretching?" were "Agree", 71.9%; "Somewhat agree", 28.1%; "Can't say either way", 0%; "Somewhat disagree", 0%, and "Disagree", 0%.

When asked "Do you think you have become more interested in strength training and stretching?", the responses were "Agree", 71.9%; "Somewhat agree", 25.0%; "Can't say either way", 3.1%; "Somewhat disagree", 0%; and "Disagree", 0%. These results indicate that the high school students who participated in CASP had a high level of awareness and interest in the training effect.

Next, the responses to the question "Do you think interacting with university students was a positive experience?" were "Agree", 93.8%; "Somewhat agree", 6.3%; "Can't say either way", 0%; "Somewhat disagree", 0%; and "Disagree", 0%. Also, when asked "Do you think you have become more interested in the occupation of a physiotherapist?", the responses were "Agree", 34.4%; "Somewhat agree", 53.1%; "Cannot say either way", 12.5%; "Somewhat disagree", 0%; and "Disagree", 0%. These results confirmed that the participants were satisfied with their interaction with the university students and the experience increased their awareness of physiotherapy as an occupational field.

Finally, the responses to the question "Are you glad you participated in this activity?" were "Agree", 84.4%; "Somewhat agree", 15.6%; "Can't say either way", 0%;" Somewhat disagree", 0%; and "Disagree", 0%. These results indicated that the experience was generally well-received by the participating high school students.

5. Impressions of the university students who conducted CASP activities

We conducted a questionnaire survey of 12 of the students at our university who conducted the CASP activities to ask them about their impressions of the experience. The responses to the question "Did CASP increase your interest in the field of sports?" were "Agree", 50%; "Somewhat agree", 50%; "Can't say either way", 0%; "Somewhat disagree", 0%; and "Disagree", 0%. When asked the question "Do you think that you have advanced your studies in the field of sports by participating in CASP?", the responses were "Agree", 33%; "Somewhat agree", 25%; "Cannot say either way", 17%; "Somewhat disagree", 0%; and "Disagree", 0%. In addition, all 12 surveyed students (100%) answered that they had experienced growth as a result of their involvement with CASP.

As mentioned above, it can be said that CASP was effective as a learning opportunity not only for the participating high school students but also for the university students that conducted the activities.

6. Discussion

In Japan, the number of university students is decreasing due to the declining birthrate [1], and as a result, students are becoming more diverse as universities struggle to meet enrollment targets. This diversification of students poses a major challenge. In particular, the number of students who lack the basic academic skills or motivation to learn is increasing, and this is an extremely serious problem.

This is also the case in medical universities. In recent years, medical universities have introduced educational methods such as active learning [2, 3] and remedial classes in order to deal with this problem. Meanwhile, medical students are expected to have a clear orientation toward their profession from the time they enter university. In other words, if medical students do not have a strong motivation to earn the necessary qualifications, they should not enter the university in the first place. However, in reality, not only do some students lack the motivation to study, but they also lack a clear vision of their profession [2]. In particular, physical therapist training programs at medical

universities generally require students to acquire basic academic skills, improve their motivation for learning, and clarify their occupational orientation early on in their studies because they are required to develop more advanced medical skills and stronger communication skills as they prepare for the national examination and clinical practice.

In the CASP program, not only the high school students who participated in CASP activities but also the university students who conducted the activities reported feeling the effects of learning. This is due to the fact that the university students became aware of how the subjects they are studying now are connected to there and they experienced a process similar to that of actual physical therapy, which involves evaluating the client, identifying problem points, and developing a training menu to address those problem points. In other words, it can be inferred that participation in CASP provided students with insight into the work of a physical therapist and helped them understand the importance of the basic classes they are enrolled in.

7. Conclusions

Since 2016, we have been implementing CASP for junior high and high school students in Ishikawa Prefecture. This project provides support to students, helping them improve their athletic performance and preventing injuries from occurring or recurring during club activities by utilizing the knowledge and skills of our university's Faculty of Health Sciences.

In Japan, the decline of students' motivation to study has become an issue, even in medical universities. Active learning programs such as CASP, which also serve as regional examination activities, are an effective educational method because they can be expected to produce educational effects not only in the participating junior and senior high school students but also in the university students who conduct the activities.

Conflict of interest

The authors declare that they have no competing interests.

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Section 3

Practical Reports from the University for the Past Few Years

Chapter 9

Perspective Chapter: Prevention of COVID-19 at Our University

Shinichiro Maeshima, Ryuji Nomura, Etsuko Nogami, Takuya Yamamoto and Junko Yamane

Abstract

With the rapid spread of the new coronavirus, COVID-19, many universities switched to online classes to promote social distancing and reduce the risk of infection. The Ministry of Education, Culture, Sports, Science and Technology, however, requested universities hold face-to-face classes whenever possible. Therefore, after the national emergency was lifted, our university, the Kinjo University in Hakusan, launched the "Kinjo Infection Control Team" to help prevent infection on campus. Our university was one of the first universities in the Hokuriku region to resume face-to-face classes. Infection control teams were originally organized at hospitals and other medical facilities by professionals specializing in infection prevention and control. Although our university did not have an affiliated hospital, we had medical professionals, including doctors and nurses, as well as virology researchers, who conducted environmental patrols, hand hygiene education and monitoring, and infection education for students and faculty. The most important countermeasures against the spread of infectious disease in universities are the maintenance of the campus environment and the behavioral changes of students. To maintain a safe learning environment during a pandemic, it is necessary to consider the best measures to prevent infection from various aspects so that we can avoid spreading infectious diseases, and also maintain maximum student activity and provide a safe learning environment at all times.

Keywords: COVID-19, SARS-CoV-2, infection control team, prevention, university

1. Introduction

COVID-19, a viral infection caused by SARS-CoV-2, was first identified in Wuhan, China in December 2019 when a cluster of pneumonia cases was attributed to a new coronavirus [1]. Since then, it has caused a global pandemic, with 187 million cases and 4 million deaths worldwide, at the current time [2]. Though vaccination is in progress, in many countries, including Japan, the disease continues to spread, with the number of infections reaching record highs every day.

In Japan, the first COVID-19 case was detected on January 16, 2020, followed by a rapid spread of the disease. On April 7, 2020, a state of emergency was declared in seven prefectures, expanding into the whole country by 16 April as the outbreak

spread nationwide [3]. As a result, many universities started their new April semester online and held graduation and entrance ceremonies virtually. Although this social distancing helped control the spread, cluster outbreaks of the infection occurred from parties at some universities. The state of emergency was declared over at the end of May 2020, but the new coronavirus was not gone, and at this time there were many concerns about the spread of the infection.

Although virtual learning is effective, it is important for universities to also provide face-to-face classes, such as exercises, experiments, practical skills, and hands-on training for employment at hospitals and nursing homes. In order to hold in-person classes and activities safely, an on-campus team of qualified medical staff took the lead in implementing thorough infection control and launched face-to-face classes earlier than anywhere else in the Hokuriku region, located in the northwestern part of Honshu, the main island of Japan. In this chapter, we describe the infection control procedures we have been implementing at the university over the past year that have successfully allowed us to have in-person learning safely during the COVID-19 pandemic.

2. Implementation of infection control teams

An infection control team is a team that works alongside other healthcare staff and leads the control of an infection in a hospital by ensuring all measures are taken to prevent infection [4]. The team usually consists of a physician specialized in infectious diseases, laboratory technicians, nurses, pharmacists, and administrative staff. The team conducts infection rounds for environmental patrols in the hospital, as well as provides infection education to staff to prevent infection. To help prevent the spread of COVID-19, Kinjo University established its own infection control team, called Kinjo Infection Control Team, or KICT. The KICT was positioned as a subordinate organization of the infection control division (**Figure 1**). The main activities of

Figure 1.
Kinjo Infection Control Team. Kinjo University has established such an infection control team (Kinjo Infection Control Team; KICT) and named it KICT.

• Infection rounds and environmental patrols on campus
• Infection control education for staff and students
• Questionnaire survey of students and teachers
• Hand sanitization and alcohol consumption survey
• Publication of "KICT newsletter" for raising awareness

Table 1.
Activity items by KICT.

the KICT included those described above, as well as conducting surveys of students and teachers about hand sanitization and alcohol consumption and publishing a newsletter to raise awareness about the virus (**Table 1**).

2.1 Infection rounds and environmental patrols on campus

Infection control rounds of two campuses in the city, one in the Matto district and the other in the Kasama district, were carried out to improve the environment of the facilities. These environmental improvements included changing densely packed lecture rooms to allow for more social distancing, installing and adjusting acrylic panels to prevent infection spread via respiratory fluids, installing foot-operated alcohol spray machines to kill viruses on hands, advising on how to improve ventilation in facilities, and teaching students about co-curricular activities that can be done safely (**Figure 2**).

2.2 Infection control education for staff and students

On July 3, 2020, a lecture was held as a FD/SD training session, titled "University Education in the Age of Coronaviruses—From Infection Control to a New Way of

Figure 2.
Improving the environment for infection control. The acrylic panels in the student cafeterias have been installed and adjusted (a), and the foot-operated alcohol sprayer and non-contact thermometers were placed at the entrance to the campus (b).

Life". This lecture sought to educate university faculty and staff on how to hold in-person lectures safely during the pandemic. In addition, on 23 September, a lecture on "Infectious Disease Control in the Age of Coronaviruses—GoTo New Lifestyle University" was given during second-semester orientation for all students. This lecture described lifestyle changes for students to help prevent the spread of COVID-19. Finally, at each monthly Professors Meeting and Infectious Disease Committee Meeting, information on the global infection situation, local infection situation and medical conditions, and infection control measures were made available and discussed.

2.3 Questionnaire survey of students and teachers

Questionnaires were sent to university students and faculty on a regular basis using Google forms. The content of the questionnaires varied from students' perceptions and behaviors concerning COVID-19, to the specifics of teachers' lectures. The results were shared with KICT members and subsequently shared with faculty and students on the university website.

2.4 Publication of the "KICT newsletter" to raise COVID-19 awareness

In addition to the publication of KICT's activities and the results of the questionnaire surveys, a "KICT Newsletter" was also published weekly. This newsletter provided the latest information, literature, and knowledge about COVID-19, and sought to keep readers informed about the pandemic.

2.5 Hand sanitization education

Hand sanitization is one of the most basic procedures in the medical field and is highly effective at preventing the spread of COVID-19 and other diseases [5].

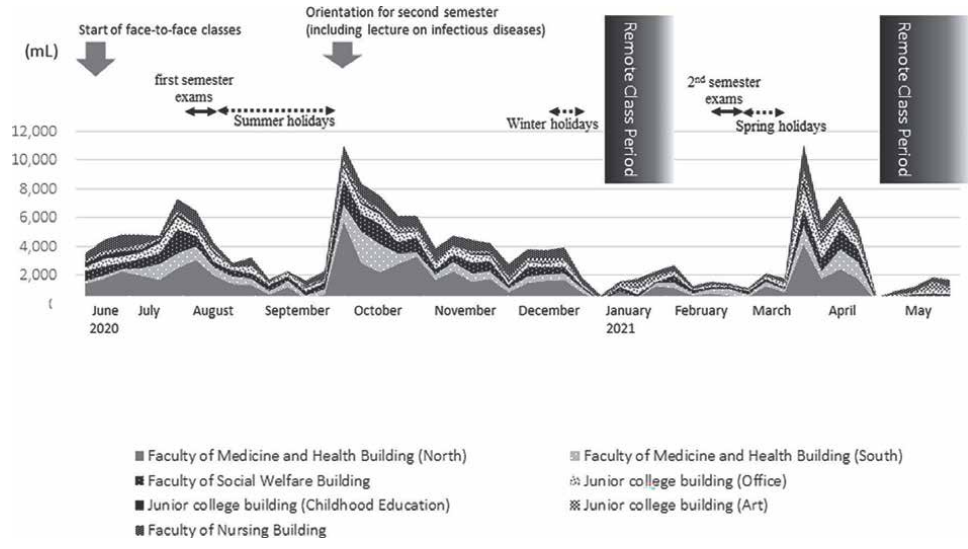

Figure 3.
Alcohol consumption was monitored with the help of the Health Care Centre.

Figure 4.
Coming to school and lunch time. Faculty members from each department stood at the entrance and instructed students to disinfect their hands, avoid crowding, closing spaces and close contact, and to wear masks correctly (a). They also instructed the students not to talk while eating in the student cafeteria (b).

Although alcohol disinfection machines were placed at the entrances of department buildings, students who had not previously experienced clinical practice had a low awareness of infection prevention and did not typically disinfect their hands. We examined the consumption of alcohol from alcohol disinfection machines with the help of the Health Care Centre (**Figure 3**). In addition to warnings by faculty in charge of student affairs, supplemental educational activities on the prevention of infection were conducted. Faculty members stood at the entrance of each department building and instructed students directly to sanitize their hands, avoid crowding, avoid closed spaces and close proximity to others, and to wear masks correctly (**Figure 4**). This encouraged almost all students to sanitize their hands on a daily routine and had a large impact on minimizing the spread of infection. To further raise awareness and encourage hand sanitization, in the Faculty of Nursing, students were encouraged to submit a motto for infection control, and the Dean of the Faculty awarded the best ones.

3. Online health and behavior checklist

In the age of the smartphone, it is easy for students to respond to surveys and questionnaires on online platforms, such as Google forms. The Online Health and Behavior Checklist was developed by Associate Professors, Tsuyoshi Kimura, and Akio Kamiya at our university. At 7 am each morning, an email was sent to students at the university, asking them to enter their morning temperature, physical condition, and current location. If students did not respond with this information, a warning email was sent at 10 am and again at 12 pm. The Google form responses were shared with the faculty in charge of the student's course, members of the health management center, and the infection control committee. Each individual or group then checked the responses for any health concerns in the students (**Figure 5**). The health management checklist sheet was launched in November 2020 in three faculties of the university. It was then expanded in late December to the junior college so that the health behavior history of students could be monitored on all campuses.

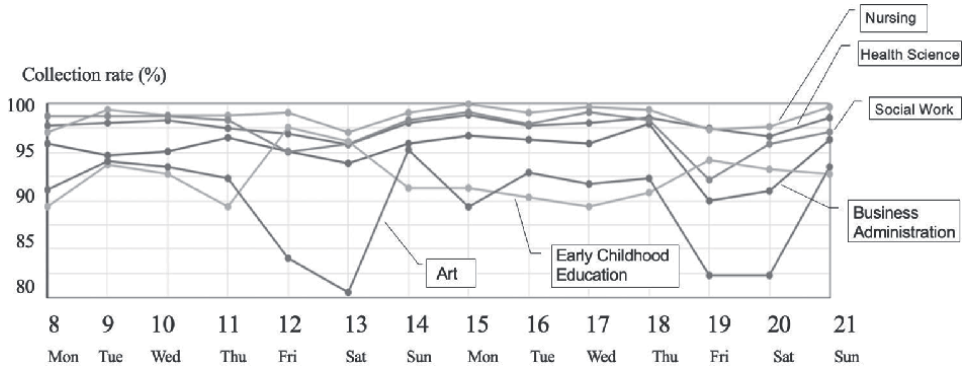

Figure 5.
Online health and behavior checklist. online health and behavior checklist can be shared with your faculty member in charge of your course, members of the Health Care Centre and the Infection Control Committee.

4. Anti-corona student supporter and leader system

The student leader and supporter system for corona control were set up to encourage teaching staff and students to carry out infection control measures together. The aim of this system was to ensure that students obtain the correct knowledge and skills for infection prevention measures, manage their own health and behavior, and take appropriate action according to the current infection situation (**Figure 6**). To become a student supporter in this system, students attended a 10-hour training course. The training covered background on SARS-CoV-2, COVID-19, standard precautions to take during the pandemic, activities that are safe and preventative from COVID-19 outbreaks, and the standard infection control measures taken in hospitals and welfare facilities. Next, students participated in practical training in infection control, where they investigated the actual situation of hand hygiene and practiced infection prevention actions together with the teaching staff. Having faculty and student leaders working together was effective at preventing COVID-19 outbreaks at the university.

Figure 6.
COVID-19 prevention student supporter certification ceremony. These students received 10 h of training to become supporters.

5. Vaccination for COVID-19

Vaccination is likely the most effective way of protecting against viral infection and resuming normal social activities safely [6]. In Japan, however, students from

Figure 7.
Vaccination for COVID-19. Vaccination against COVID19 was carried out for students and staff over 5 days on the campus of the Faculty of Nursing.

universities without connected hospitals have to wait until they are contacted by the municipality to get vaccinated. Public Central Hospital of Matto Ishikawa is a core hospital in the region and has had a high level of communication with our university since the establishment of the Faculty of Nursing. Last year, our university signed a comprehensive agreement with the hospital. In this agreement, a teacher from the Faculty of Nursing works for the hospital and university students visit the hospital for practical training. Additionally, vaccinations for healthcare workers and others were made available to students and staff who wished to be vaccinated (**Figure 7**). Following this, due to the promotion of professional vaccination by the government, an increasing number of universities in the consortium of universities also offered mass vaccinations for students. Having a head start allowed our university to complete the vaccination of students more quickly than any other university.

6. Conclusions

In response to the spread of COVID-19, our university set up an "Infection Control Team" and implemented thorough infection prevention within the university. Though this team was successful in preventing the spread of COVID-19 on campus, a few students became infected off-campus, by family members of healthcare workers, by attending a banquet after the coming-of-age ceremony, or by traveling during the holidays. The most important aspect of infection control in universities is the maintenance of the campus environment and changing students' behavior. To maintain maximum in-person student activity and still provide a safe learning environment, it is necessary to consider the best infection prevention measures from all possible angles. We hope that this new coronavirus infection will be under control soon and that student life can return to normal.

Acknowledgements

We have been fortunate that no cluster of COVID-19 has occurred at Kinjo Gakuen to date (end of 2021). We would like to express our gratitude to all the faculty, staff, and students who cooperated in the infection control efforts.

Conflict of interest

The authors declare that they have no competing interests.

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Chapter 10

Perspective Chapter: Comprehensive Cooperation Agreement with the University Community

Tsutomu Kibayashi, Keisuke Machino and Shinichiro Maeshima

Abstract

Universities are the centers of society's intellectual activities and are places where highly skilled professionals are trained. For managers and businesses, universities are a valuable resource for revitalizing and promoting communities and industries. Achieving this requires multifaceted cooperation and collaboration with universities. In 2017, our university concluded a "comprehensive cooperation agreement" with the city of Hakusan, where the university is located. Last year, the university signed an agreement with Dai-ichi Life Insurance Co., and this year it signed one with Eon Mall Co., Ltd. A variety of projects are currently being planned to be carried out at Eon Mall Hakusan, a major supermarket in the community. The main purpose of these agreements is to help the community develop by solving local problems and fostering new professionals.

Keywords: comprehensive agreement, regional contribution, university, industry-government-academia partnership

1. Introduction

The novel coronavirus has accelerated various changes that had been expected to occur gradually in the future [1, 2]. Amid the major transitions occurring under the "digital transformation" (DX) label, there has been a surge in motivation for "industry-government-academia partnerships," in which universities form cooperative relationships in society to undertake various projects.

Industry-government-academia partnerships can make major contributions to revitalizing universities and developing society, and for some time there have been calls to improve and strengthen these endeavors. Universities play an important role as sources of knowledge for society as a whole, and because they are places for training highly specialized professionals, for local governments and companies they are a valuable resource for vitalizing and promoting communities, industries, and other sectors. One current trend is that companies are no longer seeing universities merely as a source of workers, but also as partners in producing creative seed technologies

and as places to outsource research development (R&D) and personnel development. In response to this, university education is diversifying with the goal of fostering creative and practical professionals in ways that takes the needs of industry into account. Needs for lifelong learning, such as through recurrent education, have also increased in recent years, as part of efforts to adapt to trends including the "new normal," changes in management to incorporate VUCA (volatility, uncertainty, complexity, and ambiguity), and the increasing sophistication of industrial technology.

University education needs to be sensitive to rapidly changing societal conditions and be able to adapt quickly. To achieve this, education must not only give students problem-solving skills but also help them develop the ability to first identify problems. Our university trains students in the fields of health, medical, and welfare, and can provide assistive technology to address aspects of community and industrial health from prevention to rehabilitation. The university is capable of exploring and intervening in issues related to frailty caused by measures to control the novel coronavirus. (In this context, frailty is the deterioration of mental and physical functions and the loss of social connections from restricting one's behavior.) To put its powers to full use for the good of society, the university has concluded comprehensive agreements with local governments and industries and is engaged in health-related initiatives to help create vibrant and independent communities. Within the university, efforts are underway to discover and develop promising seeds that will produce support and creativity based on original concepts.

2. Significance and fundamental role of universities in partnerships among industry, government, and academia

"Industry" refers to the corporate sector in a broad sense, which includes private companies and nonprofit organizations. Industrial R&D plays an important role in that it is tied directly to economic activity. Companies conduct various surveys to find out the needs of their target customers. Companies that manage large shopping centers have concluded that "health" is one of the main concerns of their customers. The same is true for life insurance companies, which are always thinking about how to provide health-related initiatives. In addition, the sale of sports-related products, shoes, and clothes is no exception to this. In this, we can find some points of connection with the seeds related to health promotion developed at our university. Specifically, we have made proposals on sports/training instruction, matching the fit of footwear to growth, continuous regular exercise, and walking in large shopping centers, and have worked with companies to implement these ideas.

"Government" refers to publicly funded, government-affiliated research institutes such as R&D-type incorporated administrative agencies, as well as national and municipal organizations. Public research institutes carry out strategic research with specific goals to improve scientific and medical technology, in ways that follow basic research, cutting-edge research, and societal needs. For example, the university has collaborated with the National Center for Geriatrics and Gerontology at the Japan Science and Technology Agency, to develop effective exercise regimens for elderly people who have been forced to restrict their lifestyles due to the coronavirus pandemic, and has helped produce videos for public education. We are already looking to the post-pandemic world and exploring initiatives for the new normal. National and local governmental organizations play an important role in improving systems. The main objectives of and important challenges for public community comprehensive aid

centers that support the long-term care insurance system are "preventing the need for long-term care" and "promoting health." Through an industry-government-academia partnership, the university is planning a sustainable and effective initiative aimed at elderly people at a major shopping center. Municipal bulletins, which have a high level of public trust, will be used to promote participation. As an example of the strategic partnership, a fun setting where different age groups, including students, can interact will be used to collect data on factors such as physical function, activity levels, and psychological/behavioral changes. This will then be objectively analyzed and assessed to provide participants with feedback. It is also important to use these processes and results in educational areas.

"Academia" is the academic sector that includes universities, inter-university research institutes, and higher technical colleges. The basic mission of these institutions is to provide education and conduct academic research, but also to contribute to society. Their role is to train and secure top-level professionals who can create new knowledge and carry forward intellectual assets into the future. The university offers off-campus practical training for nurses, physical therapists, occupational therapists, social workers, and long-term care workers to deepen students' understanding of society. Having students learn in hospitals, care facilities, and companies will help them to reflect on and organize their own work, create new perspectives, and provide opportunities to verify outcomes. Universities contribute to their communities through a cycle of research followed by applying that knowledge to education. Constantly thinking about social significance, considering the strengths and weaknesses of one's knowledge and wisdom, and learning in society create the ability to uncover problems, then solve them.

Industry-government-academia partnerships occur across sectors with fundamentally different missions and roles. When they are formed, it is important for the parties to understand and respect each other's missions and roles, and to use the vitality of each to complement one another. The "cooperation agreements" that are often used in these endeavors are characterized by carrying out things through mutual contact and discussion, but not by creating continuous and stable relationships with strong bonds.

3. Forms of industry-government-academia partnership

1. Research activities such as joint and sponsored research projects.

2. Practical education partnerships such as internships and practical training.

3. Collaborative development of educational programs in clinical and real-world settings.

4. Technology transfers related to research outcomes.

5. Consulting activities such as technical guidance and support.

Partnerships can be put into the above five categories. However, in actual industry-government-academia partnerships, these activities are closely related and it is rare for a single category to exist independently. Industry-government-academia partnerships are often constructed to involve several elements simultaneously. For example,

a partnership related to low-back pain consultations among production engineering workers may include both exercises and treatments for low-back pain (technology transfers) as well as offering consultations in the work environment. In a broad sense, industry-government-academia partnerships can also include things that occur in the lead up to full-scale collaboration, such as dissemination of educational or research data, inter-sector exchanges between stakeholders, holding open lectures such as by sending corporate representatives to speak at universities, and offering space inside a company's industry-academia exchange facility. Considering the diversity of activities associated with industry-government-academia partnerships, research is needed into how they should be implemented and the best policies for them.

To comprehensively promote new academic research, generate technological innovations, and solve social issues through these partnerships, it is important that in addition to medicine and the natural sciences, which have often been the subject of these endeavors, to also promote partnerships in the humanities and social sciences that primarily focus on relationships between people.

There is a growing awareness that as people approach 100 years of life, illness is not something that can be completely cured but is rather something they need to have a relationship with. In other words, modern rehabilitation needs the ability to adapt, to figure out how to come to terms with illness. This ability is affected not only by medical care, but also by the societies in which these people live, their surrounding environments, and their level of psychological satisfaction. Further, keeping in mind the specialization of the companies that play leading roles in industry, government, and academia; the characteristics and types of universities; and that fields of research will be at differing levels of progress, there is also a need to think about how to support progress in diversity and inclusion, or the acceptance of a wide variety of views and people. Each institution needs to make independent and strategic assessments of which activities to focus on based on their individuality and characteristics.

4. University missions and social contribution

Universities have a certain responsibility to society as a whole to promote academic research and train highly skilled professionals. Therefore, it is important to respect the independence of universities, though they must also adopt an approach of autonomously responding to the time's expectations of society.

Historically, education and research have been the missions of universities, but as social conditions change, so are the roles universities are expected to take on. In addition to education and research, universities are now expected to make social contributions, which is becoming a "third mission." Human resource development and academic research make long-term contributions to the development of society, though in recent years shorter-term and more direct contributions have been sought through things like public lectures, commercialization of research results, and technology transfers. These endeavors are often referred to as the "social contribution of the third mission." However, "social contribution" does not mean mere economic revitalization, but contributions made to the development of societies (including local communities, economic societies, and the international community) overall, in terms of local communities and welfare/environmental issues. Our university is engaged in concrete initiatives in the community under the keyword "health." Social contribution by universities, which are institutions for educating students, should not be merely the offering of unpaid labor or the free use of facilities but should utilize

their unique characteristics as bases of knowledge [3]. The goal should be to use the knowledge gained through educational and research activities to benefit local communities through joint research projects and technology transfers as part of industry-government-academia partnerships, which can improve the lives and welfare of local residents and help create a vital and prosperous society. Currently, there is growing public interest in technology transfers and the creation of new industries through industry-government-academia partnerships. These are ways universities can make social contributions, and each school should adopt approaches that are suited to its individuality and characteristics in ways that incorporate the diversity of society.

Diversity needs to be engaged with not only by each university but also at the individual faculty level. However, considering the diversity and originality of the research themes faculty are engaged in, if they are approached by industry about their own research results or themes, they should search for ways to use these results while receiving organizational support, such as by contacting the university department in charge of industry-government-academia collaboration. Therefore, regardless of the academic field, each faculty member needs to be constantly aware that the university is expected to make social contributions.

5. Educational aspects of industry-government-academia partnerships

Industry-government-academia collaboration can also make great contributions to revitalizing university education. Therefore, along with providing opportunities for students to interact with companies through joint research, practical training, and internships, the industry can offer perspectives and cooperation in the realm of university education, such as by developing joint educational programs and hiring people with corporate experience. This can also be effective from the perspective of promoting practical education and training professionals who can meet the needs of industry and the rest of society. It goes without saying that the knowledge and experience faculty members gain through industry-government-academia partnerships will ultimately come back to benefit students through educational activities.

On the research side, in addition to conventional academic research, there is a growing awareness of the significance of research that focuses on and solves social issues. Thanks to rapid progress in DX and ICT, more joint research projects involving various organizations and institutions are expected. Society's expectations and demands for industry-government-academia partnerships that make use of university research results are growing [4].

6. Industry-government-academia partnerships in the community

Technological innovation and the creation of new industries using the resources and potentials from R&D in the community are an important part of promoting community science and technology and of revitalizing Japan's economy. Organic collaboration among regional institutions is needed, such as through the creation of knowledge clusters. It is relatively easy to encourage people to participate because the goal is not to generate profits but to reach out to the local community with the assistance of local governments. Once knowledge is obtained, it must be widely disseminated via feedback and public relations. Doing this over and over will help win the trust of society and lead to more inquiries from companies. No single

intervention or approach is best. Each initiative must bear in mind the characteristics of the community and the conditions of local industries.

Conflict of interest

The authors declare that they have no competing interests.

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Universities have two roles. As educational institutions, a university develops human resources with advanced expertise, and as research institutions, they promote the investigation of issues in researchers' specialized fields. In addition, the role of universities has recently expanded to include contributing to the local community. Universities should engage in social contributions by returning the knowledge acquired through their educational and research activities to the local community through related activities such as joint research and technology transfer as part of industry-academia-government cooperation, and improving the lives and welfare of local residents, leading to vitality and the formation of a prosperous society. This book describes the community contribution activities and social connections of our university since its establishment.

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