

The Stakeholders' Views on the Growth of Telemedicine Use

Nermin Elokla

Medical Information Center (MIC)
Kyushu University Hospital
Fukuoka, Japan

email: nelokla@hotmail.com

Tomohiko Moriyama

International Medical Department (iMed)
Kyushu University Hospital
Fukuoka, Japan

email: tomohiko.moriyama.153@m.kyushu-u.ac.jp

Naoki Nakashima

Medical Information Center (MIC)
Kyushu University Hospital
Fukuoka, Japan

email: nnaoki@info.med.kyushu-u.ac.jp

Abstract— The views and experiences of the stakeholders on the use of telemedicine play an important role in the development of the service. This study aims to investigate the willingness of Japanese people to use the telemedicine service, and identify cases/situations it is preferred to use for. It also identifies the stakeholders' opinions and needs to increase actual use of telemedicine. To achieve our goals, two different types of stakeholders were selected, including general public and medical doctors. Regarding the first group that includes ordinary people, 84 participants in the age ranging from 20 to 64 years were randomly selected, and data were collected from them using a questionnaire. As for the second group of participants, online interviews were conducted with 25 physicians (with ages ranging from 30 to 65 year) working in different scopes of medicine. The results of both surveys reveal that all participants except three doctors had never experienced telemedicine despite COVID-19 state of emergency. Less than half of the participants in each group expressed their willingness to use telemedicine at present. Furthermore, the majority of our participants pointed out that telemedicine is a good tool for virtual visits to inpatients by their loved ones. Based on the stakeholders' views and needs, this study identifies two approaches to increase telemedicine utilization. First approach aims to expand the scope of telemedicine, so that encompasses various issues, which currently concern the community in Japan. The second one focuses on improving the telemedicine platform through different actions recommended by each group of participants.

Keywords - *Telemedicine; Service Development; Stakeholders, Views and Needs*

I. INTRODUCTION

Since 2018, telemedicine has been covered by Japanese insurance, but the incentive to promote telemedicine is weaker than that of other countries partially due to free access to medical institutions and other issues [1] [2].

Telemedicine can be defined as the use of electronic communications and information technologies to provide clinical services when participants are at different locations [3]. In April 2020, the COVID-19 crisis has prompted Japan to ease regulations on telemedicine [4]. However, the use of deregulated telemedicine has been sluggish compared to the US and UK. In Japan, only 15% of medical institutions have deployed telephone or online consultations [5]. Therefore, this study investigates public willingness to use current

telemedicine service. It also identifies the needs of different stakeholders to develop telemedicine. In this study, the use of diverse population samples is useful to create an inclusive telemedicine service that meets the needs of as many people as possible. We focus on two types of stakeholders, including general public and medical doctors.

The rest of this paper is organized as follows. Section II explains the method of this study. Section III shows the results of the survey. Section IV includes discussion and limitation of a study. Section V includes conclusion.

II. METHOD

To achieve our goals, online 'semi-structured' interviews 'including 20 questions' were conducted with 25 Japanese physicians (21 males and 4 females) between August and October 2020. The doctors were randomly selected for this study. Furthermore, a semi-structured questionnaire (9 multiple-choice questions) was undertaken with 84 individuals from the public (63 females and 21 males) between February and April 2021. Selecting the questionnaire participants was based on their busy works with limited vacations time (about 10 days in a year) to visit hospitals. The questionnaire sheets had been given to the person in charge of the department by hand in order to distribute it to all the employees. Based on the literature review [6] [7], the questionnaire was designed, and then piloted on 5 individuals. From the responses of 5 people, the questions were revised and determined. Probing questions were used to determine the best patterns and circumstances for making telemedicine services more usable and efficient.

In this study, all participants were provided with an explanation of telemedicine and all information regarding the study, including the purposes for undertaking the surveys. Ethical approval for this study was obtained from the Kyushu University Hospital, permission no. 2021-15.

III. RESULT

The questions were answered by two various types of stakeholders. First group includes 84 administrative employees (63 females and 21 males). Second group includes 25 medical doctors (21 males and 4 females). The following are the main results of the surveys.

A. The Characteristic of Participants

The first group includes the general public, and with ages ranging from 20 to 64 years.

TABLE I. CHARACTERISTICS OF PARTICIPANTS IN THE FIRST GROUP (N=84)

Gender N=84	Age N=84	Physical Disability	City	Occupation Administrative Employee N=84	Hospital Visit in a year N=84	Awareness of Telemedicine	Experience of Telemedicine
Female N 63 (75%)	20-29 17 (20%)	No	Fukuoka	University A N 53 (63%)	Once a week 52 times 2 (2%)	Very much	No
	30-39 16 (19%)			University B N 31 (37%)	Once every 2 weeks 26 times 2 (3%)	N 14 (17%)	
	40-49 28 (34%)			Once a month 12 times 16 (19%)	Somewhat		
	50-59 17 (20%)			Once every 2 months 6 times 6 (7%)	N 59 (70%)		
Male N 21 (25%)	60-69 6 (7%)			Once every 6 months 2 times 24 (29%)	Not at all		
				Once a year One time 12 (14%)	N 11 (13%)		
				No visit 0 0			
				No answer — 22 (26%)			
100%	100%	100%		100%	100%	100%	

TABLE 2. CHARACTERISTICS OF PARTICIPANTS IN THE SECOND GROUP (N=25)

Age of Participants		Gender		Affiliation	
30-39 years	11 (44%)	Male	21 (84%)	University hospital	14 (56%)
40-49 years	8 (32%)	Female	4 (16%)	Non- university hospital	2 (8%)
50-59 years	5 (20%)			Clinic	9 (36%)
60-69 years	1 (4%)				

Participant	Gender	Years of work	Affiliation	City	Scope of practice	Awareness of telemedicine	Experience of telemedicine
1	Male	11	Hospital 1	Fukuoka	Gastroenterology	Very much n=5 (20%)	No
2	Male	11	Hospital 1	Fukuoka	Gastroenterology		No
3	Male	10	Clinic 1	Saga	Otorhinolaryngology	Somewhat n=18 (72%)	No
4	Female	9	Hospital 2	Kitakyushu	Collagen Disease		No
5	Male	20	Hospital 1	Fukuoka	Otorhinolaryngology	Not at all n=2 (8%)	Yes (3 months)
6	Male	7	Hospital 1	Fukuoka	Otorhinolaryngology		No
7	Male	6	Hospital 3	Nogata	Otorhinolaryngology		No
8	Female	18	Hospital 1	Fukuoka	Dermatology		No
9	Female	6	Hospital 1	Fukuoka	Dermatology		No
10	Male	20	Hospital 1	Fukuoka	Dermatology		No
11	Male	6	Hospital 1	Fukuoka	Dermatology		No
12	Male	14	Hospital 1	Fukuoka	Dermatology		No
13	Male	18	Hospital 1	Fukuoka	Neurology		Yes (3 months)
14	Female	17	Clinic 2	Fukuoka	Gastroenterology		No
15	Male	17	Clinic 2	Fukuoka	Gastroenterology	No	
16	Male	16	Clinic 2	Fukuoka	Gastroenterology	No	
17	Male	34	Hospital 1	Fukuoka	Diabetology	Yes (3 months)	
18	Male	28	Clinic 3	Fukuoka	Gastroenterology	No	
19	Male	20	Clinic 4	Fukuoka	Gastroenterology	No	
20	Male	24	Hospital 1	Fukuoka	Gastroenterology	No	
21	Male	25	Clinic 5	Fukuoka	Otorhinolaryngology	No	
22	Male	40	Clinic 6	Fukuoka	Orthopedics	No	
23	Male	25	Clinic 7	Fukuoka	Ophthalmology	No	
24	Male	6	Hospital 1	Fukuoka	Gastroenterology	No	
25	Male	10	Hospital 1	Fukuoka	Gastroenterology	No	

They are administrative employees working (full-time job) in different business sectors at 2 public universities in the Fukuoka city. The results of the questionnaire indicated that all participants have no physical disabilities, and are not telemedicine users. Fifty-nine (70%) of them are somewhat aware of telemedicine. The majority (29%) visit the hospitals about 2 times a year (Table 1).

On the other hand, the second group includes medical doctors with ages ranging from 30 to 65 years old. They are working in various scopes of medicine (including internal medicine, neurology, dermatology, orthopedics, otorhinolaryngology and ophthalmology), and at different healthcare facilities (including university and non-university hospitals as well as small clinics). The results of online interviews with 25 physicians revealed that at the beginning of COVID-19 pandemic (from May to August 2020) only 3 out of 25 doctors practiced telemedicine (hospital-based telemedicine) via telephone (audio only visit). Furthermore, we found that 18 (72%) of them were somewhat aware of telemedicine (Table 2).

B. Opinions Towards the Use of Telemedicine Service

All participants were asked about their interest in and willingness to use telemedicine. Regarding the first group (see Figure 1), less than half (46%) of participants answered with “yes”. About 37 (44%) of participants chose “I’m not sure”, and 8 (10%) of them responded with “no”. Concerning the situations/cases, in which the participants may use a telemedicine for, 65 (77%) of them would prefer to use the service in the state of a personal emergency “mild illness”, while 30 (36%) participants might use the service when it is imposed by policies or other means. Twenty-five (30%) participants answered that when a hospital is far from home, while 15 (18%) participants responded that it might happen for prescription renewals and chronic care management. A few (7%) participants indicated that in all cases, they will not use telemedicine, and 3 (4%) participants chose “other”.

On the other side, the majority (48%) of doctors in the second group expressed their interest in telemedicine despite its shortcomings which have a negative effect on the use of a service (see Figure 2). Regarding the major reasons for abandoning a telemedicine at present; 15 (60%) doctors stated their inability to perform an accurate and complete physical exam for the patients, while 12 (48%) of them mentioned lower revenues of telemedicine. Furthermore, 7 (28%) doctors stated their preferences for in-person visit over a telemedicine (such as; P # 2 stated that “*it is not possible to build trust with the patients through telemedicine*”, and P # 8 mentioned that “*the relationship between doctor and patient is based on trust. This trust strengthens when people actually meet each other. In virtual consultation, even trust becomes virtual*”). About 6 (24%) participants stated the barriers related to telemedicine work environment (including regulations and facilities). Further, 6 (24%) doctors indicated social influences on their decision-making, while 3 (12%) doctors stated other issues, such as

most of the patients are elderly and have poor ICT skills (see Figure 3).

C. Expanding the Scope of Telemedicine

The participants were asked about their issues/concerns, which could be well addressed through online care services. The majority (62%) of participants in the first group indicated that telemedicine is a good tool for virtual visits to inpatients by their loved ones and/or conducting remote follow-up meetings with the family members who are unable to be with their hospitalized patients. Forty-two (50%) participants stated that telemedicine could be effectively used for following up care, including post-operative follow up, while 39 (46%) participants mentioned that the service is a suitable way to educate people about lifestyle diseases. Twenty - two (26%) participants indicated that telemedicine can be used for patients on board (such as emergency medical care on the express train or at the sea by providing medical advice for the passengers on board ships), while 19 (23%) participants stated their needs to school-based telemedicine program for providing access to high-quality healthcare in the school setting. A few (12%) participants mentioned the need to use telemedicine for birth control counselling. Eight (10%) participants chose “other” (see Figure 4). On the other hand, the result of online interviews detected that the majority (40%) of physicians agreed with the first group of participants on the suitability of telemedicine for the virtual visits to inpatients by their loved ones and relatives.

D. Actions to Improve a Telemedicine Platform

We asked the participants about their views and needs to improve a telemedicine platform. The majority (49%) of first group indicated the importance of creating a user-friendly telemedicine program (see Figure 5). Twenty-four (29%) participants suggested to provide telemedicine in higher number of hospitals and be for all, while 21 (25%) participants requested to make the service available at any time “24 hours a day, and 7 days a week”. Twenty (24%) participants indicated the necessity to offer many value-added programs to telemedicine patients as a part of their wellness programs, while 18 (21%) participants requested to make the services easy to access without having Internet connection problems. About 17 (20%) participants responded that telemedicine must consider desires and needs by age demographic. Ten participants (12%) chose “other”, such as recommended that telemedicine be held to the same standards of in-person care, and establish unique patient engagement strategy that focuses on creating greater awareness of telemedicine’s potential and its usage.

Regarding the doctors' viewpoints and needs, the following are the most important actions to develop and expand the telemedicine service.

- Recommendations for telemedicine expansion:
P # 2 “*Due to some issues, telemedicine will not spread in Japan unless it is mandated by policy or other means*”.
P # 3 “*Patients are not ready for telemedicine. They should learn about the service as a quick option to receive care*”.

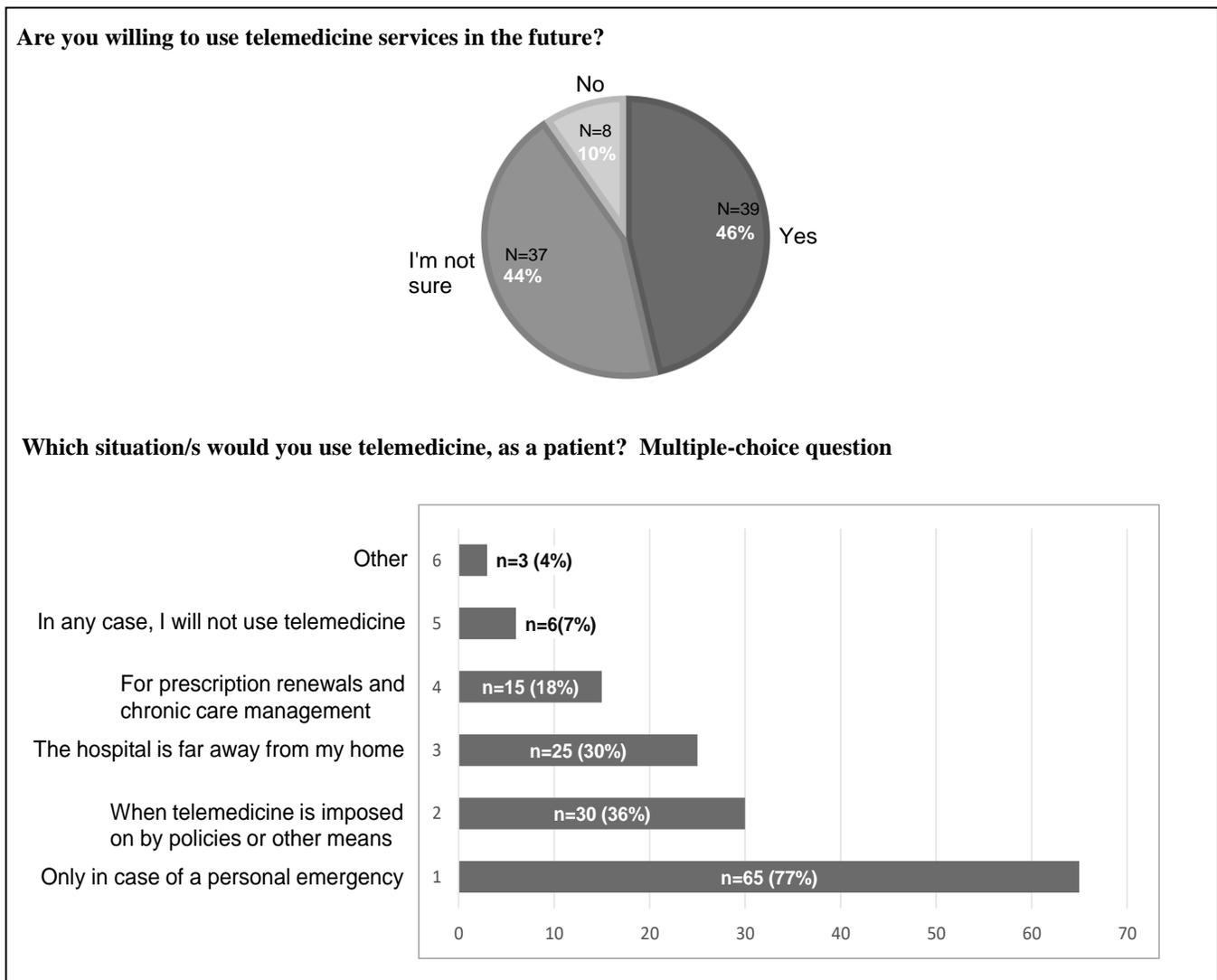


Figure 1. Telemedicine utilization in Japan (ordinary people, N=84)

Are you interested in using a telemedicine service?

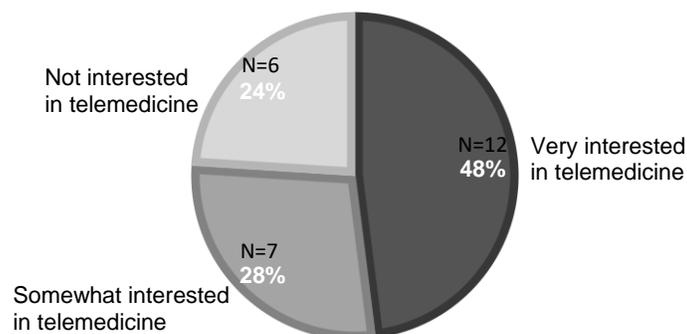


Figure 2. Physicians interest in Telemedicine (N=25)

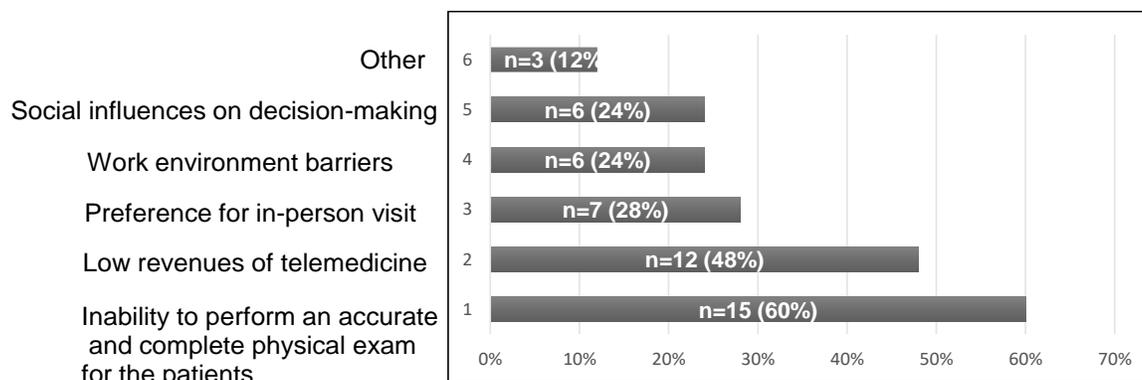


Figure 3. Major reasons for abandoning a telemedicine service (Physicians, N=25) - multiple-choice question

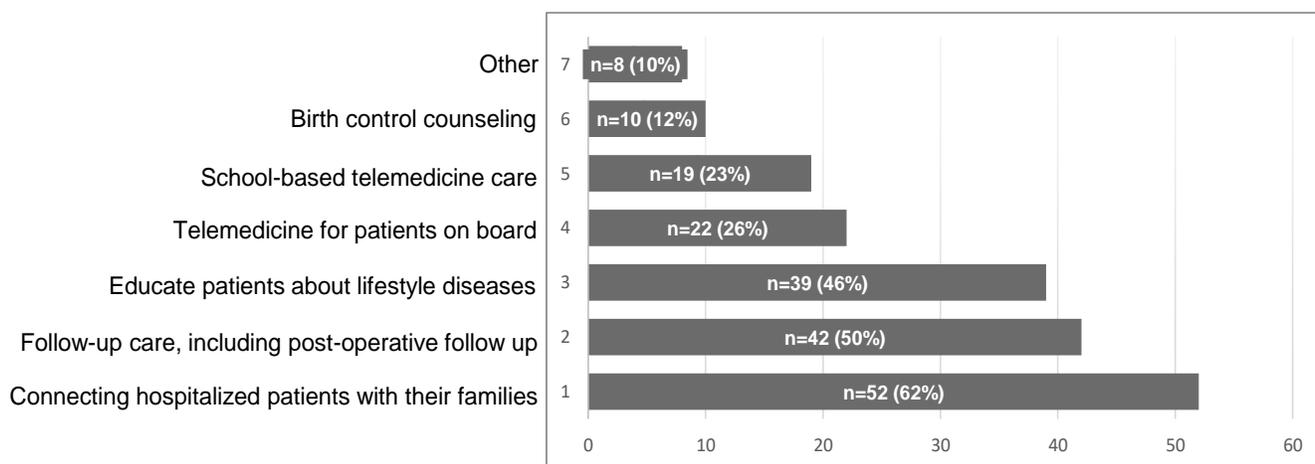


Figure 4. Issues that require telemedicine utilization (ordinary people, N=84) - multiple-choice question

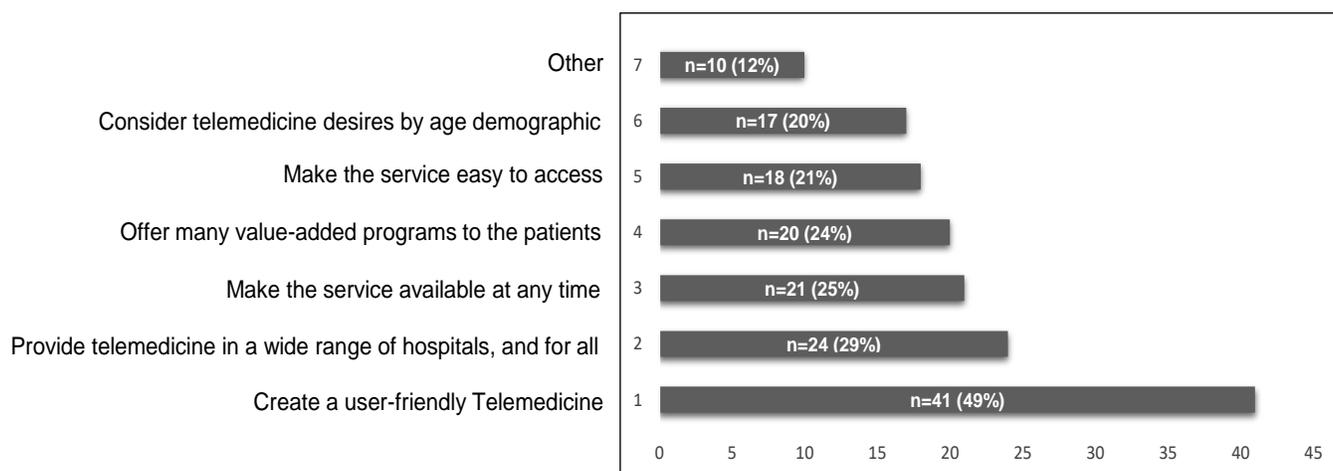


Figure 5. Key actions to improve current telemedicine program (ordinary people, N=84) - Multiple-choice question

P # 7 “There is a necessity to promote telemedicine in the unpopulated/remote area in Japan”.

P # 24 and 25 “Telemedicine should be more widespread in order to prevent infections and improve the efficiency of medical treatment. It is not very popular because many elderly people are not familiar with ICT. Therefore, ICT education for both elderly doctors and patients is needed”.

- Recommendations for raising telemedicine awareness: P # 4 “Patients broadly should know the merit and demerit of telemedicine and accept it”.

P # 17 “Unique and advanced marketing strategies should be established to increase the patient awareness of telemedicine, such as the successful approach which is used for ‘generic’”.

- Recommendations about the regulations and facilities: P # 3, 17 and 20 “It is necessary to put strict rules and high-quality clinical practice guidelines to avoid any crimes or medical malpractice with telemedicine”.

P # 20 “All Japanese, especially politicians and lawyers should be fully aware of the telemedicine risks”.

P # 5 and 20 “About the issue of low practice fee, the payments for telemedicine are better not covered by the health insurance, and allow doctors to set the prices freely. Furthermore, subsidies are needed. Cheap refund for hospitals, implementation and running cost. Medical fee should be increased for hospitals”.

P # 1 “Telemedicine should maintain the same income as F-to-F meeting”.

P # 13 and 20 “Policies of hospitals and equipment for telemedicine should be well prepared to use the service as one of its treatment tools”.

E. Usability requirements for a Telemedicine Meeting

Regarding the most suitable and trustful healthcare delivery model, the survey results revealed that the majority (74%) of participants in the first group preferred home-based telemedicine, while 12 (14%) participants chose mobile medical clinic, and a few (12%) participants selected the hospital-based telemedicine. Regarding the better mode for communication, we found that the majority (73%) of participants preferred video call, while 17 (20%) participants chose voice call, and a few (7%) participants selected “other”. About the most adequate device for a telemedicine visit, the majority (38%) preferred smartphone “using a video call service”, while 30 (36%) participants chose PC/tablet, about 24% of participants preferred smartphone “a voice call only”, and a few (2%) of them chose “other” (see Figure 6).

On the other hand, the result of online interviews with 25 physicians detected that 14 (56%) doctors stated the necessity to improve their ICT skills, while 13 (52%) of them want the opportunity to experience first-hand what telemedicine is all about. Furthermore, 8 (32%) doctors stated other issues, such as getting the agreement of administrative staffs to practice the service in the hospitals, while 6 (24%) doctors wanted to find ways to train the staff on a shortened time. About 4 (16%) of doctors wanted to improve their online communication skills with patients (see Figure 7).

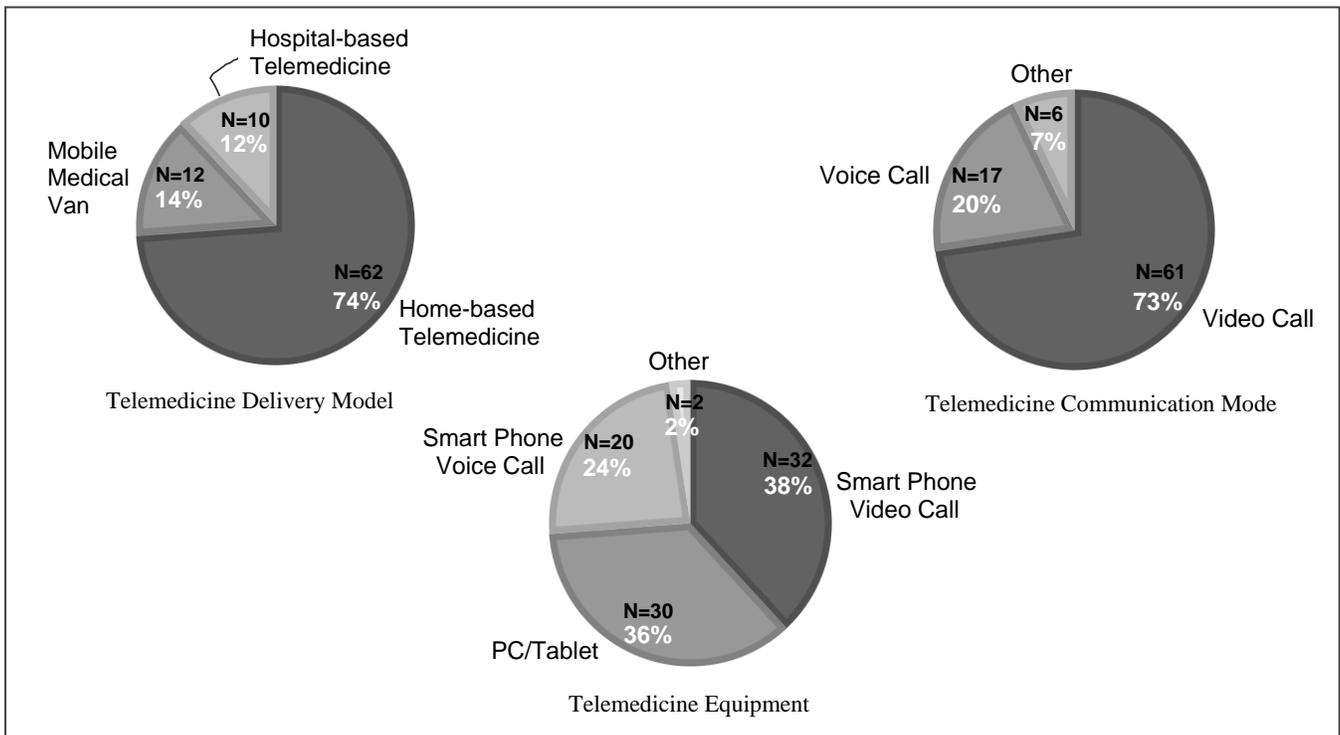


Figure 6. Best model of telemedicine usage (ordinary people, N=84)

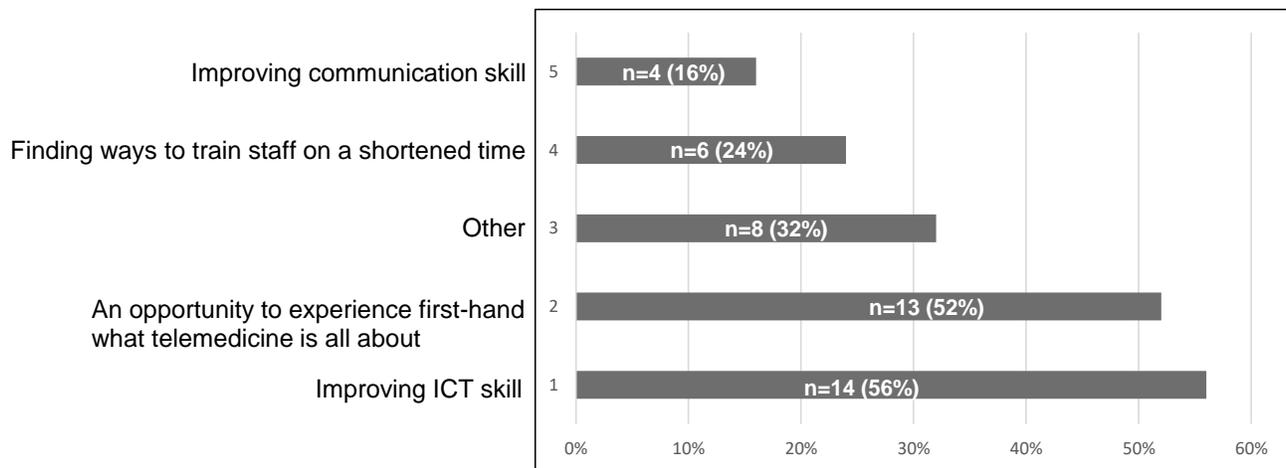


Figure 7. Usability requirements for a Telemedicine Meeting (Physicians, N=25) - multiple-choice question

IV. DISCUSSION

Telemedicine services have the advantage of ensuring the health of inaccessible local residents and increasing convenience [8] [9]. Studies have shown that remote monitoring approaches are as effective as – and in some cases better than – in-person care for many chronic conditions [10] [11]. However, all the participants in this study, except three doctors, were not telemedicine users, even in a state of public health emergency due to the SARS-CoV-2 outbreak. Further, less than half of the participants from each group expressed their willingness to use the telemedicine service at present. In Japan there is a strong cultural bias towards face-to-face consultation, but the servicing rural and remote areas by doctors is increasingly difficult so there is an urgent need to increase the uptake of telemedicine [2]. These may confirm the viewpoints and recommendations of some physicians (P # 2, 3, 7 17, 23 and 24) on the necessity to establish innovative strategies for increasing the awareness and use of telemedicine.

In terms of telemedicine growth and development, studies reported that the service should deliver care that respects the patients' preferences and values - responds to needs in a person-centered manner [12] [13].

Based on the participants' responses, there are two approaches to potentially increase the use of telemedicine in Japan. First one aims to expand telemedicine capabilities. This is by identifying community issues and concerns that can be addressed through online care services. In other words, it is better going beyond traditional home diagnostic and monitoring activities to include further medical care forms where the individuals' abilities are restricted.

The survey results revealed that most (62%) participants

in the first group indicated that telemedicine is a good tool for virtual visits to inpatients by their loved ones and/or conducting remote follow-up meetings with the family members who are unable to be with their patients at hospitals. The same suggestion had been stated by the majority (40%) of physicians participating in this study.

The second approach is about understanding people's requirements, preferences and views to improve a telemedicine platform. Based on the responses of first group, there are 6 key actions suggested to higher use of a telemedicine service.

Regarding the first action, the majority (49%) stated the importance of creating telemedicine equipment as user-friendly as possible. The usability issue is one of the seven core principles that underlie the development of successful telemedicine systems [14]. Furthermore, to make a telemedicine easier and safer, be mindful of the importance of site in which virtual encounters occur [12].

The survey results indicated that most participants preferred to conduct a telemedicine appointment at home by using video call over the smartphone. Similar findings showed in another survey that the majority of Japanese participants preferred video call with supplementary text message as a communication tool used for telemedicine [15].

On the other hand, studies pointed out that home-based telemedicine system via video conference can be of great benefit to patients in terms of convenience, reliability, health care availability, and cost savings. However, there are some issues affecting the efficiency of this system and should be well considered and addressed, such as privacy and security concerns, patient age, patient and healthcare professional's capabilities to use digital technology, Internet speed, network

signal, audio quality, and technological compatibility [16] [17] [18]. In addition, a recent study indicated the necessity of the apps being easy to use for patients and staff, providing smooth access to important functions [19]. Regarding this point, further study stated that a user-friendly device which is easy to use by patients with low digital literacy is helpful, and a system allows medical personnel to remotely control the equipment could be an option [11].

Generally, usability is an important key to the successful implementation of telemedicine which is why the majority (56%) of physicians participating in the study indicated the need to improve their skills in using the ICT system, while some (P# 24 and 25) of them stated the need to educate the ICT among older adults (including physicians and patients).

Second action, 24 (29%) participants suggested providing the telemedicine services in the greater number of hospitals/clinics. In Japan, there is a slow spread of telemedicine in the hospitals. A high percentage of hospitals are not offering the service due to many issues, such as the lack of infrastructure and uncertainty about reimbursement [20]. This was also indicated by some doctors (P# 1, 5, 13 and 20) through the interviews. A study reported that among the 110,898 medical institutions that exist, the number of medical institutions implementing telemedicine increased slightly from 10,812 (9.7%) in April 2020 to 16,202 (14.6%) in June. Of this number, only 6,801 (6.1%) medical institutions implement telemedicine for a patient's first visit [21]. Lack of telemedicine use in the hospitals is not only limited to the clinical services (including remote patient care), but also to the non-clinical activities (such as medical education, management meetings, provider training, etc.). A recent study pointed out that international telemedicine conferencing is not sufficiently active in Japan, even though the installed equipment and technical expertise of technical staff in telemedicine are adequate [22].

The third action is about the service availability seven days a week. The current study findings showed that twenty-one (25%) participants requested to offer telemedicine services for patients at any time, day or night. This might be because there are sometimes difficulties to find an appropriate major hospital/clinic to visit in case of an emergency in Japan [23] [24]. Confirmation on that, 65 (77%) participants would prefer to use telemedicine services in a state of a personal emergency.

The fourth action, 20 (24%) participants recommended offering many value-added programs to the telemedicine patients as a part of their wellness programs. Regarding the fifth action, 18 (21%) participants clarified the importance of fast Internet speed for transmitting patients' files, records, pictures, and videos. A study reported that 18 factors inhibit the dissemination of telemedicine service in Japan, including network speed [25]. Most of the telemedicine applications require a high speed and reliable Internet bandwidth to run

smoothly. Unreliable and low wideband Internet pose barriers in smooth delivery of telemedicine service [26].

Last action, 17 (20%) participants stated the necessity of considering telemedicine desires by age demographic because not all generations have same requirements towards telemedicine. A study reported that age plays a large role in consumer healthcare trends and telemedicine usage. Understanding consumer telemedicine trends by age group may be the key to increasing awareness and the use of telemedicine [27].

Based on the answers of the respondents, it can be said that telemedicine has not significantly spread in Japan despite the COVID-19 pandemic. The results of this study detected that it would be better to incorporate telemedicine service in our lives, rather than just focusing on medical consultations. This is by using telemedicine tools to address the issues of health care that concern the society. Furthermore, there are some issues that obstruct the growth of the service at present. Therefore, the answers of two groups of participants revealed that the telemedicine service is likely to be used more by considering certain actions. In this study, the needs and interests of each group have influenced the proposed actions. The participants in first group recommended specific actions related to the service usability, availability, value, and accessibility, while the suggested points of second group are related to the service awareness and facilities, as well as legal and business issues.

Overall, it can be stated that telemedicine success begins with the individuals' satisfaction. Stakeholders will start demanding more use of telemedicine that is when the service satisfies their needs and interests.

Regarding the limitation of this study, the survey was conducted with limited number of Japanese participants. The results cannot be generalized beyond the participants of a study. The participants expressed their own perspectives to develop the current telemedicine platform, and these may not express views of the majority of Japanese people.

V. CONCLUSION

Although telemedicine brings important benefits to promote wellness, prevent disease, and enable the home management of chronic conditions, it is still relatively uncommon to use in Japan. This study discussed the stakeholders' perspectives on the use of telemedicine. It investigated the willingness of Japanese people to use telemedicine, and in what situations/cases it is preferable to use for. It also identified two approaches to promote the use of telemedicine services.

The first approach aims to expand the scope of telemedicine, so as to address many issues which concern the society. Regarding the second approach, it focuses on developing the telemedicine service by understanding the stakeholders' views and needs. Based on valuable feedback

of the participants from the general public, 6 actions are suggested to improve a telemedicine platform, and possibly raise the rate of its usage.

The key actions are concerning telemedicine usability, availability, value, and accessibility. Furthermore, recommendations have been made by the medical doctors about telemedicine awareness and facilities, as well as legal and business issues of the service.

On basis of the above findings, further studies are needed to explore the demands of different groups of individuals, such as older adults. Using larger and more diverse population samples will be valuable to establish the inclusive telemedicine service that fulfills the basic needs of the society.

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