

## Telepharmacy in mountainous depopulated areas of Japan: An exploratory interview study of patients' perspectives

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**SUMMARY** Japan has an ageing population and geographical impediments to healthcare access, so an experimental trial of telepharmacy has recently been implemented in remote islands or remote areas of Japan prior to the formal implementation. This exploratory study was conducted to understand patients' perspectives on telepharmacy in a mountainous depopulated area away from urban areas of Japan. Semi-structured interviews were conducted with four elderly patients, who were all of the patients receiving telepharmacy in Toyone village, Japan, at the time of the survey. The transcribed interview data were qualitatively analyzed by coding and categorization. The subjects thought telepharmacy would be advantageous to overcome poor access to a clinic and to improve convenience in processes ranging from medical examination to obtaining prescribed medicines. However, they pointed out the low digital literacy of the elderly. Also, they had low expectations for pharmacists, because they had previously had no relationship with pharmacists due to lack of pharmacies in the area. To promote telepharmacy, efforts to eliminate resistance to smartphones and to provide support for smartphone operations are needed among the elderly. Work is also needed to establish how pharmacists should best be involved in patient care and health support in remote areas. Our findings suggest that telepharmacy is useful in remote areas of Japan, but in locations where there is no existing relationship with pharmacists, it would be desirable for pharmacists to be actively involved with the community to maximize its effectiveness.

**Keywords** telemedicine, telepharmacy, elderly, mountainous depopulated area

Japan has an ageing population as well as geographical impediments to healthcare access, such as mountainous depopulated areas remote from urban areas. Telemedicine by doctors has been used as one approach to solve such problems in Japan, in common with other countries. Furthermore, telemedicine in areas other than rural and remote areas has been permitted since 2015, and insurance coverage of telemedicine was started in 2018 in Japan (1). In contrast, telepharmacy by pharmacists was not allowed until recently, since pharmacists' medication instructions were legally required to be given face-to-face based on the Act on Securing Quality, Efficacy and Safety of Products Including Pharmaceuticals and Medical Devices (PMD Act) in Japan. With the amendment of the law, telepharmacy finally became available in September 2020.

Before formal introduction of telepharmacy, it was first trialed for residents of remote islands or remote areas, and for those who use telemedicine in the

National Strategic Special Zones (2). Three regions of the National Strategic Special Zones, Aichi Prefecture, Yabu City in Hyogo Prefecture, and Fukuoka City in Fukuoka Prefecture, became the first regions in Japan to provide telepharmacy. Various clinical benefits of telepharmacy, such as improved access to healthcare (3), economic benefits (4), improved patient satisfaction (5), and effective patient counselling (6) have already been reported (7) in other countries. Therefore, the purpose of this study was to understand patients' perspectives on telepharmacy in a mountainous area remote from urban areas, and to obtain basic data for improving the practice and dissemination of telepharmacy in Japan.

Exploratory semi-structured interviews with patients who received telepharmacy service in Toyone Village, Aichi Prefecture were conducted in October 2019 by an interviewer and a sub-interviewer who specialize in pharmacy, based on an interview guide consisting of four open-ended questions. The survey items included

1) background of starting telepharmacy, 2) recent experience of telepharmacy, 3) opinions regarding the advantages and disadvantages of telepharmacy, and 4) opinions regarding the future of telepharmacy. The interviews were audio-recorded with the permission of the participants. After transcribing the whole interview contents, we separated the subjects' remarks by meaning, and assigned codes to remarks expressing facilitators and barriers to telepharmacy service (coding). Next, we integrated codes that conceptually have the same meaning and named them as categories (categorization). Coding and categorization were repeated and appropriate changes and corrections were made during the analysis process based on discussions among the authors. The interviews and analysis were all conducted in Japanese. All methods were carried out in accordance with the Declaration of Helsinki. This study was approved by the Research Ethics Review Committee, Keio University Faculty of Pharmacy (No.191003-1). Informed consent for study participation was obtained from all subjects.

The participants were four patients with chronic diseases (a female in the 60s, two males in the 60s, a female in the 90s) who were receiving telemedicine and telepharmacy services in Toyone village. They were all of the patients in the village who had received telepharmacy service at the time of the survey.

Three main categories of facilitators of telemedicine and telepharmacy were identified based on subjects' statements (Table 1). As facilitators, subjects stated that telemedicine and telepharmacy contributed to improving accessibility for both medical staff and patients in an area where access to medical institutions is poor (Table 1-A). They pointed out that residents who live far from the clinic in the village would have difficulty going there, since there is little public transportation in this area. They felt that telemedicine and telepharmacy would make up for poor transportation in the area and reduce the burden of regularly going to distant medical institutions. The doctor in the village clinic travels about 40 minutes by car to another

clinic in a neighboring village for an hour of medical examination every Tuesday. One subject expected that telemedicine would reduce the doctor's time and effort required for this. Some patients who have chronic diseases such as hypertension and dyslipidemia, and whose symptoms are stable, felt that telemedicine and telepharmacy services would allow them to obtain medicines while at home without going to the clinic. Subjects were aware of the advantage that the time required from examination to obtaining medicines could be shortened (Table 1-B). Some subjects felt that they did not have time to visit the clinic because they worked during the day. Furthermore, the clinic in the study area was open only on weekday mornings. It seems to be a great advantage for such patients that they can receive examinations wherever they are, at home or at work, and do not have to worry about running out of medicine (Table 1-C).

Three main categories of barriers to telemedicine and telepharmacy were identified based on subjects' statements (Table 2). Of the four subjects, three in their 60s, who usually use smartphones, did not feel any particular difficulty or inconvenience regarding smartphone use for communication. However, they were worried that older generations than theirs would be unfamiliar with smartphones and find them challenging to use (Table 2-A). In fact, the subject in her 90s said that she could manage to operate the tablet device if instructed by her family or care staff, but she could not operate it herself. Since many elderly people live alone in the study area, she speculated that some might find it difficult to use telemedicine and telepharmacy. To overcome this, it would be desirable to provide opportunities for the elderly to learn how to handle devices such as smartphones and tablet terminals and to familiarize them with the devices. Besides, the subjects pointed out telecommunication system issues (Table 2-B), such as "telecommunication status is sometimes bad" and "the voice is sometimes hard to hear". At the time of the study, telepharmacy was operated only within the National Strategic Special Zone, and some

**Table 1. Facilitators of telemedicine and telepharmacy for patients**

Category	Code
A).Improving accessibility for remote area residents to a village clinic	<ul style="list-style-type: none"> <li>• Reducing the burden of going to a distant village clinic regularly.</li> <li>• Making it easier to have an examination for the elderly visiting a distant village clinic.</li> <li>• Making up for poor transportation in the area of residence.</li> <li>• Unnecessary for doctors to go to the neighboring village for examination.</li> </ul>
B).Improving convenience from taking a medical examination to obtaining prescribed medicines	<ul style="list-style-type: none"> <li>• Availability of prescribed medicines at home.</li> <li>• Reducing the time required from taking a medical examination to obtaining prescribed medicines.</li> </ul>
C).Possibility of balancing work and hospital visits	<ul style="list-style-type: none"> <li>• Possibility of seeing a doctor anywhere, such as at home or at work.</li> <li>• Reducing the burden of having time to obtain medicines during work.</li> <li>• Reducing worry about running out of prescribed medicines due to being unable to visit a village clinic.</li> <li>• No need to visit a village clinic in time for its limited opening hours.</li> </ul>

**Table 2. Barriers to telemedicine and telepharmacy for patients**

Category	Code
A).Low digital literacy for the elderly	<ul style="list-style-type: none"> <li>• Difficulty in operating devices such as smartphones and tablets.</li> <li>• Limitation of operating devices by themselves without help.</li> <li>• Unfamiliar with devices.</li> </ul>
B).Immature telecommunication system	<ul style="list-style-type: none"> <li>• Poor transmission status in mountainous areas.</li> <li>• Difficult to hear the voice.</li> </ul>
C).Issues for the implementation phase	<ul style="list-style-type: none"> <li>• Need for development of new rules or regulations.</li> <li>• No established delivery system of prescribed medicines.</li> <li>• Inconvenience of not being able to receive telemedicine and telepharmacy on their own devices.</li> <li>• Much labor and time needed for receiving instructions and preparation prior to telemedicine and telepharmacy.</li> </ul>

issues for the implementation phase were also pointed out (Table 2-C).

As for communication with doctors or pharmacists online, the patients felt that they could communicate as smoothly as in face-to-face communication. However, they were also concerned about whether telemedicine and telepharmacy could provide the same level of care as face-to-face contact. Moreover, depending on their age and symptoms, some patients preferred face-to-face examination. They believed that they would be more reassured if they were examined in person and that face-to-face talking with a doctor was an important part of treatment for the elderly.

In the study area, patients receive medicine at the clinic after examination and receive explanations about the medicine from the doctor or nurses, and so they had never communicated with a pharmacist. The lack of opportunities to contact pharmacists seemed to be directly linked to their low awareness and low expectations for pharmacists. One participant felt that it was bothersome to tell the pharmacist what he/she had already told the doctor. One subject with experience of prescribing errors showed some understanding of the importance of medication instruction. One subject thought that many patients, including herself, often do not understand much about the medicines they are taking, and that it was good to have opportunities to ask pharmacists to confirm that their drugs were suitable.

There had been little contact between patients and pharmacists so far in the study area. Therefore, the subjects' awareness of pharmacists and their function was low. No one had any experience of consulting with a pharmacist. It may not be easy to give meaningful medication instructions in such a situation. To make the most of telepharmacy in regions where there is no pharmacy nearby, it may be necessary to educate patients about pharmacist's abilities. It would probably be helpful for pharmacists at urban pharmacies in charge of telepharmacy to visit the relevant areas regularly to carry out health support activities and communicate with residents.

As mentioned above, in the area surveyed, there

was no pharmacy nearby, and this is not uncommon in underpopulated areas. Therefore, patients' unfamiliarity with medication counselling by pharmacists may have affected their perspectives. This is a limitation of the study.

In Japan, telepharmacy in urban areas will be expanded following an amendment to the PMD Act in September 2020. The COVID-19 pandemic has also greatly affected the implementation of telepharmacy in Japan. As an extraordinary and temporary measure during the COVID-19 pandemic, remote medical counselling by pharmacists, including by telephone, has also been permitted since April 2020, before the official introduction in Japan. It will be important to identify the differences between patients' perspectives of telepharmacy in mountainous areas and urban areas to improve the delivery of telepharmacy in Japan.

This exploratory interview survey extracted patients' perspectives on telepharmacy in a remote mountainous area, where there is no pharmacy nearby. The results suggest telepharmacy is useful in areas with poor medical resources and offers improved convenience in receiving care, but it would be desirable for pharmacists to be more actively involved with the community to increase its effectiveness.

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*Conflict of Interest:* Kyowa Chemical Co., Ltd. runs a pharmacy that conducted telepharmacy in the present study. IY and Nasu T are executive officers, Nagai T is an employee, MK is CEO/COO of Kyowa Chemical Co., Ltd., respectively. Minacolor Inc. provided a system for telepharmacy. NS and KS are an employee and a representative director of Minacolor Inc. The authors report no other conflicts of interest in this work.

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