International Trend of Non-Contact Healthcare and Related Changes Due to COVID-19 Pandemic

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In response to the global spread of coronavirus disease-2019 (COVID-19), many countries have expanded access to non-contact healthcare. This study aimed to investigate the current state of non-contact healthcare in developed countries before and after the outbreak of the COVID-19 pandemic, and examine the potential clinical and political implications applicable to Korea. Before the COVID-19 outbreak, non-contact healthcare was provided to a limited extent. However, given the surge in COVID-19 cases, countries have lifted the restrictions on non-contact healthcare by expanding eligibility to patients and providers and the range of services. Countries that were slow to implement non-contact healthcare before the pandemic experienced a paradigm shift. Non-contact healthcare has advantages in maintaining essential health services while protecting patients and providers from viral infections. In Korea, non-contact healthcare was regarded as a business sector, so it has not been formally discussed from a public health standpoint. Given this global urgency, discussions should begin surrounding how to best utilize non-contact healthcare, considering the values, safety, and efficacy from the perspective of continuity of patient care. Non-contact healthcare should shift to utilizing a patient-centered approach. The step-by-step strategic planning of non-contact healthcare is imperative for ensuring value, quality, equity, and safety of services.

Key Words: SARS-CoV-2, COVID-19, telemedicine, patient care management, delivery of healthcare

INTRODUCTION

The coronavirus disease-2019 (COVID-19) pandemic has changed people's lives around the world. Many countries, including Korea, have experienced a paradigm shift in all facets of life. In particular, social distancing strategies have been implemented with the intention of limiting close contact between people to minimize the spread of the COVID-19.[1-3] Schools also have implemented distance learning systems to make sure their students stay safely at home.[4] A large number of companies have also offered work-from-home options to their employees.[5] Notably, non-contact healthcare has gained global attention as an alternative to traditional in-person visits during this unprecedented pandemic.

In general, non-contact healthcare refers to the provision of services from a distance using Information and Communication Technology (ICT), as opposed to the traditional way in which physicians provide face-to-face services to patients.[6] Until recently, non-contact healthcare has been praised for improving access to healthcare services in rural areas where health resources are insufficient, and for increasing patient-physician in patients with limited mobility for user convenience.

Recently, as the COVID-19 pandemic accelerated the shift towards a contactless society, non-contact healthcare services have been expanding rapidly. In the COVID-19 era, non-contact healthcare has additional advantages in protecting healthcare

providers and patients from viral infections while maintaining essential health services. It can play a significant role in ensuring patients with chronic diseases to have access to healthcare services, particularly those in need of ongoing and continuous treatment, even in times of restricted movement without direct physical contact.[7] Previously, in the United States and Australia, non-contact healthcare was only available to patients residing in specific regions. However, due to the COVID-19 crisis, its coverage has expanded to patients in all regions.

In the United States, Japan, and Australia, non-contact healthcare services were only accessible to patients who had experienced in-person treatment before, but the COVID-19 has broken down the barriers and allowed access to all patients. Just as COVID-19 has created a momentum shift towards non-contact healthcare in other countries, Korea has been actively utilizing non-contact healthcare services. Before the pandemic, non-contact healthcare services between patients and healthcare professionals were prohibited in principle. However, in light of the pandemic crisis, non-contact healthcare was temporarily allowed for all citizens, although not in a permanent state. Since March 2020, the Korean government temporarily allowed patients to get consultations and prescriptions over the phone in order to ensure essential health services, continue care of patients, and protect physicians and patients while preventing viral transmission in time of the COVID-19 pandemic.

In this phenomenal milestone, this study aimed to review the current state of non-contact healthcare in major developed countries before and after the COVID-19 pandemic, and examine the potential political implications applicable to Korea. The main objectives of this study were as follows. First, we examined the status of non-contact healthcare utilization in major countries under general situations before the COVID-19 outbreak. Second, we reviewed how each country has utilized non-contact healthcare services in response to the global health crisis after the COVID-19 pandemic. Finally, we settled the issues related to non-contact healthcare from a Korean perspective and mapped out the political ramifications to be considered prior to the full expansion of non-contact healthcare.

SEARCH STRATEGY

The target countries of this study were selected through a purposive sampling among the OECD countries that implemented non-contact healthcare services but differed in their healthcare systems. A total of six countries with advanced ICTs were selected and examined in this study: the United States, United Kingdom, Japan, Australia, Canada, and France. The United States operates on a predominantly private health insurance system but also offers government-funded programs to a limited extent for certain populations, such as the elderly and low-income people. The United Kingdom, on the other hand, runs an expansive universal healthcare system known as the National Health Service, and Canada similarly provides government-funded healthcare systems to its entire population. The remaining three countries, Japan, Australia, and France, have a national health insurance system similar to Korea.

This study used the narrative review method with the intention of investigating studies that explain a topic of interest and provide a wide range of the selected topics.[8] Searches were conducted via PubMed, Google Scholar, and Google by using search terms for the topics of interest. This study viewed telehealth and telemedicine as categories of non-contact healthcare. Therefore, the terms "telehealth" and "telemedicine" were used to search the literature. The study also focused on real-time remote consultation between healthcare providers and patients, such as outpatient care. The keywords used for this narrative review were "country name" of each country, "strategy," "policy," "regulation" and "status of utilization" of "telemedicine" and "telehealth," and "COVID-19." OECD publications, national archives, white papers, and initiatives published by governments or governmental agencies, research reports, and peer-reviewed journals were included. Although this study fell under the narrative review method that mainly includes recent literature, historically relevant articles were also included in the study to review the background of non-contact healthcare. Furthermore, we examined and presented changes in the amount of non-contact healthcare used before and after COVID-19 pandemic.

Ethical consideration
The Institutional Review Board (IRB No.2020066) approved this study.

OVERVIEW OF NON-CONTACT HEALTHCARE

In the United States, non-contact healthcare was initiated to reduce disparities in access to healthcare services due to the regional-level capacity gaps and its vast territory. Non-contact healthcare began to be actively discussed in 1993, when the American Telemedicine Association, a non-profit organization committed to expediting the adoption of telehealth, was established. Since then, based on the Public Health and Welfare Act of the Federal government and the Telehealth Development Act of the State governments, non-contact healthcare was introduced to expand access to care in medically underserved areas and to reduce healthcare costs while improving the quality of care.[9]

The move toward telehealth sped up in 1997 when the Government Accountability Office published a report to identify the status of telehealth practices along with strategies and problems within Federal al agencies and major institutions. The Department of Defense also reported on the technical, legal, and political issues of telehealth focusing on business, research, and development.[10] Based on these actions, the Balanced Bud-

get Act was enacted in 1997, and Medicare, funded by the Federal government for people aged 65 years and older, began to pay for telehealth services for the first time in history.[11]

These Medicare telehealth services have been permitted under specific circumstances when patients, physicians, and healthcare workers in different locations can interactively communicate in two-way and in real-time. This requires communication devices, including audio and video devices.[12] While telehealth has been used to improve access to healthcare in rural areas with a shortage of resources, there are still limitations on eligible patients and participating facilities. Currently, Medicare covers telehealth services for patients residing in designated rural communities and specific types of facilities including physician offices, hospitals, critical access hospitals, and rural health clinics.[12]

Medicaid is another government program, co-funded by the Federal government and States, for vulnerable populations such as low-income families. Each state has adopted its own laws and guidelines for operating its Medicaid telehealth services. In contrast to Medicare limiting services to two-way real-time interactive communication, Medicaid expanded reimbursement to cover services such as remote monitoring and store-and-forward. Furthermore, when the Center for Connected Health Policy investigated the telehealth policies for 50 states and the District of Columbia, only seven states were identified with comprehensive telehealth options.[13] This analysis was based on a scoring system that used 13 indicators of two areas related to reimbursement and then classified States into four grades–A, B, C, and F–according to the sum scores.[13] Namely, the States with grade A were active in providing telehealth services along with a wide range of services and higher reimbursement rates. The States with lower grades as F were less permissible to telehealth in addition to having limited scope and reimbursement.

In the present day, telehealth usage in the United States has been on the rise despite some restrictions. According to a nationwide survey conducted, it was reported that live video consultations between patients and providers increased significantly by 15% for about 3 years, from 6.6% (June 2013) to 21.6% (December 2016).[14]

In the United Kingdom, telehealth and telecare aim to provide care and support for individuals and families necessary for independent living in their homes and to reduce avoidable admission while not compromising the quality of care. Accordingly, the UK set out to design telehealth and telecare services to improve health and welfare at the national level, including but not limited to housing, health, and social care. In the late 2000s, telehealth began to emerge as a key preventive service on reports covering a wide variety of topics, such as patient support for chronic diseases, dementia, and adult social care services.[15-20]

In 2008, the UK implemented the Whole System Demonstrator (WSD) program, which was a globally representative trial of telehealth and telecare. This large-sized program engaged a group of 6191 patients and 233 general practitioner (GP) practices from three regions of England, including Newham, Kent, and Cornwall, and was undertaken for 2 years starting in May 2008. In this program, two types of services were provided; telecare services to take care of health and monitor safety; and telehealth services for patients living with long-term conditions, including diabetes, chronic obstructive pulmonary disease, and heart failure. In the UK, the proof of effectiveness demonstrated in the WSD trial caused telehealth and telecare to gain more momentum.[21,22]

Currently, telehealth is supervised by NHS Digital, which was established to digitize healthcare in 2016. NHS Digital has developed a mobile app, called the "NHS App," which enables patients to manage their own health and physicians to remotely monitor the patient's health. Notably, this app was designed for patients to make reservations for GP, get online consultations, and check their medical records and prescriptions online.[23] These actions, however, did not immediately lead to the widespread adoption of telehealth. In some regions such as London, from 2017, mobile-based GP at Hand services have been offered in order to reduce appointment waiting period and provide patients consultations and prescriptions through video and audio devices at their own convenience.[24]

Japan made the first attempt to introduce telehealth in the 1970s, but its progress was made later in the 1990s. The evolution of telehealth in Japan was dependent on its social issues and geographical background. Increased healthcare spending due to the aging population, in addition to a low birth rate, jointly raised concerns about the financial sustainability of Japanese health systems. In addition, disparities in healthcare access and imbalance of health resources have continuously attributed to Japan's geography, being a country made up of several thousand islands.[25] From this point of view, telehealth has experienced a paradigm shift towards the prevention and evolution of ICT.

In December 1997, the Japanese Ministry of Health, Labor and Welfare (MHLW) issued a notification and approved telemedicine using ICT devices as a medical practice.[25] Since then, however, telemedicine services were narrowly provided on a scale of pilot programs. In March 2011, the great earthquake disaster in East Japan triggered the Japanese government to go beyond the restrictions on telemedicine. As radioactive material was leaked from the Fukushima Nuclear Power Plant, the Tohoku regions contaminated by radiation became isolated and inaccessible to healthcare professionals.[25] For that reason, the Japanese government revised the Telemedicine Act to temporarily allow telemedicine services between physicians and their patients.

Then, in 2018, the MHLW released the guideline for telemedicine to provide services for all populations on a full scale.[26,27] According to this guideline, telemedicine was divided into three services, online consultations, online referrals, and on-

line health counseling. Online consultation refers to the diagnosis, examination, delivery of results, and prescribing of drugs between physicians and their patients using ICT devices. During online referrals, physicians may recommend patients to consult with certain medical specialties, followed by a one-to-one conversation using ICT devices. Online health counseling is an exchange of health information in general. Patients and their families may request to receive telemedicine services first, but in-person visits should precede telemedicine services. The attending physicians should also be aware of their patient's clinical conditions and care.[27]

In Australia, telehealth programs were promoted to tackle the low number of physicians per unit area and to improve access to care for patients, such as those with chronic diseases. In 1999, a national health information plan called "Health Online" was developed as the first action towards telehealth; however, it was later initiated in 2011 when it was specified in the legislation of Medicare, national health insurance scheme in Australia.[28,29]

Australia has actively implemented telehealth services as new items added to the Medicare Benefit Schedule (MBS). In the initial stage, the MBS financial incentive program was introduced to better equip healthcare providers with the video and audio devices necessary to conduct physician-patient video consultations.[30] Accordingly, telehealth services have been reimbursed by Medicare only for video and audio equipments.[31] In general, patients eligible to receive telehealth services from Medicare are limited to those who reside in rural, remote, and regional areas. However, older patients in residential aged care facilities and aboriginal Australians are also covered by Medicare regardless of the area of residence. Therefore, a wide variety of healthcare providers, including specialists, medical practitioners, and allied healthcare professionals, are able to provide telehealth services and receive reimbursement from Medicare. Therefore, the MBS item numbers for telehealth were subdivided into 34 items according to the services provided, group of providers, and location of service.[32]

The Department of Human Services of Australia reported that a total of 475545 telehealth services were provided to 144400 patients by 13815 providers from July 2011 to June 2016. Residents in New South Wales utilized the telehealth services the most, accounting for about one-third of the total uses. The most popular medical specialties were psychiatry (794 cases), pediatric medicine (441 cases), and anesthetics (239 cases).[33]

In Canada, the use of telemedicine was initially spread as a means of attaining health equity in communities. Canada is the second-largest country in the world in terms of area, and its population has been concentrated in warmer cities for the south of the country.[34] As regional discrepancies in healthcare have widened between areas focused on agricultural, fishing, and gathering sector and urban areas, issues on healthcare delivery and regional health disparities have been discussed from the early stages.[35]

In 1997, the federal government of Canada established the

Advisory Council on Health Infrastructure (ACHI) to improve access to healthcare across the nation. The ACHI released a report stating that the information technology applications in the health sector, telehealth, for instance, would enhance the quality, accessibility, and efficiency of healthcare services.[36] Following this, telehealth policy and regulations have been pushed forward by the governments.

The provincial and territorial government in Canada each operates its own non-contact healthcare programs. The Federation of Medical Regulatory Authorities of Canada established minimum guidelines to ensure that province/territory-driven telemedicine services for patients are provided in a consistent manner across the nation. Specifically, these guidelines state that physicians are required to disclose their identity, region, and licensure status to patients, and to explain the suitability and limitations of provided telemedicine services. In addition, physicians utilizing telemedicine should keep medical records through face-to-face services, and maintain patient confidentiality by keeping their information private.[37]

Health officials in Ontario have been actively developing non-contact healthcare services in the provinces; and in recent years, the Ontario Ministry of Health funded the establishment of the Ontario Telemedicine Network (OTN) for policy development and pilot program launches. Although telemedicine services were not covered by the Ontario Health Insurance Plan (OHIP), physicians were remunerated through provincial government funds when billed to OHIP.[38] In 2017, the OTN launched a pilot program to provide patients with video visits at home using computers, smartphones, and tablets. In the first year of this pilot program, more than 11000 video visits were delivered by 565 providers. Among all video visits, psychiatry (47%) accounted for the largest proportion, followed by general/family medicine (27%), and other specialists (26%).[39]

Unlike the province of Ontario, where telemedicine services are not covered by the OHIP in principle, the province of British Columbia covers selected audio and video visits by a government health insurance plan called the Medical Service Plan (MSP). It is mandatory that physicians provide direct interactive services to patients through video links, which can be charged to the MSP.[40]

France introduced telehealth to improve public health and to mitigate regional health disparities and excessive health spending. Although France has high-level health resources at the national level, including human and materials, large regional disparities in accessibility to these resources still remain.[41] Subsequently, to tackle these social problems, France enacted the Hospital, Patients, Health and Territories law providing a legal basis to implement telehealth services.[42] Telehealth in France includes five types as specified by law. These are physician-patient remote consultation, remote patient monitoring, tele-expertise, remote assistance of colleagues, and remote medical response to an emergency.[43,44]

Initially, telehealth in France was operated in monitoring-

based pilot programs. However, following the launch of My Health 2022 (Ma Santé 2022) in 2018, telehealth has been covered by the statutory health insurance system.[45,46] Among telehealth services provided, remote consultations are available only for patients who have received face-to-face consultations at least once within the last 12 months. Moreover, telehealth services are not available to patients who are living close to specialists, those under the age of 16, and in emergencies. Patients can receive telehealth services from any place, provided they have the necessary devices, including their homes or dedicated locations such as pharmacies and health centers equipped with the required devices.[47]

In France, a series of administrative procedures for remote consultation has been specified. First, remote consultation begins at the request of patients or by the advice of attending physicians as in-person visits. However, due to the physicians' obligation towards the patients, remote consultation usually initiates upon the physicians' judgment for the appropriateness of remote care instead of face-to-face care. Before starting remote consultation, physicians send patients a link to a secure website at the appointment time. Then, the patients use devices that meet the requirements of remote consultation and connect to the link sent from their physicians to consult through video. Physicians should obtain all of the patients' consent prior to initiating remote consultations. If necessary, physicians issue prescriptions to their patients, in a paper or electronic format that ensures confidentiality and security of personal information. The providers are paid for remote consultation services at the same rate as face-to-face consultations.[47]

According to a survey conducted in 2019, the public and healthcare professionals in France generally had positive perceptions towards telehealth. It was reported that 98% of healthcare professionals and 79% of the public were aware of telehealth, and that 50% of healthcare professionals and 40% of the public were willing to use telehealth services. Only 6% of the survey respondents had an experience of telehealth, such as remote consultation, while 71% were satisfied with the services provided. Among healthcare professionals, 9% had experiences providing telehealth, and 86% were satisfied with providing such services (Table 1).[48]

NON-CONTACT HEALTHCARE TRENDS DURING COVID-19 PANDEMIC

On March 11, 2020, the World Health Organization (WHO) declared a pandemic in response to the worldwide and skyrocketing spread of the COVID-19.[49] As the rapid spread of COVID-19 also threatened global societies and local communities, the governments in a number of countries took vigorous measures to contain and mitigate the spread of COVID-19, including restrictions on public gatherings, movement, and travel. When the degree of risk reached critical levels, cities around

the world adopted strict lockdown measures.[50-52] Accordingly, six countries reviewed in this study have expanded telehealth services, with governments lifting laws and regulations limiting the scope of patients, residing regions, and applicable diseases to use telehealth services and leveraging the potential and benefits of telehealth. Actively utilizing non-contact healthcare allows the detection of patients who are suspected to have COVID-19, and those who test negative can easily access healthcare services without a direct visit to healthcare institutions. As a result, the utilization of telehealth has also exploded (Fig. 1).[53-55]

On March 19, 2020, the Centers for Medicare & Medicaid Services (CMS) of the United States announced a policy to expand coverage for telehealth services on a temporary basis in response to the COVID-19 pandemic.[56] During the COVID-19 public health emergency, CMS has offered providers payment parity; this means that telehealth services are compensated at equal rates to in-person services.[57] At the same time, patients are given the flexibility to receive healthcare services without the need to visit providers directly and physically. Medicare eliminated restrictions on telehealth, allowing patients in all areas to have access to the telehealth services that only rural patients had been permitted prior to the COVID-19 outbreak. This ensures that patients residing in all regions are eligible to access telehealth services with interactive two-way communications between patients and physicians in real-time. In addition, first-time patients can now receive telehealth services, at home or at any other health institutions, including clinics, hospitals, nursing homes, and rural health clinics. The range of reimbursable services and providers has also further expanded so that the care planning for patients with cognitive impairment, psychological and neuropsychological testing, physical therapy, and occupational therapy are included. Therefore, physical therapists, occupational therapists, clinical psychologists, and speech pathologists are temporarily paid by CMS for their services provided through telehealth.[57]
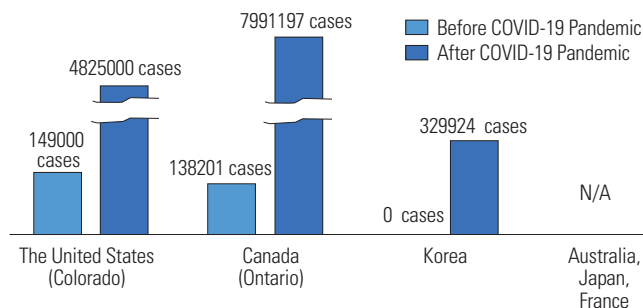
On March 5, 2020, the NHS England of the United Kingdom pre-emptively advised the GPs across the country to switch pre-booked, face-to-face appointments to online, telephone, or video patient triaging to reduce viral transmission.[58,59] The NHS also recommended that patients receive online and video consultations using the NHS App and GP website instead of face-to-face care.[60] During an online consultation, patients are asked to fill out virtual forms on their health and have a conversation with physicians to seek out the best care options. If necessary, patients are given phone or video consultations, the latter resembling face-to-face appointments. Patients can receive consultations, referrals, and advice on prescribed medications through video consultations, which require devices that allow video calling and internet connection. Phone calls are for limited use, and are offered only to patients who are not available for video calls.[61,62]

Japan expanded telemedicine services as of April 2020, due to the spread of COVID-19 and the prospective collapse of healthcare systems.[63,64] Until then, telemedicine services were deliv-

Table 1. Status of Non-Contact Healthcare before COVID-19 Outbreak

Country	Category	Description
U.S.	Type of non-contact healthcare implemented	• Real-time interactive services. Telecommunication system between a provider and a patient should be used to interactively communicate in two-way and in real-time
	Eligible patients	• For established patients who live in rural community
	Patient's place	• Healthcare institutions with specialty and subspecialty providers • Patients' home for kidney dialysis patients, rapid diagnosis of acute stroke patients, and drug use and mental health disorders
	Eligible providers	• Doctors, nurse practitioners, clinical psychologists, and licensed clinical social workers
U.K.	Type of non-contact healthcare implemented	(London) • Real-time interactive services using GP at Hand app between a provider and a patient
	Eligible patients	• Patients registered in GP at Hand app if they live or work in close proximity to the GP surgery
	Issuing prescription	• A repeat prescription is sent electronically to a pharmacy of patient's choice
Japan	Type of non-contact healthcare implemented	• Real-time interactive services. Telecommunication system between a provider and a patient should be used to interactively communicate in two-way and in real-time
	Eligible patients	• For established patients with chronic disease
	Issuing prescription	• In case of drug prescription records with face-to-face care in the past
Australia	Type of non-contact healthcare implemented	• Real-time interactive services. It should use telecommunication system between a provider and a patient to interactively communicate in two-way and in real-time
	Eligible patients	• For established patients who live in rural community (Remoteness areas 2–5) • First non-healthcare patients who are aboriginal or in residential aged care facilities
	Eligible Providers	• GPs, specialists, midwifes, nurses
Canada	Type of non-contact healthcare implemented	• (BC and ON) Real-time interactive services. Telecommunication system between a provider and a patient should be used to interactively communicate in two-way and in real-time.
	Eligible patients	• (BC) No limitation. All residents in British Colombia • (ON) Participants in OTN Programs
	Eligible providers	• (BC) Family doctor and specialists • (ON) GPs, family doctor, and specialists
France	Type of non-contact healthcare implemented	• Real-time interactive services. Telecommunication system between a provider and a patient should be used to interactively communicate in two-way and in real-time.
	Eligible patients	• For established patients
	Patient's place	• Patient's home • Healthcare centers or pharmacies with video and microphone equipment

BC, British Colombia; OT, Ontario; GP, general practitioner; OTN, The Ontario Telemedicine Network.

Fig. 1. Changes in the usage of non-contact healthcare before and after COVID-19 Pandemic. The number of cases before and after the pandemic is compared between 2019. 3. 11–2019. 12. 31 and 2020. 3. 11–2020. 12. 31 in the United States, 2019 3. 12–2019. 7. 29 and 2020 3. 11–2020. 7. 28 in Canada, and 2019. 3. 16–2019. 12. 31 and 2020. 3. 16–2020. 5. 31 in Korea, respectively. The number of non-contact healthcare case is not available in other countries.

ered through video only; however, due to the COVID-19 pandemic, patients began to receive such services over the phone, under the condition that the diagnosis and prescription can-

not be provided. Telemedicine services are usually permitted to patients with previous visit history; however, in the case of patients who visit for the first time, telemedicine services are available only at health clinics equipped with the required devices. Furthermore, the applicable diseases for telemedicine have expanded from chronic diseases, such as hypertension, to all diseases and conditions.[65,66] When it comes to medications, patients are eligible to be prescribed new drugs and receive their drugs at home, including by courier.[66]

Australia also temporarily extended the Medicare coverage of telehealth to all Australians to minimize local transmission of COVID-19 and protect the public from infection.[67] Additionally, regional restrictions on providing telehealth services were also loosened to provide universal services across the nation. Reimbursable GP services for telehealth are not limited to standard services and consultations, but also include chronic disease management, autism and pervasive developmental disorder and disability services, pregnancy support, and mental health services. Popular apps and software, such as Zoom, Sky-

pe, FaceTime, Duo, and GoToMeeting, are used during video consultations. Consultation over the phone is also available if video devices are not accessible. Drug prescriptions through telehealth are permitted only for oral contraceptives, cholesterol-lowering drugs (statins), and drugs requiring continuous prescriptions. Continuous prescription drugs are only allowed upon the pharmacist's approval due to immediate necessity, and they are limited to drugs with previous prescription history within 6 months.

In the Canadian province of British Columbia, telehealth has been expanded since March 27, 2020, to protect healthcare providers and patients from infection, and to continue essential health services against the COVID-19 pandemic.[68] Telehealth, called "Virtual Care," is provided through free mobile apps, such as FaceTime and Skype, or over the phone, with less strict technical requirements. Another large Canadian province, Ontario, temporarily expanded the means and eligibility of telehealth services and initiated provisional payment for the delivery of telehealth.[69] By not placing restrictions on the subjects of telehealth utilization, these services are allowed for all healthcare providers and patients, as well as their caregivers. The delivery of telehealth services is not limited to virtual video solutions verified by OTN and allows phone calls. In addition, since March 14, 2020, the provisional fees for telehealth services are being paid to healthcare professionals by OHIP.

France has also emphasized the importance of continuity of care even during the COVID-19 pandemic and expressed concerns about patients refraining from healthcare services from fear of infection.[70] This is because patients should receive continuous care and medication, even under the restrictions applied during the global health crisis. To tackle this issue and protect the public and healthcare providers, the French government took actions to actively utilize telehealth services; as a result, since April 21, 2020, patients who test positive or are symptomatic for COVID-19, pregnant women, elderly people aged 70 years and over, and those with long-term diseases have been allowed to receive telehealth services, even if they have not previously received in-person care.[71] In order for online consultations to occur, healthcare providers and patients are required to equip themselves with devices, such as PCs, mobile phones, and tablets, with cameras and microphones to enable real-time video. If patients are not equipped with the necessary devices, video chat applications can be put to use instead. The statutory health insurance of France covers all health costs pertaining to telehealth services for patients with confirmed or suspected COVID-19 infections, and other patients are reimbursed at the same amount as face-to-face healthcare services (Table 2).[72]

CLINICAL IMPLICATION OF NON-CONTACT HEALTHCARE

We found that prior to the outbreak of COVID-19, the United States, Japan, and Australia secured safety by limiting the scope of patients who had access to non-contact healthcare services, doctors who could provide services, and diseases. Although the spread of COVID-19 has lifted restrictions on the use of non-contact healthcare in most countries and is spreading to the nation, clinical effectiveness and safety are the key general medical services. Korea has also been allowed to utilize telephone consultation to cope with the COVID-19 pandemic; but unfortunately, there has been no prior discussion of non-contact healthcare. To prepare for the post COVID-19 era, the clinical implications of non-contact healthcare that must be considered to ensure medical quality have been presented.

Firstly, non-contact healthcare should be applied and expanded from clinically safe and effective fields. As areas where non-contact healthcare can be applied, chronic diseases such as diabetes and hypertension in primary care can be considered. In the field of chronic disease management, the effectiveness of non-contact healthcare is accumulated the most, and positive patient experiences are reported.[73] Several studies have shown that non-contact healthcare for chronic disease management is clinically similar to face-to-face care.[74] In addition, telephone consultation conducted in Korea was reported to have a high frequency of use by people with diabetes and hypertension, and to continuously manage the disease by receiving medication prescription.[75]

Secondly, service guidelines should be prepared to provide safe medical services to patients. Prior to COVID-19, it was found that non-contact healthcare was only available to patients with existing medical records in many countries. It should be limited to patients who have a trusting relationship with the doctor who is familiar with the patient's condition. In addition, excessive non-contact healthcare based on convenience can create unnecessary side effects. This may cause the secondary prevention function (early detection and early treatment) to stop working. Therefore, it is necessary to prevent deterioration in the quality of healthcare by restricting consecutive non-contact healthcare.

Finally, the gap in accessibility of non-contact healthcare should be minimized. It should be noted that the non-contact healthcare began with concerns about how to resolve inequality in the accessibility to medical care in areas where patients cannot receive treatment due to a shortage of doctors. Although healthcare should be equally accessible to all patients, a study conducted in the United States reported that there was a gap in the access to non-contact healthcare by age, residence, and type of medical coverage.[76] For example, the elderly population with chronic diseases can benefit the most from non-contact healthcare, but there may be some differences in its access depending on the degree to which the patients are familiar with digital use and reading comprehension. To prevent inequalities in access to non-contact healthcare, support and monitoring are needed for those who have difficulty using digital devices.

Table 2. Status of Non-Contact Healthcare before and after COVID-19 Outbreak

Country	Category	Before COVID-19	After COVID-19
U.S.	Type of non-contact healthcare implemented	• Real-time interactive services	
	Eligible patients	• For established patients who live in rural community	• All nationwide patients
	Patient's place	• Healthcare institutions with specialty and subspecialty providers	• Patients' home • Healthcare institutions
U.K.	Type of non-contact healthcare implemented	(London) • Real-time interactive services	• Real-time interactive services
	Eligible patients	• Patients registered in GP at Hand	• All nationwide patients
	Issuing prescription	• A repeat prescription is sent electronically to a pharmacy	
Japan	Type of non-contact healthcare implemented	• Real-time interactive services	• Real-time interactive services • The office where the equipment is installed (if it is the first time for non-contact healthcare)
	Eligible patients	• For established patients with chronic disease	• All nationwide patients
	Issuing prescription	• In case of drug prescription records in the past face-to-face care	• Prescription is sent electronically to a pharmacy • Prescription is delivered to the patients
Australia	Type of non-contact healthcare implemented	• Real-time interactive services (using government-certified solutions)	• Real-time interactive services (included widely available video calling apps and software such as Zoom, Skype, FaceTime, Duo, GoToMeeting and others) • Telephone • E-mail
	Eligible patients	• For established patients who live in rural community • Aboriginal or in residential aged care facilities	• All nationwide patients
Canada	Type of non-contact healthcare implemented	• (BC and ON) Real-time interactive services	• (BC and ON) Real-time interactive services and telephone
	Eligible patients	• (BC) All residents in BC • (ON) Participants in OTN Programs	• (BC and ON) All residents in their States
France	Type of non-contact healthcare implemented	• Real-time interactive services	• Real-time interactive services • Telephone
	Eligible patients	• For established patients	• For established patients • Patients, patients with symptoms of COVID-19 infection, acute patients, chronic patients, and pregnant women (if it is the first time for non-contact healthcare)
	Patient's place	• Patient's home • Healthcare centers or pharmacies with video and microphone equipment	
	Issuing prescription	N/A	• Prescription is sent electronically to a pharmacy • Patients can get prescribed medication directly

BC, British Colombia; OT, Ontario; GP, general practitioner; OTN, The Ontario Telemedicine Network.

POLITICAL IMPLICATION AND STRATEGIES TO SCARE UP NON-CONTACT HEALTHCARE IN KOREA

The previous restrictions to non-contact healthcare have been drastically lifted in several countries during the COVID-19 pandemic due to the support of systematically established laws, strategies, and guidelines. In order for non-contact medical care to be implemented in Korea, it must be accompanied by policy and legal support.

Firstly, non-contact healthcare between patients and healthcare providers should be allowed through the revision of the medical law. Currently, the medical law in Korea only allows non-contact healthcare among healthcare providers. The medical law should cover the following: the definition of non-contact healthcare, the type of service, the patients who can use non-contact healthcare, the method of use (equipment), and the place where the patient can receive non-contact healthcare.

Secondly, non-contact healthcare needs to operate within the healthcare system. In order to disseminate non-contact healthcare, an appropriate fee must be developed. Payments and reimbursement for non-contact healthcare are offered in the United States, Australia, Canada, and France. In addition, as it is paid within the health insurance system, continuous analysis and evaluation mechanisms should be established for the usage and quality of non-contact healthcare.

Thirdly, education on the use of non-contact healthcare is needed. In order to improve the acceptance of non-contact healthcare care, which is a relatively new medical paradigm, healthcare providers and patients must be educated on it. It was previously reported that about one-third of healthcare workers in OECD countries were not familiar with using digital technologies.[77] Therefore, it is necessary to provide education on how to deal with certain situations, such as how to use the non-contact healthcare equipment and internet errors that may occur when meeting patients remotely. Patients who have difficulty visiting healthcare institutions are the biggest benefactors of non-contact healthcare. If patients find the use of non-contact healthcare difficult and inconvenient, leading to the cessation of this service, there will be an inevitable disruption of the continuity of care.

Lastly, the most sensitive issue is the design of a non-contact healthcare system that ensures information security and protection of personal information and data. Considering that non-contact healthcare uses real-time images and interactively exchanges data, a framework committed to protecting information security and patient privacy should be established prior to building a platform for non-contact healthcare. At the same time, national standards for privacy and information security should be formed when building the institutional design.

CONCLUSION

Since the outbreak of COVID-19, non-contact healthcare has expanded significantly in many countries that used to have limited use of non-contact healthcare. Telephone consultation was temporarily allowed to maintain patient healthcare and prevent the spread of COVID-19 in Korea. Now that non-contact healthcare is in a natural environment, we need to think about how to use healthcare better and more effectively. This study reviewed the status of non-contact healthcare before and after the COVID-19 pandemic in several countries, and comprehensively described and compared the legal and policy status of non-contact healthcare, the target and scope of non-contact healthcare, compensation measures, and changes after COVID-19.

In conclusion, when considering safety and effectiveness, non-contact medicine is the first to be applied to chronic disease management. In order to provide safe services, constant non-contact healthcare should be discouraged and users should be limited to re-examined patients. It is also necessary to ensure that there is no inequality in access to non-contact healthcare. Policy and legal support are needed to implement and disseminate non-contact healthcare. Also, reimbursement of non-contact healthcare as well as education for medical provider and patients are needed. Lastly, it is essential to design a system that can guarantee the protection of personal information and data security related to non-contact healthcare.

Although we comprehensively reviewed the state of non-contact healthcare in this study, there were some limitations. First, the countries were randomly selected. Second, since these countries have their own backgrounds for healthcare policies and the adoption of non-contact healthcare, we need discretion in interpreting situations of non-contact healthcare in these countries. Lastly, non-contact healthcare (telephone consultation) has a short history in Korea. Therefore, we should continually evaluate and review the safety and effectiveness of non-contact healthcare.

AUTHOR CONTRIBUTIONS

Conceptualization: all authors. Data curation: Soomin Kim and Jee-Ae Kim. Formal analysis: Soomin Kim and Jee-Ae Kim. Funding acquisition: Jin Yong Lee. Investigation: Jee-Ae Kim. Methodology: all authors. Project administration: Jin Yong Lee and Jee-Ae Kim. Resources: Jee-Ae Kim and Soomin Kim. Software: Soomin Kim. Supervision: Jin Yong Lee and Jee-Ae Kim. Validation: Jee-Ae Kim. Visualization: Soomin Kim. Writing—original draft: Soomin Kim. Writing—review & editing: all authors. Approval of final manuscript: all authors.

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