

Original Research

A strategy of providing outdoor medicine dispensing services for outpatients during the COVID-19 pandemic

Chuang HC , Chang YL , Liou JH , Chen HM 

Received (first version): 08-Aug-2022

Accepted: 04-Jan-2023

Published online: 27-Mar-2023

Abstract

Background: The COVID-19 pandemic has created dramatic challenges for healthcare systems around the world, including Taiwan. At the end of January 2022, there were 17,951 confirmed cases and 851 deaths nationwide, while the COVID-19 vaccination coverage rate in Taiwan was only 80.8%, making it hard to defend against the quick mutation of the virus, which gave rise to variants, such as Omicron. **Objective(s):** To safeguard the rights of patients to receive medicines in a safe way, we offered three new pharmaceutical services, including an outdoor medicine dispensing refillable prescription service, telemedicine, and a queue management system. The purpose of this article is to share our successful experience and to investigate the impact of outdoor pharmaceutical services during the COVID-19 pandemic. **Methods:** In order to provide patients with an outdoor medicine dispensing refillable prescription service and telemedicine service, prior arrangement through a booking system was required. Patients could obtain a queue ticket through a multi-media intelligent serving machine or the counter. We also relocated one of our counters from the pharmacy department to the front lobby during the morning peak hours. Then we gave surveys via paper questionnaires in 2020 and Google Forms in 2021 to confirm that the services were helpful. **Results:** A total of 24,248 person-times were recorded for chronic disease patients with refillable prescriptions visiting our hospital in 2020, compared with 14,134 person-times in 2021. For the queue management system, the total number of person-times in 2020 was 26,670, which relieved about a quarter of the waiting outpatient burden. Furthermore, use of telemedicine totaled 3,369 person-times. A high proportion (over 90%) of patients reported being satisfied with these services. **Conclusions:** The three new pharmaceutical services not only prevented patients from interrupting their medications during the epidemic period, but also reduced the risk of contagion. All three services provided outpatients with a safe and low-risk method of picking up their medications, and a high proportion of patients were satisfied with these services

Keywords: outdoor medicine dispensing services; telemedicine; COVID-19

BACKGROUND

The Coronavirus Disease 2019 (COVID-19) pandemic has created dramatic challenges for healthcare systems around the world, including Taiwan (Republic of China, R.O.C.). The Taiwan Centers for Disease Control (TCDC) announced that “Coronavirus disease 2019 (COVID-19)” was a notifiable infectious disease of the fifth category on January 15, 2020. Then, on January 21 of the same year, the first imported case was confirmed, and the first local case was confirmed on May 28. Because the number of confirmed cases continued to increase unpredictably, the Central Epidemic Command Center announced on May 15 that for the Shuangbei area, including

Taipei City and New Taipei City, a nationwide level 3 alert was in effect and this was expanded to the whole country on May 19, 2021. As of the end of January 2022, there have been 17,951 confirmed cases and 851 deaths nationwide, while the COVID-19 vaccination coverage rate in Taiwan was only 80.8% for the first dose and 72.5% for the second dose, and thus it was a considerable challenge to guard against the rapid emergence of variants, such as Omicron.¹

According to data on new deaths of COVID-19 cases in Taiwan provided by the TCDC, 90% had a history of chronic disease, such as diabetes mellitus, hypertension, hyperlipidemia, chronic obstructive pulmonary disease, asthma, chronic nephritis, arthritis, tuberculosis, and so on. Patients with a chronic disease must return to the hospital regularly, which not only increases the risk of infection but also wastes time. In accordance with healthcare policies implemented by the National Health Insurance Administration, Taiwan has separated drug prescription and drug dispensing services since 1997.² Patients with a chronic disease who are stable enough to be prescribed refillable prescriptions can choose to go back to the original medical institution to receive the second or third refillable prescriptions, or they can visit a pharmacy in their neighborhood. However, for patients who have chosen to return to our hospital for the second or third refillable prescription, it was important to find a way to make their visit as brief and as safe as possible to minimize the threat posed by COVID-19. Meanwhile, telemedicine as well as the medicine dispensing system were upgraded and scaled up to reduce

Chuang HC*. Bachelor of Science in Pharmacy, Department of Pharmacy, Taichung Veterans General Hospital, Taiwan (R.O.C.). christ0936@hotmail.com

Chang YL. Master of Science (MS) degree, Department of Pharmacy, Taichung Veterans General Hospital, Taiwan (R.O.C.). samtweety@hotmail.com

Liou JH. Master of Science in Pharmacology, Chief of Outpatient pharmacy, Department of Pharmacy, Taichung Veterans General Hospital, Taiwan (R.O.C.). liujh@vghtc.gov.tw

Chen HM. MHA, Department of Health Services Administration, Chief of Clinical Pharmacy Division, Department of Pharmacy, Taichung Veterans General Hospital, Taiwan (R.O.C.). hsmchen620928@gmail.com



the risk of transmission. The first conceptual framework for telemedicine implementation during outbreaks was published in 2015.³ In Spain, teleconsultation with drug dispensing was promoted, but with limited access in some geographic areas in 2019.⁴ In the United Arab Emirates (UAE), a prospective study in 2021 carried out for 4 months in 52 community pharmacies using disguised direct observation showed that telepharmacy services improved dispensing safety and increased patients' access to pharmaceutical care, but specific errors such as wrong-patient error were more likely to occur.⁵ In China, a medication consultation service system and telepharmacy service model based on social software were established in February 2020, but there were only 1,432 views, 66 followers, and 39 counseling cases completed within 2 months.⁶ As for hospitals in Taiwan, because of the lack of a regulatory framework to integrate the telemedicine services, we had little experience with telemedicine and outdoor medicine dispensing systems until 2021.

To safeguard the rights of patients to receive medicines, while minimizing the probability of patients becoming infected while waiting for their medicine, we offered three new pharmaceutical services, including an outdoor delivery drug refillable prescriptions service, telemedicine, and a queue management system. In this article, we share our successful experience of this model of pharmaceutical care during the COVID-19 pandemic.

METHOD

This was a retrospective study which utilized the medical information system of our hospital to gather data from Feb. 10 to July 3, 2020 and from May 13 to Aug. 7, 2021, using surveys, i.e., paper questionnaires and Google Forms. We included patients with chronic diseases who had a refillable prescription and had made an appointment to receive medicines through the Internet or our app. We implemented three new pharmaceutical services, including an outdoor delivery drug refillable prescriptions service, telemedicine, and a queue management system. Then we conducted surveys via paper questionnaires in 2020 and Google Forms in 2021 to determine whether the services were actually helpful in the COVID-19 pandemic. Also, we collected the utilization rate of online reservations and the rate of using the prescription refilling system. Chronic disease patients who had a second or third refillable prescription and chose to return to our hospital to pick up their medication were deemed to have used the prescription refilling system and these data were used in the analysis of the service adoption rate. Furthermore, the utilization rate of online reservations was based on patients who choose to make a reservation first through the Internet or our app before coming to pick up their medication. These two utilization rates were used to assess the numbers of patients who used our dispensing services. The Institutional Review Board of Taichung Veterans General Hospital approved this study (IRB number: CE21367A). Written consent from the study patients was not obtained because the hospital dataset consists of deidentified

secondary data for research purposes, and the Institutional Review Board of Taichung Veterans General Hospital issued a formal written waiver for the need for consent.

The outdoor delivery drug refillable prescriptions service

The period: from Feb. 10 to July 3, 2020 and from May 13 to Aug. 7, 2021.

Our outdoor medicine dispensing service was first established on February 10, 2020. It was located right next to the driveway at the front of the outpatient building on the first floor. We rapidly set up all of the relevant electrical equipment, which was completed within a day, including computers, printers, a multi-media intelligent serving machine, health insurance card readers, and so on. Further, the informational posters were quickly created to educate patients about the whole process. Also, we asked the Personnel Office to assign volunteers to assist in the handling of medicines. The service time was from 8:30 to 17:00 (without breaks), Monday through Friday. The goal was to reduce the volume of people passing through the hospital, and to prevent people gathering at the hospital dispensing while prescriptions were being dispensed. The patients could choose to stay in their cars while waiting. Prior arrangement through the hospital website or our app booking system was required before or on the day that they want to pick up the medicine. After arriving at the new dispensary location, they should insert their health insurance IC card into the reader to check their refillable prescription. The patients could obtain a queue ticket on which the patient's prescription booking information, including the receipt number, is printed through the multi-media intelligent serving machine. The pharmacists still perform the drug utilization evaluation (DUE) indoors, including the prescription content, indications, usage and dosage, drug-drug interaction, adverse drug reactions and allergies, repeated medication, following the National Health Insurance Payment Guidelines, drug incompatibility, and other drug-related issues. Drug consultation is provided when the drug is delivered, and the pharmacists answer any drug-related questions raised by the patient or the person who is assisting the drug recipient, based on information provided by the medication package insert, databases, the literature, and so on. Consultations may include information such as the drug's properties, pharmacological effects, stability, compatibility, dosage, route of administration, usage and dosage, therapeutic use, clinical indications, contraindications, drug interactions, pharmacokinetics, and adverse drug reactions. The process is presented in Figure 1.

Telemedicine service

To minimize in-person visits and reduce the face-to-face contact between physicians and patients, a telemedicine service (including video call or telephone only) was provided from May 25 to July 19, 2021. The service was mainly for "stable chronic patients who had previously been in the hospital for a long time" (restricted to those who are returning to the hospital). Patients registered using the online registration page (<http://register.vghtc.gov.tw/register/>), and then selected



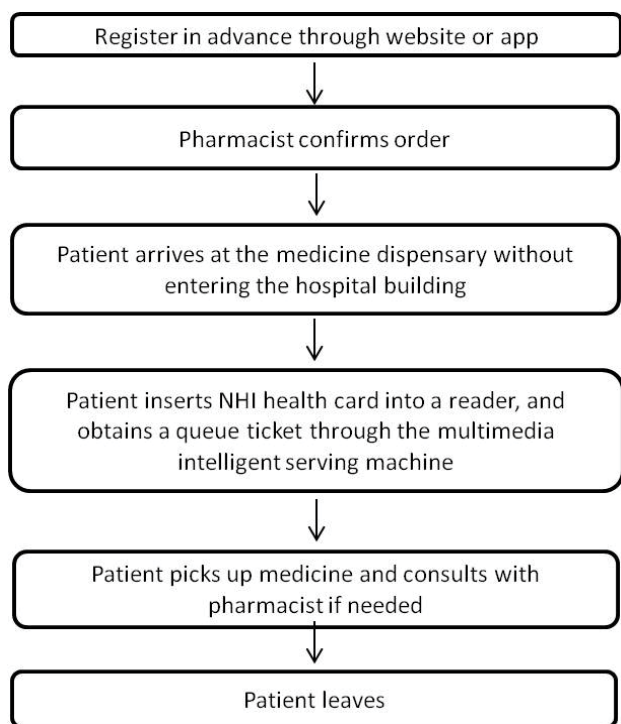


Figure 1. Workflow of the outdoor medicine dispensing refillable prescriptions process

outpatient appointment registration, including video or telephone diagnosis and treatment. The opening hours were from 8:30 to 12:00 in the morning, and from 1:30 to 5:00 in the afternoon. For each consultation period, i.e., morning and afternoon, there was a limit of only 10~20 patients to ensure that all of the patients were well cared for. Each prescription was valid for 24 hours (excluding holidays) from the date of consultation (inclusive), and the medicine could not be received after the expiration date of the prescription. After the patients had finished the telemedicine consultation, they visited the outdoor medicine dispensing services area to get their prescription. This area was right outside our hospital, which meant that patients did not need to enter the building. When the patients arrived at the outdoor dispensing area, they just needed to insert the health insurance IC card into the reader and get their prescription at the payment counter nearby. Furthermore, hospital pharmacists were available to assist patients if needed. Outdoor drug consultations could be provided with the same level of quality as that provided by the regular dispensary service prior to the COVID-19 pandemic. The service was open from 8:30 to 17:00 without a break at noon, from Monday to Friday.

Queue management system

To improve our queue management system, we further relocated one of our counters from the hospital dispensary to the front lobby (number-6) during the morning peak hours, from 8:00 to 13:00, from April 7 to June 5, 2020. Additionally, for social distancing purposes, we not only rearranged seats

in the waiting areas, but also placed stickers on the floor at 1.5-meter intervals. Most importantly, patients were able to access a smart QR code link (Figure 2), which provided updates of the current queue number. Patients could wait elsewhere comfortably until the medication was ready for their collection. We conduct surveys via paper questionnaires from June 29 to July 3, 2020 and Google Forms from July 1 to July 7, 2021.



Figure 2. The smart QR code link provides the most recent queue number

The topics on the questionnaires were as follows:

Which service did you use, the outdoor medicine dispensing refillable prescriptions service or the telemedicine service?

What mode of transportation did you use to visit our hospital?

Gender

Age

Rate the convenience of booking prescription medications through the web or our app.

Rate the convenience of the counter's location.

Rate the smoothness of the procedure for obtaining your medicine.

Rate your satisfaction with the patient-pharmacist interaction.



Rate your satisfaction with the whole pharmaceutical outdoor dispensing services.

The questionnaires were with a 5-point-scale, and 5 was the maximum score, which indicated with very high satisfaction.

The content validity index (CVI) structure was 1.0 and Cronbach's alpha coefficient for the entire questionnaire was 0.897.

RESULTS

The data for 2020 and 2021 are presented separately below.

Data in 2020

Data on the outdoor medicine dispensing service were collected from February 10 to July 3. For chronic disease patients with refillable prescriptions, a total of 24,248 person-times were recorded, averaging 243 person-times per day. The patients' satisfaction with the medicine dispensing procedures were surveyed and compared between indoor and outdoor counters. Table 1 shows the outdoor counter had significantly higher patient satisfaction ratings compared with the indoor counter ($p < 0.001$), and the overall satisfaction was as high as 94.6%.

Data on the queue management system were collected from April 7 to June 5, 2020, and we provided services from 8 am to 1 pm. A total of 26,670 person-times received this service, averaging 606 person-times per day. The volume accounted for 26.9% of the concurrent total prescriptions, as shown in figure 3. This service relieved about a quarter of the waiting outpatient burden. Meanwhile, the procedure followed minimum social distancing rules (i.e., 1.5 meters indoors, and 1-meter outdoors) as recommended by the Central Epidemic Command Center (CECC).

Data in 2021

Data on the outdoor medicine dispensary service were collected from May 13 to Aug. 6. For chronic disease patients with refillable prescriptions, a total of 14,134 person-times were recorded, averaging 207 person-times per day. Data

total prescriptions/counter

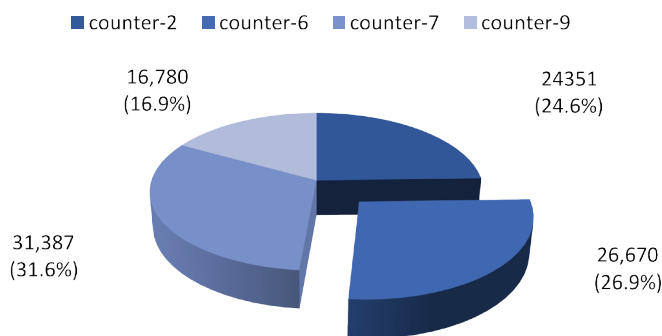


Figure 3. The total number of prescriptions of the whole outpatient counter

on telemedicine were collected from May 25 to Aug. 6. A total of 3,369 person-times used this service, averaging 72 person-times per day. Video consultations accounted for 6% of utilization, compared with 94% for telephone consultations. We conducted surveys via Google Forms from July 1 to July 7. A total of 300 patients who used the outdoor medical dispensing services completed the online survey, including 194 person-times for chronic disease patients with refillable prescriptions, and this figure represents the population who tends to visit our hospital regularly. Also, we collected 106 person-times for telemedicine, which might have included new patients. The satisfaction with the whole process was 91%; the satisfaction with the pharmacists' attitude was 97%, and the overall satisfaction was 93.3% (Table 2).

Also, the utilization rate of online reservations by patients receiving medicines increased year by year: 30.5% from February to July 2019, 37.2% in the same period of 2020, and 39.6% in 2021. The rate of using the prescription refilling system was significantly lower than before the COVID-19 outbreak and decreased year by year, 28% from February to July in 2019, 25.6% in the same period in 2020, and 23% in the same period in 2021 (Figure 4).

Moreover, during 2020 and 2021, a paper questionnaire and Google Forms (online), respectively, were used to conduct

Table 1. Comparison of satisfaction with procedure for obtaining medicine between indoor dispensing counter and outdoor counter

	n	In-hospital pharmacy						Outdoor counter						p-value
		Mean	±SD	Minimum	Maximum	Median	IQR	Mean	±SD	Minimum	Maximum	Median	IQR	
Convenience of booking prescription medications through website or app	247	4.4	±0.8	2	5	5	(4-5)	4.7	±0.5	2	5	5	(5-5)	<0.001**
Smoothness of operating intelligence service machine	244	4.3	±0.7	2	5	4	(4-5)	4.6	±0.6	3	5	5	(4-5)	<0.001**
Convenience of the counter's location	246	4.1	±0.9	1	5	4	(3-5)	4.5	±0.8	1	5	5	(4-5)	<0.001**
Smoothness of medicine getting procedure	246	4.1	±0.8	2	5	4	(4-5)	4.7	±0.6	2	5	5	(4-5)	<0.001**
Waiting time for medication	248	4	±0.9	1	5	4	(3-5)	4.7	±0.6	2	5	5	(4-5)	<0.001**
Patient-Pharmacist Interaction	247	4.4	±0.7	1	5	5	(4-5)	4.8	±0.5	3	5	5	(5-5)	<0.001**

Wilcoxon sign rank test. * $p < 0.05$, ** $p < 0.01$.



Table 2. Age and gender of patients who used the outdoor medicine dispensing services, including the outdoor medicine dispensing refillable prescriptions service and telemedicine clinic service

Age (years)	Video telemedicine clinic service		Telemedicine (telephone only)		the outdoor medicine dispensing refillable prescriptions service		total	
	female	male	female	male	female	male	female	male
	7	6	70	23	99	95	176	124
<=25	0	0	3	0	3	1	6	1
>65	1	1	14	2	11	15	26	18
26~35	0	0	9	2	10	5	19	7
36~45	3	2	23	4	17	18	43	24
46~55	1	2	15	9	28	30	44	41
56~65	2	1	6	6	30	26	38	33
Total	13		93		194		300	

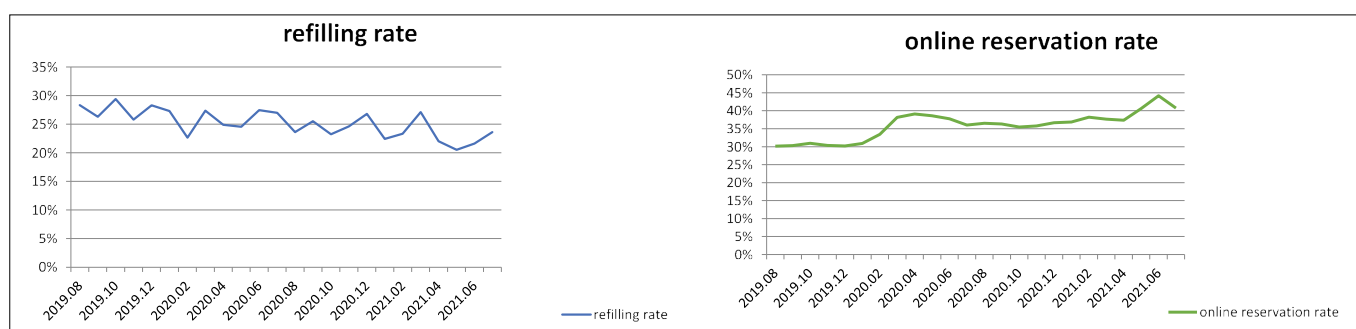


Figure 4. The rate of online reservation compared with the refilling rate in our hospital

satisfaction surveys. The surveyed patients were all satisfied with the convenience of making an appointment, the suitability of the drug collection location, and the overall process, with ratings all scoring higher than 4.5 (out of a maximum of 5). Most importantly, the satisfaction with the pharmacists' attitude increased from 4.76 to 4.85, and the overall satisfaction increased from 4.61 to 4.76. Comparisons between the results of these two time periods are shown in table 3.

The refilling rate in our hospital decreased during the COVID-19 pandemic, but the rate of online reservation increased, which shows that the patients tended to pick up their medicine at their neighborhood pharmacy instead of the hospital, which was likely due to the perception that there was a greater risk of COVID-19 infection at hospitals. Figure 5 shows the trends of patients who used the refill prescription and telemedicine services. The outdoor medicine dispensing services allowed patients to make an online reservation so that they could then pick up their medicine in a safe manner.

DISCUSSION AND CONCLUSION

The outdoor medicine dispensing service was a patient-centered service, which enabled patients to pick up their medicine quickly and safely during the COVID-19 pandemic. It improved the accessibility and convenience of pharmaceutical services with high satisfaction: the overall satisfaction was as high as 94.6% in 2020 and 93.3% in 2021. Our experience

Table 3. Satisfaction scores of the two satisfaction questionnaires

Questionnaires	2020.06.29-07.03	2021.07.01-07.07
	Paper questionnaire (n=249)	Online survey (Google Forms) (n=194)
Convenience of booking prescription medications through the website or app	4.72	4.61
Convenience of the counter's location	4.54	4.49
Smoothness of procedure for getting medicine	4.67	4.64
Satisfaction with the patient-pharmacist interaction	4.76	4.85
Satisfaction of the whole pharmaceutical outdoor dispensing services	4.61	4.76

(These were questionnaires with a 5-point-scale, and 5 was the maximum score, which indicated with very high satisfaction)

in 2020 informed our approach and we rapidly adapted in 2021 to improve our service, such as the provision of a video introduction to show patients how to operate the multi-media intelligent serving machine, which is designed to help patients get their medicine more quickly. However, data were collected using two different methods, a paper questionnaire and an online survey, which might have affected the results. In addition, conducting an online survey (Google Forms) might have introduced bias, as some of the patients may have had limited familiarity with or ability to use the Internet or a smart



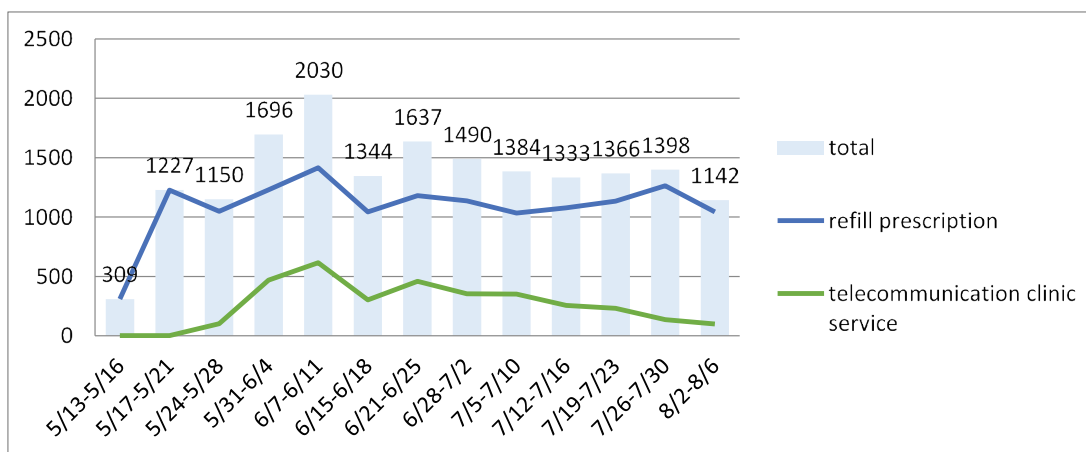


Figure 5. The trends of patients who used the refill prescription and telemedicine clinic services

phone, which might be one of the reasons why no patients older than 65 years of age completed a Google Forms survey.

At the end of August, 2021, we stopped providing outdoor medicine dispensing services. In total, there were more than 40,000 person-times in the two time periods, 2020 and 2021. The rate of using the prescription refilling system was significantly lower than before the outbreak of COVID-19 pandemic, but the utilization rate of online reservations by patients receiving medicines has been increasing year by year, which indicates patients might have been afraid to visit the hospital or stay in the hospital for an extended period during the COVID-19 pandemic. Instead, patients chose to go to a pharmacy near their home or make an appointment at home first, and with the help of the outdoor medicine dispensing services, the whole process became much quicker, more convenient, and safer. Also, it may have been helpful for increasing medication use and compliance.

No overall increase in the prescription refilling rate was noted following the implementation of the outdoor medicine dispensing services. Furthermore, the rate of outdoor medicine dispensing services usage decreased slightly within the final few weeks, which might be attributable to cultural factors. In Taiwan, patients prefer face-to-face visits with their doctor, and might consider a visit helpful even if no medicine was prescribed. Hence, as the COVID-19 pandemic began to subside in Aug. 2021, there was a corresponding decrease in the number of patients utilizing telemedicine. Furthermore, our patients were required to use the online registration page first and were then diagnosed by their doctor, for both video and telephone consultations, and therefore technical problems might have been an obstacle. Another issue was that prescriptions were valid only for 24 hours (excluding holidays), so patients needed to go to the nearby outdoor medicine dispensing services area to get their prescription. This area is outside the front entrance of one of our hospital buildings, so patients do not need to enter the building itself. For patients who live far from our hospital, this may still be regarded as a disadvantage and as a result they may have not wanted to use this service. These factors may have contributed to the

decrease in the rate of telemedicine utilization toward the end of the service in Aug. 2021. Moreover, as the COVID-19 pandemic waned, we decided to suspend the outdoor medicine dispensing services temporarily after conducting an evaluation.

LIMITATIONS

Even though a high satisfaction rate was reported, only 300 patients responded to the questionnaire and the survey was conducted for only one week. Compared with the total number of patients who used the outdoor medical dispensing services, the total number of the respondents was too small and the follow-up duration was too short. Furthermore, the service time was from 8:30 to 17:00 (including the lunch break), Monday through Friday only. However, for patients who needed to pick up medications as soon as possible, a pharmacy in their neighborhood may have been more helpful.

CONCLUSION

In conclusion, we implemented three new pharmaceutical services during the COVID-19 pandemic: an outdoor medicine dispensing refillable prescriptions service, telemedicine, and a queue management system with a smart QR code link. These services helped to avoid disrupting patients' access to their medications during the pandemic period, but also reduced their risk of infection. These measures provided outpatients with a safe way to pick up their medications, and their satisfaction with our medicine dispensing service was excellent. However, the sample size was a little small, and further study may be needed.

FUNDING AND ACKNOWLEDGMENTS

This research did not receive any specific funding. We thank our colleagues at Taichung Veterans General Hospital, especially the IRB leader Chu Yu Wen and all the staff who helped patients complete the questionnaires. This study could not have been accomplished without your assistance.



CONFLICTS OF INTEREST STATEMENT

NO

FUNDING INFORMATION

NO

References

1. Taiwan Centers for Disease Control (TCDC). <https://www.cdc.gov.tw/>.
2. Lin YF, Lin YM, Sheng LH, et al. First drive-through pharmacy services in Taiwan. *J Chin Med Assoc.* 2013;76(1):37-41. <https://doi.org/10.1016/j.jcma.2012.10.001>
3. Ohannessian R, Duong TA, Odone A. Global Telemedicine Implementation and Integration Within Health Systems to Fight the COVID-19 Pandemic: A Call to Action. *JMIR Public Health Surveill.* 2020;6(2):e18810. <https://doi.org/10.2196/18810>
4. Margusino-Framinan L, Illarro-Uranga A, Lorenzo-Lorenzo K, et al. Pharmaceutical care to hospital outpatients during the COVID-19 pandemic. *Farm Hosp.* 2020;44(7):61-65. <https://doi.org/10.7399/fh.11498>
5. Mohamed Ibrahim O, Ibrahim RM, Abdel-Qader DH, et al. Evaluation of Telepharmacy Services in Light of COVID-19. *Telemed J E Health.* 2021;27(6):649-656. <https://doi.org/10.1089/tmj.2020.0283>
6. Li H, Zheng S, Li D, et al. The Establishment and Practice of Pharmacy Care Service Based on Internet Social Media: Telemedicine in Response to the COVID-19 Pandemic. *Front Pharmacol.* 2021;12:707442. <https://doi.org/10.3389/fphar.2021.707442>

