

Original Article

First drive-through pharmacy services in Taiwan

Yuh-Feng Lin ^{a,b}, You-Meei Lin ^c, Li-Huei Sheng ^d, Hsiu-Yu Chien ^c, Tian-Jong Chang ^e,
Cai-Mei Zheng ^b, Hsi-Peng Lu ^{f,*}

^a Graduate Institute of Management, School of Management, National Taiwan University of Science and Technology, Taipei, Taiwan, ROC

^b Division of Nephrology, Department of Internal Medicine, Shuang Ho Hospital, Taipei Medical University, Taipei, Taiwan, ROC

^c Department of Pharmacy, Shuang Ho Hospital, Taipei Medical University, Taipei, Taiwan, ROC

^d Department of Business Administration, School of Management, National Taiwan University of Science and Technology, Taipei, Taiwan, ROC

^e Department of Medical Education and Research, Shuang Ho Hospital, Taipei Medical University, Taipei, Taiwan, ROC

^f Department of Information Management, National Taiwan University of Science and Technology, Taipei, Taiwan, ROC

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Abstract

Background: Taiwan has separated drug prescribing and drug dispensing services since 1997. Because of this, patients with chronic illness as well as those with diseases that have a relatively stable status may have their prescriptions refilled in nearby clinic pharmacies without having to go to hospitals.

Methods: Shuang-Ho Hospital in Taipei, Taiwan, implemented a drive-through pharmacy service as a more convenient refilling system to provide patients in need with a more effective way to refill their prescriptions. To assess the efficacy of this new refilling system, changes in patient drug prescription behavior were compared 6 months before and 6 months after the system was deployed.

Results: We found an increase in the overall refilling prescription rate, with an increased use of online reservations (7.9% vs. 4.9%, $p < 0.001$), an increased proportion of medications picked up (93.0% vs. 88.1%, $p < 0.001$) after the implementation period, and an elevation in the percentage of patients using drive-through pharmacy services (45.4% vs. 28.9%, $p < 0.001$; second vs. first quarter, respectively) during the 6 months after the implementation period. Generally, the prescription refilling rate for all population categories at Shuang-Ho Hospital increased significantly after the drive-through service was provided (51.1% vs. 50.2%, $p < 0.01$). The middle-aged population group (40–65 years of age) was found to utilize the drive-through prescription service more than other age groups.

Conclusion: The drive-through pharmacy provides patients with convenient access to pick up refilling prescriptions in a shorter time than ordinary pharmacy service. During a short-term follow-up, an overall increase in the prescription refilling rate was noted after the drive-through service was put into place. Our survey revealed that an upward of 90% of the patients were satisfied with the drive-through service. Future promotion of the service may help patients effectively utilize drive-through pharmacy prescription refilling and enhance disease control.

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Keywords: chronic illness; drive-through pharmacy services; drug dispensing; drug prescribing; drug refilling system

1. Introduction

Chronic diseases, including diabetes mellitus, hypertension, chronic obstructive pulmonary disease, and cerebrovascular accidents, are currently the leading cause of mortality world-

wide, comprising approximately 63% of total mortality.¹ The economic and social costs of chronic diseases account for a sizable financial and emotional expenditure in the larger healthcare dynamic, and they have become an important and impacting burden for patients, families, and entire countries. Thus, if countries and their governments can reduce the chronic disease burden, this could yield lower healthcare costs, higher productivity, and improved economic output nationwide. It is also important for patients to get routine follow-up medical care and regular medications. Previously, physicians both prescribed

* Corresponding author. Dr. Hsi-Peng Lu, Department of Information Management, National Taiwan University of Science and Technology, 43, Section 4, Keelung Road, Taipei 106, Taiwan, ROC.

E-mail address: lu@mail.ntust.edu.tw (H.-P. Lu).

and dispensed drugs for those patients with chronic diseases, which typically occurred through regular follow-up examinations. The policy separating drug prescribing and dispensing has been implemented in Taiwan hospitals since 1997 to control unnecessary drug expenditures. The functional goal of this system is to reduce the profiteering incentives for both the pharmacist and the physician.² Many patients may choose not to go back to their original hospital pharmacies to refill prescriptions. Although this is manifestly convenient for patients, it is difficult to monitor medication use and compliance. Frequently, the original hospital pharmacies lack sufficient records to ascertain whether patients really get their medications on a regular basis at outside pharmacies. However, if greater convenience encourages patients or families to regularly refill necessary medications, and actually take those medications, drive-through pharmacies may genuinely be beneficial to both the patient and the healthcare professional.

Taipei Medical University-affiliated Shuang Ho Hospital (SHH) consists of 1580 in-patient beds and provides medical services for a population of 636,000 people in the Zhonghe and Yonghe Districts. In 2010, medical professionals in the pharmacy department observed that nearly one-half of their patients did not return to SHH for their refillable prescriptions. Thus, SHH pharmacists were concerned about the rate of patient compliance with prescribed medications and treatment, which were not under SHH registration, and sought to establish efficacious measures to increase the hospital pharmacy refilling rate.

First, a survey of 359 patients from SHH outpatient departments was conducted to assess why patients did not return to the SHH pharmaceutical center to regularly refill their medications. Among those 359 patients, 40.95% refilled their medications at nearby hospital and community pharmacies due to convenience and ease of transportation. Notably, the second most significant reason why patients refilled their prescriptions elsewhere was that they experienced inconvenient parking at the hospital. Although SHH mainly serves those people in the Zhonghe and Yonghe Districts, many Taiwanese residents outside these two districts also come to the outpatient clinics for their disease management. They felt that it was inconvenient to drive all the way to the hospital, find a parking space, and wait an extended time to have their medications refilled. Additional reasons why patients refilled their prescriptions at other pharmacies included required registration fees, complicated processes, confusion about prescriptions, and other problems.

Since 2009, several measures have been taken to increase the medication refill status in SHH, including termination of the registration fee for refilling prescriptions, opening separate, dedicated counters for refilling medications, and the introduction of an online refill reservation system. Additionally, in 2011, to address the inconvenient parking problem, SHH implemented a drive-through pharmacy service.

2. Methods

In July 2011, SHH began implementing the first drive-through pharmacy service in Taiwan, opening a dedicated

four-lane driveway near the hospital building. The service is offered not only to patients with refillable prescriptions from SHH physicians, but also to those in need of refill medicines for prescriptions from other hospitals. Patients may request their refills to be processed via the online system by use of a dedicated phone line or in person at the hospital. When patients arrive at the drive-through lanes, their National Health Insurance Bureau insurance cards are scanned through an integrated circuit (IC) card reader for personal identification. A pharmacist supervises and personally delivers all medications to patients in the drive-through lanes after confirming information about each prescription user and his or her medications. A calling system was also commenced to remind the patients about timely medication refill and medication consultation/education. The medicines were kept in the pharmacy for 7 days if not picked up by the patient.

Using a pre-post study design, we analyzed the impact of this drive-through pharmacy service on the online refill reservation system and prescription rates by comparing those data before and after this service was provided. Different factors that we compared included population status of online refill reservation system, the proportion of refilling prescriptions completed by online reservation, the population status using drive-through service, and the overall prescription refilling rate 6 months before and 6 months after the drive-through service was implemented. Subgroup analysis was completed using age (<40, 40–65, and >65 years of age), and differences between the sexes regarding online reservation system use, refilling prescriptions, and drive-through service. Additionally, χ^2 analysis was used to analyze these data, and $p < 0.05$ was considered clinically significant. All the patients involved were informed about the study and agreed to participate.

3. Results

The percentage of patients using the online reservation system (7.9% vs. 4.9%, $p < 0.001$; Fig. 1 and Table 1) and the proportion of prescriptions refilled (88.1% vs. 93%, $p < 0.001$; Table 2) increased significantly after the service. The number of patients with refillable prescriptions using the drive-through service increased from 94 per month in July 2011 to 482 per month in December 2011 (Fig. 1). The proportion of patients

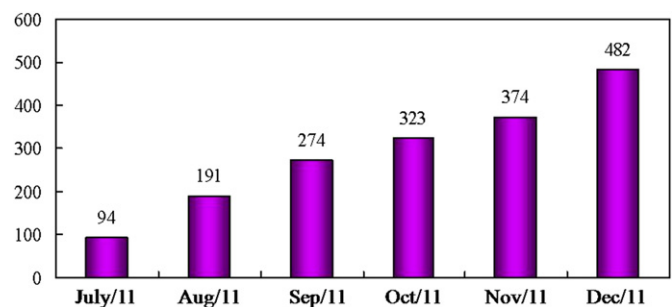


Fig. 1. Number of refillable prescriptions processed by the drive-through pharmacy service since opening in July 2011.

Table 1
Population status of online refill reservation system before and after drive-through pharmacy service (*N* = 114,241).

	Before	After	<i>p</i> *
	<i>n</i> (%)	<i>n</i> (%)	
Use online RRS	2596 (4.9)	4871 (7.9)	<0.001
Not use RRS	50,223 (95.1)	56,551 (92.1)	

RRS = refill reservation system.

* χ^2 test.

using the drive-through service in connection with the online reservation system increased significantly after the service was promoted (45.4% vs. 28.9%, *p* < 0.001; Table 3). The ratio of patients who did not return to SHH pharmacy for their refills decreased progressively after the drive-through service was put into place (Fig. 2). Generally, the overall prescription refilling rate at SHH increased significantly after initiating the drive-through service (51.1% vs. 50.2%; Table 4). Patients who came to refill their prescriptions are analyzed by sex and age. Although fewer female than male patients use the online reservation system and return to refill their prescriptions, the difference was not significant (data not shown). Of the three subgroups we examined, the middle-aged population (40–65 years) stood out as the group whose members were most likely both to return to refill prescriptions and to use the drive-through service. Members of the other two groups (<40 years and >65 years) have underutilized both the refilling prescription and drive-through services provided by SHH (Figs. 3 and 4). A survey questionnaire was distributed to those who used the drive-through service, which revealed that more than 90% of patients were satisfied with the service.

4. Discussion

The SHH pharmacy is the first pharmacy in Taiwan to offer a drive-through prescription refill service, and we found it to be very attractive option for most patients. We ascertained that the number of online reservations made, the proportion of prescriptions refilled, and the volume of patients using drive-through services to refill their medications increased significantly during the 6-month follow up period after the drive-through service was implemented. However, we did determine that female patients were more likely to underutilize the service than male patients. Of our three observed groups, the middle-aged population used our drive-through service and refilling prescription more than other age groups. Although short-term refilling rate has increased as a whole after the

Table 2
Proportions of refilling prescriptions using online reservation before and after drive-through pharmacy service (*N* = 7467).

	Before	After	<i>p</i> *
	<i>n</i> (%)	<i>n</i> (%)	
Reservation with prescription	2286 (88.1)	4529 (93.0)	<0.001
Reservation without prescription	310 (11.9)	342 (7.0)	

* χ^2 test.

Table 3
Population status using drive-through service for refilling prescriptions (*N* = 4529).

	First quarter	Second quarter	<i>p</i> *
	<i>n</i> (%)	<i>n</i> (%)	
Use drive-through pharmacy service	559 (28.9)	1179 (45.4)	<0.001
Usual counter service	1375 (71.1)	1416 (54.6)	

* χ^2 test.

drive-through service was put into place, the long-term refilling rate needs to be considered as well.

The idea of drive-through pharmacy services is not pioneering on the world stage; however, at the time we implemented our drive-through service, it was the first one in Taiwan. The Walgreens Pharmacy chains in the United States established freestanding stores with drive-through pharmacy services in 1992. This system enables customers to drop off or pick up prescriptions by driving up to windows similar to fast food drive-through establishments. Drive-through pharmacies are commonplace in the United States, and approximately 3000 pharmacies across the country offer this service, including 80% of all Walgreens pharmacies and 43% of all Rite Aid pharmacy locations.³ In Taiwan, however, due to limited space and high population density, no pharmacy before had offered drive-through services. To our knowledge, the SHH pharmacy was the first pharmacy in Taiwan to use this drive-through system to improve the accessibility and convenience of pharmacy services with the specific aim to increase medication use and compliance.

The drive-through services for refilling medications particularly targeted those patients with limited mobility who do not need to get out of their cars and for commuters who need to pick up medications without delay. In SHH, the drive-through medicine refilling service officially opened on July 1, 2011, generating substantial attention in the media. Small reminder cards were provided to the patients, and promotion posters were displayed in the hospital lobby. Before the drive-through service was activated, it took at least 40 minutes to pick up refill medications compared with only 3 minutes using the drive-through service. A pharmacist may prepare the refill medications when an order is received online, or by patient phone request, and hand over the completed refill prescription immediately upon patient arrival. Patients may save time

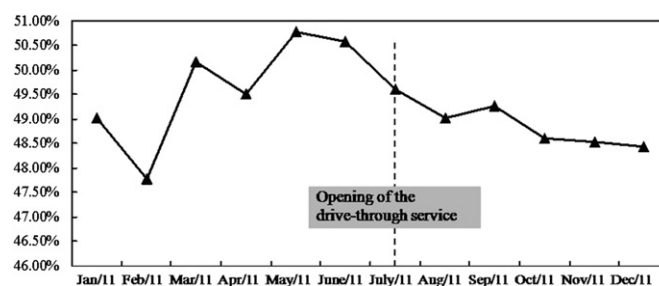


Fig. 2. Percentage of patients who did not return to the Shuang Ho Hospital pharmacy to fill their refillable prescriptions in 2011.

Table 4
Prescription refilling rate before and after drive-through service (N = 114,241).

	Before	After	p*
	n (%)	n (%)	
Outside the hospital	26,278 (49.8)	30,042 (48.9)	<0.01
At hospital	26,541 (50.2)	31,380 (51.1)	

* χ^2 test.

looking for parking places and further save on parking fees. A patient satisfaction rate exceeding 90% was found by using this drive-through service, and the number of patients using this service significantly increased by the second quarter as compared to the first quarter. Ultimately, the goal for the drive-through service is to serve an average of 80–100 patients per day.

Few studies have discussed the disadvantages of drive-through pharmacies.^{4,5} One survey on community pharmacists revealed that dispensing and communications errors, efficiency problems, and other obstacles may occur as part of the drive-through window service.⁴ Most of the drive-through pharmacy locations in the United States use an intercom for communication between the patient and pharmacy staff and a pneumatic tube system to exchange payments and medications. This refill delivery design may also be responsible for reduced interactions between pharmacists and patients as compared with walk-in window interactions observed in another project.⁵ One analysis conducted by Hoxsie et al⁶ revealed that dispensing errors in community pharmacies were mostly associated with a lack of patient name verification and the number of prescriptions being picked up.

The SHH pharmacy made a significant effort to prevent these types of errors, and safeguards we have put in place resulting in few dispensing errors to this day. In the SHH drive-through, the pharmacists actually come out of the building to verify patient identification and number of prescriptions with the patient or family member and hand over patient prescriptions in person. With this method, they may

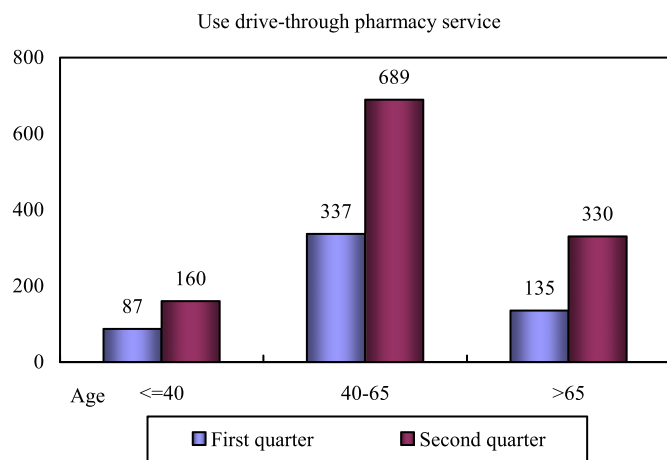


Fig. 3. Analysis of patients using the drive-through service during the first and second quarters of service by age group. p = 0.18.

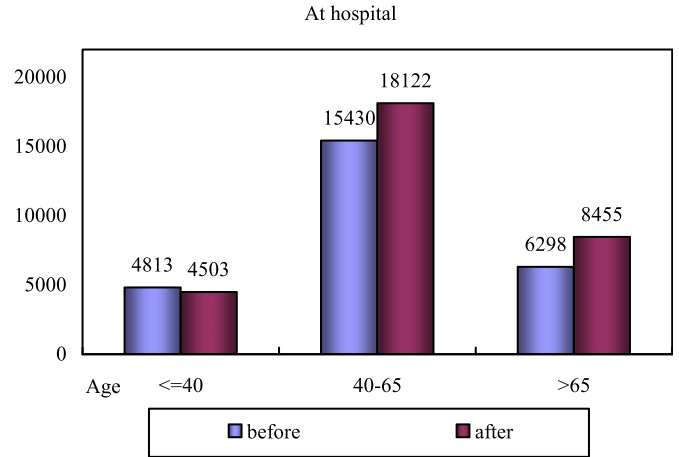


Fig. 4. Analysis of patients using the prescription refilling system by age group before and after the implementation of the drive-through pharmacy service. p < 0.001.

offer a better face-to-face consultation as needed. Patients may also use the calling system to inquire about their medication and receive further consultation and education as necessary. Studies on elderly Taiwanese patients with chronic diseases found that the prevalence of potentially inappropriate medication use is high in this population,^{7,8} and it is associated with a higher risk of hospitalization. Thus, the drive-through service has been designed to reduce the possibility of prescribing inappropriate medications compared with regular services. To save time, patients may first contact our pharmacists through the calling system prior to their arrival.

We faced numerous barriers while the drive-through service was being implemented, including how to best provide driveway directions, where to place the identification card, how to educate patients to most efficiently use the online reservation and calling system before arrival, among other issues. This study also had its own limitations, including a shorter follow-up duration and smaller population size. We analyzed the age and sex of those patients who came to refill medications, although we did not obtain information about their basic education and health education status, extent of self-care, or other personal information. Our drive-through service operates during office hours and is not open during the evening. This may explain why patients younger than 40 years of age typically underutilize our service. Because some patients and family members may wish to pick up their medications after office hours, we hope to extend our drive-through service to include nighttime hours in the future. Even to this day, however, many patients and family members still are unaware that this system had been launched at SHH. Thus, further measures to improve our service may include using multiple social media outlets like Facebook and Youtube to share positive patient and family experiences when using the drive-through service. We also have a plan to distribute more pamphlets on the drive-through service to patients during their outpatient follow-up examinations. Patients may also find occasional technical difficulties while the using online

refill reservation system for the drive-through service. This technical difficulty could explain why fewer female patients use the system than male patients and why the elderly population over 65 years of age underutilizes the service. Our future plans may include the development of automated telephone reminders, which could help remind patients to refill medicines on time and improve medication compliance. This may also allow patients to place refill orders by phone. Continuous effort will be developed and maintained to promote the drive-through services to the general public, while still providing the best processes and procedures to enhance patient safety. Consequently, pharmacists will have to undergo additional training to best implement this system now and into the future to prepare for Taiwan's drastically increasing population.

In conclusion, a drive-through pharmacy service recently launched at the Taipei Medical University-affiliated SHH provides patients a more convenient and efficient way to refill prescriptions than traditional pharmacy services. It is apparent that saving time and money without prescription errors satisfies most patients. Additionally, an overall increase in the prescription refilling rate was noted during short-term follow-up after the drive-through service was implemented. We have also observed that age and sex may determine whether patients choose to use the online reservation and drive-through pharmacy service, but this may require further investigation. Overall, drive-through service may encourage patients with chronic diseases to improve their medication compliance and disease control.

Acknowledgments

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