



Pattern of utilization of pharmacy value-added services in 2019 and 2020 at health facilities in Selangor, Malaysia

Josephine Henry Basil¹, Chong Pei Feng², Asmahani Ramelan³, Dzafarullah Daud⁴, Hazlinda Nazli Naem⁴, Kong Su Shan⁵, Lau Siew Yan⁶, Mohd Dziehan Mustapa⁷, Nur Kamalah Daud⁸, Rozian Abu Chik⁴, Ruwaida Nur Zainol Abidin⁹, Shahir Anuar Shahrani⁴, Teh Chew Charn⁴, Mohd Shahezwan Abd Wahab^{10,11*}, Nur Wahida Zulkifli^{10*}

¹Department of Pharmacy, Hospital Shah Alam Persiaran Kayangan, Shah Alam, Selangor.

²Department of Pharmacy, Hospital Sungai Buloh, Sungai Buloh, Selangor.

³Department of Pharmacy, Hospital Tengku Ampuan Rahimah, Klang, Selangor.

⁴Selangor State Health Department, Wisma Sunway, Shah Alam, Selangor.

⁵Department of Pharmacy, Hospital Ampang, Ampang Jaya, Selangor.

⁶Department of Pharmacy, Hospital Selayang, Batu Caves, Selangor.

⁷Klang District Health Office, Klang, Selangor.

⁸Hulu Langat District Health Office, Kajang, Selangor.

⁹Department of Pharmacy, Hospital Serdang, Kajang, Selangor.

¹⁰Faculty of Pharmacy, Universiti Teknologi MARA (UiTM) Cawangan Selangor, Selangor, Malaysia.

¹¹Non-Destructive Biomedical and Pharmaceutical Research Centre, Smart Manufacturing Research Institute, Universiti Teknologi MARA (UiTM) Cawangan Selangor, Selangor, Malaysia.

ARTICLE INFO

Received on: 08/05/2022

Accepted on: 16/10/2022

Available Online: 05/12/2022

Key words:

Pharmacy value-added services, hospital, health clinic, refill medications, Malaysia.

ABSTRACT

Pharmacy value-added services (PVAS) include any innovative pharmacy activities to facilitate and aid the refilling of medications. In Malaysia, the government has invested in infrastructure development, promotional activities, and manpower to enhance PVAS utilization. In this study, PVAS data for the years 2019 and 2020 that were obtained from all public health facilities in the state of Selangor, Malaysia, were analyzed to identify the pattern of PVAS utilization. A reduction in the total number of new and refill prescriptions was observed in 2020. The number of patients enrolled in a PVAS program increased by 44.5% in 2020. Overall, totals of 222,358 and 416,635 prescriptions were supplied through the PVAS programs in 2019 and 2020, respectively. The most common PVAS that was newly offered in 2020 was the medicines by post (locally known as *Ubat Melalui Pos*) service. The service was also the most utilized PVAS by patients in 2020. The average waiting time per prescription for patients receiving their medications from the outpatient pharmacies at the hospitals increased slightly in 2020 but was reduced at the health clinics. Activities such as campaigns to promote PVAS can be undertaken to further enhance the utilization of the services at public health facilities.

INTRODUCTION

Pharmacy value-added services (PVAS) are defined as any innovative pharmacy activities or practices introduced or initiated by pharmacists to facilitate and aid the refilling of medications (Tan and Gan, 2016). PVAS have been commonly implemented in various outpatient pharmacy settings and are recognized globally (Sami *et al.*, 2021). In the United States, the examples of PVAS being commonly offered include mail-order pharmacies and drive-through pharmacy services (Hussain and

*Corresponding Authors

Mohd Shahezwan Abd Wahab, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM) Cawangan Selangor, Selangor, Malaysia.

E-mail: mohdsh2790@uitm.edu.my

Nur Wahida Zulkifli, Faculty of Pharmacy, Universiti Teknologi MARA (UiTM) Cawangan Selangor, Selangor, Malaysia.

E-mail: wahidazulkifli@uitm.edu.my

Dawoud, 2021; Valluri *et al.*, 2007). In Australia, PVAS such as forward dispensing, prescription reminder systems, pick-up services, and home delivery services are being offered to Australians (McMillan *et al.*, 2014). One common PVAS offered in the United Kingdom is the click-and-collect locker service that allows patients to collect their medications from lockers that are located at the nearest pharmacy or have their medications delivered to their homes (Paola, 2019). International studies have reported positive satisfaction with PVAS among users (Johnson, 1997; Smith and Coons, 1993).

Patients with chronic diseases are prescribed multiple drugs over a long period of time and require a drug supply that extends past a 1-month duration. PVAS are beneficial for this type of patients as it ensures a continuous supply of medications to them. PVAS can allow medications to be delivered safely, accurately, and punctually to patients. The use of PVAS may reduce waiting time for medication collection (Chew *et al.*, 2021). Additionally, the services may be more convenient for patients as the usual medication-collection routines, such as queuing and waiting, are minimized (Chew *et al.*, 2021; Tan and Gan, 2016).

Under the auspices of the Pharmaceutical Services Division (PSD), the Ministry of Health, Malaysia (MOHM) embarked upon a major nationwide implementation of PVAS. In 2011, the MOHM implemented a partial drug supply policy under the Quality Use of Medicines guideline, in which prescriptions with a duration longer than 1 month would be supplied monthly (Loh *et al.*, 2017). For subsequent refills until completion, patients would be given the option of either collecting their medications monthly from the conventional pharmacy counters or receiving them through the use of PVAS.

Since the endorsement of PVAS by the MOHM, the progress of the programs in the country has grown with many services have been introduced by the PSD such as the integrated drug dispensing system [locally known as *Sistem Pendispensan Ubat Bersepadu* (SPUB)], medicines by post [locally known as *Ubat Melalui Pos* (UMP)], the drive-through pharmacy, local follow-up medication supply system [locally known as *Perkhidmatan Pusat Pembekalan Ubat Susulan Setempat* (PPUSS)], and various appointment-based services such as the “appointment cards,” “SMS and collect,” “call and collect,” “e-mail and collect,” “fax and collect,” and medication locker service (known as Locker4U) (Tan and Gan, 2016).

The government has invested in infrastructure development, promotional activities, and manpower to enhance PVAS implementation (Tan and Gan, 2016). Since 2019, a key performance indicator (KPI) related to the implementation of PVAS has been enforced for all health facilities in the state of Selangor, Malaysia. This KPI stipulates that at least 20% of medication refills by patients should be performed using a PVAS. Previous studies that focused on PVAS mainly emphasized on the level of satisfaction among patients with the services (Chan *et al.*, 2015; Chew *et al.*, 2021; Lau *et al.*, 2018). At present, there is limited data on the pattern of use of PVAS by patients at the health facilities in Malaysia. Furthermore, it is unknown whether the coronavirus disease (COVID-19) pandemic affected the pattern of use of PVAS among patients attending public health facilities in the country.

In this study, we analyzed PVAS data in the years 2019 and 2020 that were obtained from all public health facilities (i.e.,

public hospitals and health clinics) in Selangor to (1) identify the number of new prescriptions, refill prescriptions, and items dispensed at the public health facilities; (2) determine the number of patients enrolled in and prescriptions supplied through PVAS programs; and (3) determine patients’ waiting time at the outpatient pharmacies. This study also aimed to identify the number of health facilities that began introducing PVAS in 2020. The findings from this study can provide a useful insight into the pattern of use of PVAS in Malaysia and provide data on the preference as well as demand for PVAS, especially during the COVID-19 pandemic. The data may help the MOHM to strategize measures to optimize PVAS in the country.

METHODS

Study design

This research involved a cross-sectional retrospective analysis of PVAS data obtained from the public health facilities in Selangor in the years 2019 and 2020. The data were compiled from all health facilities in Selangor that consist of 11 hospitals and 75 health clinics. In this study, PVAS refer to any innovative pharmacy activities or practices introduced or initiated by pharmacists at the health facilities in Selangor to facilitate and aid the refilling of medications (Tan and Gan, 2016). PVAS that are offered at the health facilities in Selangor are outlined in Table 1.

Study procedure

In this study, the following data for the years 2019 and 2020 were extracted and analyzed: (1) the number of new prescriptions, refill prescriptions, and items dispensed; (2) the number of patients enrolled in PVAS programs and prescriptions supplied through PVAS; (3) patients’ waiting time at the outpatient pharmacy; and (4) number of health facilities that newly introduced PVAS in 2020.

Data analysis

All data collected were analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 27.0 (SPSS Inc., Chicago, IL). Descriptive statistics were used to present the data.

RESULTS

Number of new prescriptions, refill prescriptions, and items dispensed at health facilities in Selangor in 2019 and 2020

A reduction of approximately 23% in the total number of new prescriptions was observed in 2020 compared to in 2019 (Table 2). A reduction of around 18% in the total number of refill prescriptions was observed in 2020 compared to in 2019. The total number of items dispensed was reduced from 30,877,133 items (in 2019) to 23,857,776 items (in 2020).

Number of patients enrolled in and prescriptions supplied through PVAS programs at health facilities in Selangor in 2019 and 2020

The number of patients enrolled in a PVAS program rose by 44.5% in 2020. A total of 666,443 patients enrolled in the programs in 2020, compared to 461,236 in 2019. Overall, totals

Table 1. Types of PVAS offered at health facilities in Selangor.

Type of PVAS	Description
Integrated Drug Dispensing System (locally known as <i>Sistem Pendispensan Ubat Bersepadu</i> [SPUB])	Collection of follow-up medications at any MOHM health facility based on patients' preference (Yussof <i>et al.</i> , 2022)
Medicines by Post (locally known as <i>Ubat Melalui Pos</i> [UMP])	Delivery of follow-up medications to patients' preferred location with a mail charge (Tan and Gan, 2016)
Drive-Through Pharmacy	Dispensing of follow-up medications to patients through pharmacy drive-through counters (Liew <i>et al.</i> , 2020)
Local Follow-up Medication Supply System (locally known as <i>Perkhidmatan Pusat Pembekalan Ubat Susulan Setempat</i> [PPUSS])	Collection of follow-up medications, which are delivered to a dedicated location (mainly at strategic public areas) on an appointed date (Perkhidmatan Pusat Pembekalan Ubat Susulan Setempat, 2016)
Appointment Card	Collection of follow-up medications using selected PVAS on an appointed date (Lau <i>et al.</i> , 2018)
SMS and Collect	Collection of follow-up medications on the date notified by patients through short messaging services (SMS) (Tan <i>et al.</i> , 2016)
Call and Collect	Collection of follow-up medications on the date notified by patients through a phone call (Chan <i>et al.</i> , 2015)
E-mail and Collect	Collection of follow-up medications on the date notified by patients through an e-mail (Chew <i>et al.</i> , 2021)
Fax and Collect	Collection of follow-up medications on the date notified by patients by fax (Tan <i>et al.</i> , 2016)
Leave and collect	Collection of follow-up medications at any time after the prescriptions are left at the pharmacy counter (Chung <i>et al.</i> , 2021)
Medical locker service (Locker4U)	Collection of follow-up medications which are prepared beforehand and placed in a designated locker on an appointed date (Chung <i>et al.</i> , 2021)

MOHM, Ministry of Health, Malaysia.

Table 2. Number of new prescriptions, refill prescriptions, and items dispensed at health facilities in Selangor in 2019 and 2020

	2019	2020	Difference	% decrease ^a
Number of new prescriptions	8,468,254	6,482,859	-1,985,395	-23.45
Number of refill prescriptions	2,293,596	1,883,472	-410,124	-17.88
Number of items dispensed	30,877,133	23,857,776	-7,019,357	-22.73

^a A positive number indicates a percentage increase, whereas a negative number indicates a percentage decrease. Calculated using the following formula: [(value in 2020 – value in 2019) / value in 2019] X 100.

of 222,358 and 416,635 prescriptions were supplied through the PVAS programs in 2019 and 2020, respectively (Table 3). This means that the total number of prescriptions supplied through PVAS increased by 87.4% in 2020, the year of which the movement control order was imposed due to the COVID-19 pandemic. Table 3 shows the number of prescriptions supplied through specific PVAS at both the hospitals and health clinics in 2019 and 2020.

In Table 3, it can be seen that, at the hospitals, the use of PVAS such as the SPUB, UMP, “e-mail and collect,” and drive-through pharmacy services increased in 2020. At the health clinics, the use of UMP and various forms of appointment-based PVAS such as the “call and collect,” “e-mail and collect,” “fax and collect,” and drive-through pharmacy services increased in 2020.

In 2020, at the hospitals, the highest increment in PVAS use was observed for UMP (which increased by 70.14%) and

“e-mail and collect” (which increased by 1,233.58%). Meanwhile, at the health clinics, the drive-through pharmacy (which increased by 4,202.40%) and UMP (which increased by 257.87%) showed the highest increment. On the other hand, at the hospitals, there was a dramatic fall in the use of some PVAS in 2020, such as the Locker4U and “call and collect” services. At the health clinics, the use of the Locker4U and “SMS and collect” services was observed to decrease in 2020.

New introduction of PVAS at health facilities in Selangor in 2020

Various PVAS were newly offered by the health facilities in Selangor in 2020 (Table 4). The most common PVAS that were newly offered in 2020 were the UMP (31 facilities), “SMS and collect” (19 facilities), and drive-through pharmacy (15 facilities) services.

Table 3. Number of prescriptions supplied through PVAS programs at health facilities in Selangor in 2019 and 2020.

PVAS	Hospitals			Health clinics			All		
	2019	2020	% increase / decrease ^a	2019	2020	% increase / decrease ^a	2019	2020	% increase / decrease ^a
SPUB	80,279	84,464	5.21	3,984	2,945	-26.08	84,263	87,409	3.73
UMP	84,500	143,770	70.14	14,215	50,871	257.87	98,715	194,641	97.17
SMS and collect	6,766	6,453	-4.63	8,782	5,643	-35.74	15,548	12,096	-22.20
Call and collect	7,502	2,769	-63.09	2,797	7,105	154.02	10,299	9,874	-4.13
E-mail and collect	271	3,614	1,233.58	0	517	100 ^b	271	4,131	1,424.35
Fax and collect	0	0	0	0	1,954	100 ^b	0	1,954	100 ^b
Locker4U	964	48	-95.02	1,345	286	-78.74	2,309	334	-85.53
Drive-through pharmacy	8,829	14,816	67.81	2,124	91,383	4,202.40	10,953	106,196	869.56
Total	189,111	255,934	35.34	33,247	160,704	383.36	222,358	416,635	87.37

^a A positive number indicates a percentage increase, whereas a negative number indicates a percentage decrease. Calculated using the following formula: [(value in 2020 – value in 2019) / value in 2019] X 100.

^b Percentage increase was 100% since the starting value was 0.

PVAS: Pharmacy Value Added Service; SPUB: Integrated Drug Dispensing System (locally known as *Sistem Pendispensan Ubat Bersepadu*); UMP: Medicines by Post (locally known as *Ubat Melalui Pos*); Locker4U: Medication Locker Service.

Patients' waiting time at outpatient pharmacies at health facilities in Selangor in 2019 and 2020

The average waiting time per prescription for patients receiving their medications from the outpatient pharmacies at the hospitals was 8.8 minutes in 2019 and 11.9 minutes in 2020 (Table 5). The average waiting time was 8.9 minutes in 2019 and 8.0 minutes in 2020 at the health clinics. Despite the discrepancy in waiting time patterns observed at the hospitals and health clinics, the data showed that most patients in both years received their drug supply in less than 30 minutes (Table 5). Interestingly, it was observed that the percentage of drug orders supplied within 30 minutes at the hospitals was slightly higher (97.9%) in 2020 than in 2019 (97%). Similarly, this percentage was higher in 2020 (98.5%) than in 2019 (95.8%) at the health clinics.

DISCUSSION

To the best of our knowledge, this is the first study that reports the pattern of PVAS use at the public health facilities in the state of Selangor, Malaysia. The present study showed that the total numbers of new prescriptions, refill prescriptions, and items dispensed at the health facilities in Selangor were lower in 2020 than in 2019. On the other hand, our data showed that the overall use of PVAS escalated in 2020 compared to in 2019. An increase in the use of PVAS such as SPUB, UMP, “e-mail and collect,” “fax and collect,” and drive-through pharmacy was observed in 2020 (see Table 3). Our data showed that, out of 1,883,472 refill prescriptions, 22.12% (416,635 refill prescriptions) were dispensed through PVAS, a rate that is higher than that reported in a previous report (7%–15%) (Tan and Gan, 2016).

The increase in promotional activities to promote PVAS during the COVID-19 pandemic can explain the surge in the use of PVAS in 2020. Our findings also suggest that patients may have acknowledged the usefulness of PVAS in ensuring the continuity of their medication supply during the COVID-19 pandemic and in minimizing their risk of contracting COVID-19 due to reduced direct contact with the crowd and healthcare personnel. Our findings were supported by the results from a survey conducted

in the state of Perak, which reported that patients were highly satisfied with PVAS during the COVID-19 pandemic mainly due to the flexibility the services offer for patients to collect their medications (Chew *et al.*, 2021).

Of all prescriptions supplied through PVAS in 2020, 46.7% (194,641/416,635) were supplied using the UMP service (see Table 3). This made the UMP the most utilized PVAS by patients in 2020. The UMP service can provide convenience to patients as their medications are delivered directly to their homes through postage. It should be noted, however, that Chan *et al.* (2015) reported that the UMP service was less preferred by patients mainly due to the cost incurred by the service. That being said, during the pandemic, the MOHM has been actively promoting and advertising the service as part of its efforts in maximizing social distancing (Yussof *et al.*, 2022). Additionally, the National Courier Service in collaboration with the MOHM provided free shipping of medications to patients' homes (Chung *et al.*, 2021). These reasons may explain the tremendous increase in the use of the UMP service in 2020.

In general, appointment-based PVAS were widely used in 2020. Of all the appointment-based PVAS, the drive-through pharmacy service was the most commonly used in 2020. Approximately 25% (106,196/416,635) of all prescriptions supplied through PVAS in 2020 were done using the drive-through pharmacy service (see Table 3). Similar to the UMP service, the surge in the utilization of the drive-through pharmacy service was mainly due to the increased promotional activities to promote the service during the COVID-19 pandemic (Yussof *et al.*, 2022).

Although the promotional activities to promote the drive-through pharmacy service have been enhanced recently, the service has been widely known by the public in the previous years. For example, as reported in two studies that were conducted in the states of Sarawak and Kelantan, the drive-through pharmacy service was among the most commonly known PVAS among patients (Chung *et al.*, 2021; Liana and Hasnah, 2015). Additionally, multiple studies showed that many patients were satisfied with the service (Chan *et al.*, 2015; Chung *et al.*, 2021; Lau *et al.*, 2018; Liew *et al.*, 2020).

Table 4. Number of health facilities in Selangor that newly introduced PVAS in 2020.

PVAS	Hospitals			Health clinics			All		
	Number of facilities began introducing the PVAS in 2020	Number of prescriptions supplied using the PVAS in 2020	Number of facilities began introducing the PVAS in 2020	Number of prescriptions supplied using the PVAS in 2020	Number of facilities began introducing the PVAS in 2020	Number of prescriptions supplied using the PVAS in 2020	Number of facilities began introducing the PVAS in 2020	Number of prescriptions supplied using the PVAS in 2020	
UMP	0	0	31	9,668	31	9,668		9,668	
Drive-through pharmacy	3	3,586	12	89,098	15	92,684			
PPUSS	2	4	2	14	4	18			
Appointment card	0	0	2	248	2	248			
Call and collect	1	52	5	3,769	6	3,821			
SMS and collect	2	1,340	17	6,142	19	7,482			
E-mail and collect	1	3,426	1	98	2	3,524			
Locker4U	1	122	3	138	4	260			

PVAS: Pharmacy value added service; UMP: Medicines by post (locally known as *Ubat Melalui Pos*); PPUSS: Local follow-up medication supply system (locally known as *Perkhidmatan Pusat Pembekalan Ubat Siusulan Setempat*).

Table 5. Average patient waiting time at outpatient pharmacies at health facilities in Selangor in 2019 and 2020.

Type of health facilities	Year	
	2019	2020
Hospitals		
Waiting time (minutes)	8.8	11.9
% of drug order supplied with 30 minutes	97%	97.9%
Health clinics		
Waiting time (minutes)	8.9	8
% of drug order supplied with 30 minutes	95.8%	98.5%

During the COVID-19 pandemic, the drive-through pharmacy service helps to maximize social distancing due to the avoidance of crowds in the pharmacy waiting areas. The service also provides convenience to patients as it avoids vehicle parking problems due to the shortage of parking spaces and traffic congestion at the public health facilities, especially during peak hours. The drive-through pharmacy service is also commonly offered in other countries such as Taiwan and Australia (Lin *et al.*, 2013; McMillan *et al.*, 2014). In Australia, the drive-through pharmacy service similarly escalated during the COVID-19 pandemic, with many Australian pharmacy chains and drug stores offering the service (Hussain and Dawoud, 2021). Due to the favorable acceptance of the service by patients, efforts to optimize the service by the MOHM should be undertaken. For instance, the operating hours of the service can be extended and the infrastructure can be improved (e.g., widening of the road) (Liew *et al.*, 2020).

In this study, we noted a variation in the utilization of other appointment-based PVAS (e.g., “SMS and collect,” “call and collect,” “e-mail and collect,” and “fax and collect” services). For example, in 2020, the use of the “SMS and collect” service decreased at both the hospitals and health clinics. On the other hand, the use of the “call and collect” service decreased at the hospitals but increased at the health clinics. Interestingly, in 2020, the “e-mail and collect” and “fax and collect” services recorded high utilization among patients at the hospitals and health clinics, respectively (see Table 3). Our data suggest that certain appointment-based PVAS are more preferred by patients at the hospitals than at the health clinics, and vice versa. Future studies may explore the strengths and weaknesses of these appointment-based PVAS, at both the hospitals and health clinics, so that strategies to further enhance the services can be developed and implemented.

Locker4U is a PVAS that has been recently introduced by the health facilities in Selangor. Locker4U is the only PVAS that does not require the presence of a human medication dispenser, thus allowing a contactless medication supply that requires no waiting time (Yeo *et al.*, 2021). This service is also available 24 hours a day and therefore is suitable for those who are unable to collect their medications during office hours (Yeo *et al.*, 2021). Nevertheless, we observed that there was a sharp decline in the use of Locker4U in 2020 (see Table 3).

The reluctance of the public to leave their homes during the COVID-19 pandemic to obtain their medications from the

lockers could be one of the reasons for the low usage of the Locker4U service. Limited awareness among patients about the service that may be due to inadequate promotion can also be a potential reason. In fact, in a previous survey conducted in 2019 among patients attending a hospital in Sarawak, the medication locker service was only known by 0.4% of the respondents (Chung *et al.*, 2021). On top of that, the costs implicated for the Locker4U program are higher (mainly for the set-up of lockers) than the other PVAS, resulting in a limited number of lockers offered in each participating health facility (Yeo *et al.*, 2021; Yussof *et al.*, 2022). This consequently limits the number of patients that can use the service. For example, in a public hospital in the state of Perak, in which the outpatient pharmacy serves approximately 1,000 patients daily, only 36 lockers are available which can accommodate 108 patients (Yeo *et al.*, 2021). That being said, the decline in the usage of Locker4U in 2020 warrants further investigations. Considering the potential benefits of Locker4U in reducing physical contact, as well as the convenience the service offers to patients, the MOHM can enhance the effort to increase the number of lockers and promote Locker4U as a PVAS.

The other commonly used PVAS at the health facilities in this study was SPUB, a well-organized referral dispensing system in which patients can refill their prescriptions at any government health facility listed in the Malaysian SPUB directory. This allows patients to refill their prescriptions at the nearest health facility to their residence (Loh *et al.*, 2017). A previous study conducted in Port Dickson, a district in the state of Negeri Sembilan, showed that patients were generally satisfied with the service (Lau *et al.*, 2018).

In 2020, we observed that the use of SPUB increased by approximately 5% at the hospitals. However, use of the service decreased by approximately 26% at the health clinics (see Table 3). The slight increase in SPUB use at the hospitals in 2020 may have resulted from the conversion of hospitals in Selangor to either COVID-19 or hybrid hospitals that limit the number of patients at the facilities. Thus, the use of SPUB can ensure continuous medication supply to patients attending these hospitals. Less manpower, as well as the limited quantity and types of medications available at the health clinics, may explain the lower utilization of SPUB as a PVAS at the health clinics.

Previous studies have shown that PVAS may reduce patients' waiting time to collect medications at pharmacies as a result of the reduction in the numbers of patients obtaining medications from the conventional pharmacy counters (Loh *et al.*, 2017; Shaat, 2011). We observed that waiting time at the health clinics was lower in 2019 than in 2020. However, we noted that the waiting time at the hospitals in 2020 was slightly higher than in 2019, despite the high utilization of PVAS in Selangor (see Table 5). In the current study, about 22% of all refill prescriptions in 2020 were dispensed through PVAS. It is noteworthy that Loh *et al.* (2017) postulated that a reduction in waiting time could be achieved with a PVAS registration of more than 30%. Nevertheless, our findings should not be regarded as evidence that PVAS was unsuccessful. The increase in the waiting time observed in 2020 could be attributed to other reasons that may be affected by the COVID-19 outbreak, such as insufficient manpower at the outpatient pharmacies (due to infected pharmacy personnel, deployment to clinical activities, etc.), resulting in pharmacists taking longer to resolve drug-related problems and to prepare medications.

Despite the benefits of PVAS in terms of minimizing the risk of contracting COVID-19 and in enhancing patients' convenience, it should be noted that for some PVAS such as the drive-through pharmacy, Locker4U, and UMP services, there is minimal or lack of interaction between patients and pharmacists (Hussain and Dawoud, 2021). Therefore, the provision of health and medication information could be limited for patients using these PVAS. Several strategies could be considered to ensure patients who are using PVAS receive adequate health and medication information. One potential measure is to include educational materials such as leaflets or brochures that include a "quick response" code containing audio-visual counseling in the medication package supplied to the patients. Additionally, pharmacists can be encouraged to utilize telemedicine to optimize patient education. In this regard, patients can be provided with teleconsultation by doctors and pharmacists, followed by the supply of medications through PVAS (Scahill *et al.*, 2018; Smith *et al.*, 2020).

Recently in April 2021, the Pharmaceutical Services Program, MOHM, launched an application known as the medicines supply management system for PVAS or "MyUBAT." This application allows the facilitation of patients' registration process as well as their supply of follow-up medications. Additionally, by using the application, patients can monitor their PVAS appointments. It is anticipated that the MyUBAT application can further promote the use of PVAS among patients, thus ensuring the continuity of their medication supply and ultimately improving their well-being.

Strengths and limitations of the study

The present study provides an overview of the pattern of use of PVAS at the health facilities in Selangor, Malaysia. The data was comprehensive as it was compiled from all public health facilities within the Selangor State Health Department. Nevertheless, this study has several limitations. First, since the data was obtained from the health facilities in Selangor, the results may not be generalizable to the health facilities in other states of Malaysia. Future studies could investigate the pattern of PVAS use in other states in Malaysia so that a comparison of the patterns across states could be performed. Secondly, we did not explore the factors of PVAS utilization by patients. Considering that there was a variation in the use of PVAS among patients at the hospitals and health clinics as noted in the present study, the factors associated with the use of PVAS warrant further investigation. Thirdly, in this study, we mainly attributed the increased use of PVAS to the COVID-19 pandemic. However, COVID-19 was only declared a pandemic by the World Health Organization in March 2020. Therefore, other factors may have influenced the use of PVAS in 2020.

CONCLUSION

On the whole, our data showed that PVAS is a preferable means for patients to collect their medications, especially during the COVID-19 pandemic. More than 400,000 prescriptions were supplied through PVAS in 2020, an amount that is about 1.8 times higher than that observed in 2019. Between 2019 and 2020, the use of PVAS increased by 87.4%. Despite this, we noted that certain PVAS recorded a decrease in usage, such as the "SMS and collect," "call and collect," and Locker4U. Activities such as campaigns and advertisements using various media platforms, especially the social media, to enhance the public's awareness of

the availability and usefulness of various PVAS can be undertaken. This can potentially enhance the utilization of the services at the public health facilities. Additionally, efforts to provide support in terms of manpower, infrastructure, and technology should be undertaken to improve the delivery of PVAS. Finally, feedback from patients who used PVAS can be obtained and used to inform the strengths and weaknesses of the services and consequently help to develop strategies to further improve PVAS in the country.

ACKNOWLEDGMENTS

The authors wish to thank the Director-General of Health, Malaysia, for permission to publish this paper.

AUTHORS' CONTRIBUTIONS

All authors made significant contributions to the study conceptualization, methodology, formal analysis, investigation, data curation, writing the original draft, and reviewing and editing the final draft.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

FUNDING

There is no funding to report.

ETHICAL APPROVAL

This research was registered with the National Medical Research Register (NMRR) and approved by the Medical Research and Ethics Committee (MREC), MOHM (NMRR-21-412-58877).

DATA AVAILABILITY

All data generated and analyzed are included within this research article.

PUBLISHER'S NOTE

This journal remains neutral with regard to jurisdictional claims in published institutional affiliation.

REFERENCES

- Chan HK, Shahabudin NA, Ghani NA, Hassali MA. Satisfaction with traditional counter versus value-added services for prescription claims in a Malaysian Tertiary Hospital. *J Pharm Health Serv Res*, 2015; 6(1):61–8.
- Chew LS, Yeo YL, Chang CT, Chew CC, George D, Rajan P. Satisfaction among patients and caregivers receiving value-added services during the COVID-19 pandemic outbreak in a tertiary hospital in the Perak state of Malaysia. *J Pharm Health Serv Res*, 2021; 12(4):477–84.
- Chung ESN, Ahmad K, Sim SM, Chai S, Wong SF. Pharmacy value-added services: experience in a Malaysian Public Hospital. *Malays J Pharm*, 2021; 7(1):22–7.
- Hussain R, Dawoud DM. Drive-thru pharmacy services: a way forward to combat COVID-19 pandemic. *Res Social Adm Pharm*, 2021; 17(1):1920–4.
- Johnson J. A comparison of satisfaction with mail versus traditional pharmacy services. *J Manag Care Pharm*, 1997; 3(3):327–37.
- Lau BT, Nurul-Nadiah-Auni AR, Ng SY, Wong SN. Satisfaction of patients receiving value added-services compared to traditional counter service for prescription refills in Malaysia. *Pharm Pract (Granada)*, 2018; 16(1):1075.
- Liana AN, Hasnah I. Drive-thru pharmacy service: assessment of perception among patients or caregivers in hospital Raja Perempuan Zainab II. *Int J Pharm Pharm Sci*, 2015; 343:88–96.

Liew JES, Gapar AAA, Shim LT. Evaluation of drive-through pharmacy service in Queen Elizabeth Hospital Malaysia. *J Pharm Policy Pract*, 2020; 13(1):1–8.

Lin YF, Lin YM, Sheng LH, Chien HY, Chang TJ, Zheng CM, Lu HP. First drive-through pharmacy services in Taiwan. *J Chin Med Assoc*, 2013; 76(1):37–41.

Loh BC, Wah KF, Teo CA, Khairuddin NM, Fairuz FB, Liew JE. Impact of value added services on patient waiting time at the ambulatory pharmacy Queen Elizabeth Hospital. *Pharm Pract (Granada)*, 2017; 15(1):846.

McMillan SS, Sav A, Kelly F, King MA, Whitty JA, Wheeler AJ. Is the pharmacy profession innovative enough? Meeting the needs of Australian residents with chronic conditions and their carers using the nominal group technique. *BMC Health Serv Res*, 2014; 14(1):1–9.

Paola S. Click-and-collect Locker Prescription Services to Hit UK, 2019. Available via <https://ajp.com.au/news/click-and-collect-locker-prescription-services-to-hit-uk/> (Accessed 08 May 2022).

Sami SA, Marma KKS, Chakraborty A, Singha T, Rakib A, Uddin MG, Hossain MK, Uddin SN. A comprehensive review on global contributions and recognition of pharmacy professionals amidst COVID-19 pandemic: moving from present to future. *Future J Pharm Sci*, 2021; 7(1):1–16.

Scahill S, Nagaria RA, Curley LE. The future of pharmacy practice research—perspectives of academics and practitioners from Australia, NZ, United Kingdom, Canada and USA. *Res Social Adm Pharm*, 2018; 14(12):1163–71.

Perkhidmatan Pusat Pembekalan Ubat Susulan Setempat (PPUSS), 2016. Available via <http://www.jknselangor.moh.gov.my/index.php/mutakhir/1231-ppuss> (Accessed 08 May 2022).

Shaht M. Improving pharmacy dispensing performance through time management. Royal College of Surgeons, Dublin, Ireland, 2011.

Smith AC, Thomas E, Snoswell CL, Haydon H, Mehrotra A, Clemensen J, Caffery LJ. Telehealth for global emergencies: implications for coronavirus disease 2019 (COVID-19). *J Telemed Telecare*, 2020; 26(5):309–13.

Smith HA, Coons SJ. Patron experience and satisfaction with pharmaceutical services. *J Pharm Mark Manage*, 1993; 7(3):81–93.

Tan CL, Gan VB. Pharmacy value added services: early beginnings, current implementation, and challenges from the Malaysian experience. *Indian J Pharm Educ Res*, 2016; 50(3):335–43.

Tan CLH, Hassali MA, Saleem F, Shafie AA, Aljadhay H, Gan VB. Building intentions with the theory of planned behaviour: a qualitative assessment of salient beliefs about pharmacy value added services in Malaysia. *Health Expect*, 2016; 19(6):1215–25.

Valluri S, Seoane-Vazquez E, Rodriguez-Monguio R, Szeinbach SL. Drug utilization and cost in a Medicaid population: a simulation study of community vs. mail order pharmacy. *BMC Health Serv Res*, 2007; 7(1):1–9.

Yeo YL, Chang CT, Chew CC, Rama S. Contactless medicine lockers in outpatient pharmacy: a safe dispensing system during the COVID-19 pandemic. *Res Social Adm Pharm*, 2021; 17(5):1021.

Yusoff I, Ibrahim NH, Ayub AC, Ab Hashim N, Choon CJ, Chee CY, Rani AAA, Hashim HH. Evaluation of pharmacy value-added services in public health facilities: Staff perception and cost analysis. *Explor Res Clin Soc Pharm*, 2022; 5:100120.

How to cite this article:

Basil JH, Chong PF, Ramelan A, Daud D, Naem HN, Kong SS, Lau SY, Mustapa MD, Daud NK, Chik RA, Abidin RNZ, Shahrani SA, Teh CC, Wahab MSA, Zulkifli NW. Pattern of utilization of pharmacy value-added services in 2019 and 2020 at health facilities in Selangor, Malaysia. *J Appl Pharm Sci*, 2022; 12(12):042–048.