IMPROVING THE PERCENTAGE OF PRESCRIPTIONS REGISTERED THROUGH THE MYUBAT MOBILE APPLICATION FOR PHARMACY VALUE-ADDED SERVICE IN PORT DICKSON HOSPITAL

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Abstract

MyUBAT is a mobile and online application system developed and approved by the Ministry of Health Malaysia to simplify and speed up the pharmacy value added service (VAS) registration process and collection of subsequent patient medication supplies from health facilities. A verification study conducted in Port Dickson Hospital from July to November 2023 showed that the percentage of VAS prescriptions registered through the MyUBAT mobile application for subsequent medicine collection was merely 0.5%. This quality improvement study aimed to improve the percentage of prescriptions registered through the MyUBAT mobile application for pharmacy VAS to more than 15% over one year. Data on the indicator were retrieved from the Pharmacy MyUBAT Web Console Management database, while data on critical steps for improvement in the process of care were collected using a standardised data collection form. Self-administered survey forms were distributed to 50 patients/ caregivers and 22 pharmacy staff. The three main contributing factors were patient reluctance to use/accept the MyUBAT mobile application (65.8%), inexperienced staff on the MyUBAT mobile application (50.0%), and lack of technical support among patients (34.2%). Remedial measures were distributed in three cycles. Cycle 1: provided a dedicated VAS dispensing counter, assisted patients/caregivers register the MyUBAT mobile application, provided tutorial to patients in the pharmacy, created awareness via the Know Your Medicine campaign with ambassadors, provided continuous medical education (CME) for pharmacy staff, and offered workshops/hands-on tutorials for staff. Cycle 2: provided promotional leaflets at the screening counter, medication collection reminder notes with QR codes linked to the MyUBAT official website, stamped 'MyUBAT' at the queue numbers. Cycle 3: dispensed medicines with the promotional leaflet to patients/caregivers, and shared cellular internet data hotspots with patients/caregivers to download the mobile application. After three study cycles, the percentage improved from 0.5% to 80.8%. The strategies could be replicated and expanded to other hospitals with similar contributing factors.

KEYWORDS: Value-added services, Mobile health applications, Pharmacy

Problem

Malaysia Pharmaceutical Services Programme has introduced pharmacy Pharmacy Value-added Services (VAS) to improve the quality of refill medication deliveries to patients. It is a service that allows patients to choose a preferred method to obtain subsequent medication supplies more efficiently. Patients can decide their preferred VAS, such as an integrated drug dispensing system, appointment card service, drive-through pharmacy service, and mail pharmacy service (1).

On the other hand, MyUBAT is a mobile and online application system developed and approved by the Ministry of Health Malaysia (MOH) in 2020. The Pharmaceutical Services Programme, MOH, officially launched MyUBAT to simplify and speed up the VAS registration process and collection of subsequent patient medication supplies from the MOH facilities. MyUBAT mobile application allows patients to monitor their chosen pharmacy VAS appointments. This system also enables the pharmacy staff to manage the VAS registration process and provide subsequent medication supplies systematically through the Pharmacy MyUBAT Web Console Management database (2). MyUBAT is further supported by the Director General of Health, Malaysia, especially during COVID-19, as it enables patients to refill their medication via pharmacy VAS (3). This is in line with a recent study conducted in Perak, a state in Malaysia, which reported that the majority of the patients were delighted with the pharmacy VAS during the COVID-19 pandemic outbreak (4).

Port Dickson Hospital is one of the leading hospitals caring for an estimated 1.13 million population in Negeri Sembilan, Peninsular Malaysia (5). As one of the main departments in the hospital, the pharmacy department offers various services through six units: outpatient, inpatient, logistic, clinical, drug information service, and manufacturing. Notably, 22 outpatient pharmacy staff dispensed between 70,000 to 100,000 prescriptions annually through traditional counter service and VAS.

MyUBAT was officially launched in Port Dickson Hospital in July 2021, and the percentage of patients using the MyUBAT mobile application to register prescriptions for subsequent medication collection was merely 0.5% from July to November 2021 during the verification period. This indicated that the patients preferred to collect their subsequent medicines supply through traditional counter services instead of VAS. However, traditional counter services can increase patients' waiting time, affect patients' satisfaction with pharmacy service (6,7), and increase the risk of communicable disease transmission, especially in congested waiting areas (8–10).

Therefore, this study aimed to improve the percentage of prescriptions registered through the MyUBAT mobile application for pharmacy VAS to more than 15%, in line with the national key performance indicator (KPI), over one year.

Background

The digital revolution in health is expanding and consolidating quickly (11). In this context, mobile health (mHealth), defined by the World Health Organization, as the use of mobile and wireless technologies to achieve health objectives (12), plays an essential role in the digital transformation among patients. The digitalisation of healthcare encompasses the integration of the internet and digital technology and its correlation with novel therapies and optimal practices to enhance health management operations (13).

In general, there are 14 categories of mHealth services: health call centres, emergency, toll-free telephone services, managing emergencies and disasters, mobile telemedicine, appointment reminders, community mobilisation and health promotion, treatment compliance, mobile patient records, information access, patient monitoring, health surveys and data collection, surveillance, health awareness raising, and decision support systems (12).

Despite the global digital transformation trend, two recent international studies reported that the prevalence of using mHealth applications among the general population or patients was less than 50% (14,15). A recent study in China reported that only 17% of patients used web-based appointment systems (16). In Malaysia, more than half (77.1%) of patients used

online appointments in the healthcare system during the COVID-19 pandemic (17).

A study conducted by Peng and colleagues (2016) reported several factors impeding the use of mHealth applications: low awareness of health applications, lack of need for health applications because other tools were already available, lack of application literacy, lack of unique functions and features, lack of time and effort (especially if every information needs to be manually entered), lack of motivation, radiation from the cell phone, applications taking storage space of the phone or draining the battery, among others (18). More recently, Liu and colleagues (2019) reported that patients would decline to use mHealth applications if they did not have a smartphone, email or were not interested. In addition, the patients addressed their concerns regarding insufficient smartphone storage, unfamiliarity with downloading applications, forgotten passwords or email accounts, and slow or absent Wi-Fi connection (19). In Malaysia, a study reported that the main factors hindering public from using mHealth applications were inaccuracy of the applications, inconvenience and not being user-friendly (20).

Some factors may hinder patients from scheduling appointments using web-based or mobile applications. These included difficulty of use (21,22), lack of publicity (23), patients staying in rural areas (24), patients from low socioeconomic status (25,26), and patients with difficulty accessing the internet and computers (24,26–29).

One could implement a few strategies to increase the mHealth application usage. Providing monetary rewards or motivational messages is a strategy that some individuals prefer. Notably, an individual's commitment and drive will determine whether they will persist in using the mHealth application to improve their health (18). Hengst and colleagues (2023) outlined a few approaches aiming at low socioeconomic position populations, such as improving health and digital literacy, encouraging trust in the mHealth applications, securing the privacy and confidentiality of information, enlightening users on the importance of mHealth, providing technological support through digital training to the end users, family and friends by the healthcare professionals, equipping healthcare professionals with relevant knowledge, and increasing number of hotspots with access to free Wi-Fi (30).

On the other hand, researchers identified several potential solutions to encourage web-based or mobile applications for patient scheduling appointments: increasing patients' awareness of the service (26,28,31), addressing people's trust and interest (22), obtaining support from the government (16,26,32), improving impression of service quality (33), and improving proactiveness of the healthcare providers (34), among others.

Among all the strategies mentioned, studies showed that brochures were ineffective in raising awareness about web-based or mobile applications for patients scheduling (28,29,31). Zhao et al. (2017) reported that patients' poor experience with the internet and computers also hindered the patients from using the service (35). On the contrary, support from the government authority improves patients' satisfaction with web-based or mobile applications for patient scheduling appointments (32).

Measurement

This quality improvement study included all new VAS prescriptions from December 2021 to March 2023. The percentage of new VAS prescriptions registered through the MyUBAT mobile application was used as the indicator, and it was calculated as below:

$$\textit{Percentage of new VAS prescriptions registered through MyUBAT mobile application} = \frac{\textit{Number of new VAS prescriptions registered through MyUBAT mobile application}}{\textit{Total number of new VAS prescriptions registered}} \times 100$$

For example, if patients registered ten new prescriptions through MyUBAT mobile application while ten were registered manually by pharmacy staff in the database for January 2022, the total number of new VAS prescriptions registered in the database would be 20. Therefore, the percentage of prescriptions registered through the MyUBAT mobile application would be 50%.

However, if no new prescriptions were registered through the MyUBAT mobile application in February 2022 while 20 more were registered manually in the database in February 2022, the percentage would drop to 25% (10/40) due to the cumulative calculation. The Pharmacy MyUBAT database calculation would restart from the beginning of the new year. The standard was set at more than 15%, adapted from the 2022 MOH VAS Action Plan (1).

Data for the indicator was retrieved from the Pharmacy MyUBAT Web Console Management database. The database was developed by the Pharmaceutical Services Programme, MOH, as part of the MyUBAT system that facilitates staff in pharmacy facilities to manage the process of VAS registration and preparation of medicine at pharmacy counters more systematically (2). The data of the contributing factors was obtained from two different types of survey forms distributed to 22 pharmacy staff and 50 patients/caregivers at the outpatient pharmacy department at the beginning of the study. On the other hand, we collected data on critical steps of the process of care at the outpatient pharmacy department using a direct observation method and a standardised data collection form during office hours.

The data on the verification study (July to November 2021) was collected and analysed in December 2021, while remedial actions were implemented from January to February 2022 (cycle 1), April to May 2022 (cycle 2), and July to August 2022 (cycle 3). The achievement was analysed in March 2022 for Cycle 1, June 2022 for Cycle 2, and September 2022 for Cycle 3. The effects of change for cycles four and five were analysed in December 2022 and March 2023, respectively.

Data collected by the team members were compiled in Microsoft Excel before performing further analysis. During the verification study, the Pharmacy MyUBAT database showed that only 0.5% (3 out of 552) of VAS prescriptions were registered through the MyUBAT mobile application for subsequent medicine supplies. The achievable-benefit-not-achieved (ABNA) was 14.5%.

Initial Assessment of the Problem

The existing process of care was reviewed and revised as shown in Figure 1, starting from prescription screening by the pharmacist until medication collection by the patient at the pharmacy counter or through VAS offered. The critical steps were identified with asterisks. On the other hand, the Model of Good Care (MOGC) on the critical step is shown in Table 1.

The usual process of care starts with the pharmacist receiving a new prescription and screens for the correct medication regimen to be given to the correct patient. If the patient needs subsequent medication collection, the pharmacist will offer VAS according to patient preferences and check if the VAS suits the patient. For patients who opt for VAS for subsequent medication collection, he/she or the caregiver(s) need to register for their preferred VAS using the MyUBAT mobile application. Medication will then be filled, counterchecked, and dispensed. However, during the verification study, direct observation by the team members found that the MyUBAT mobile application was not offered during the prescription screening stage. At the same time, the Pharmacy MyUBAT database showed that only three patients used the MyUBAT mobile application to register for pharmacy VAS.

A brainstorming session was conducted to identify the potential contributing factors to this problem. It was presented using a problem analysis chart (Figure 2). Next, a survey was carried out using two different types of survey forms to further investigate the contributing factors. They were distributed to 22 pharmacy staff and 50 patients/caregivers at the outpatient pharmacy department. The results of this survey revealed the respondents' perceptions of the significant contributing factors that covered reasons on reluctance to use/accept the MyUBAT mobile application (65.8%) and the lack of technical support among patients (34.2%), while pharmacy staff expressed their main concern was on their inexperience on the use of MyUBAT mobile application (50.0%). Each strategy developed was targeted to address at least two or more contributing factors.

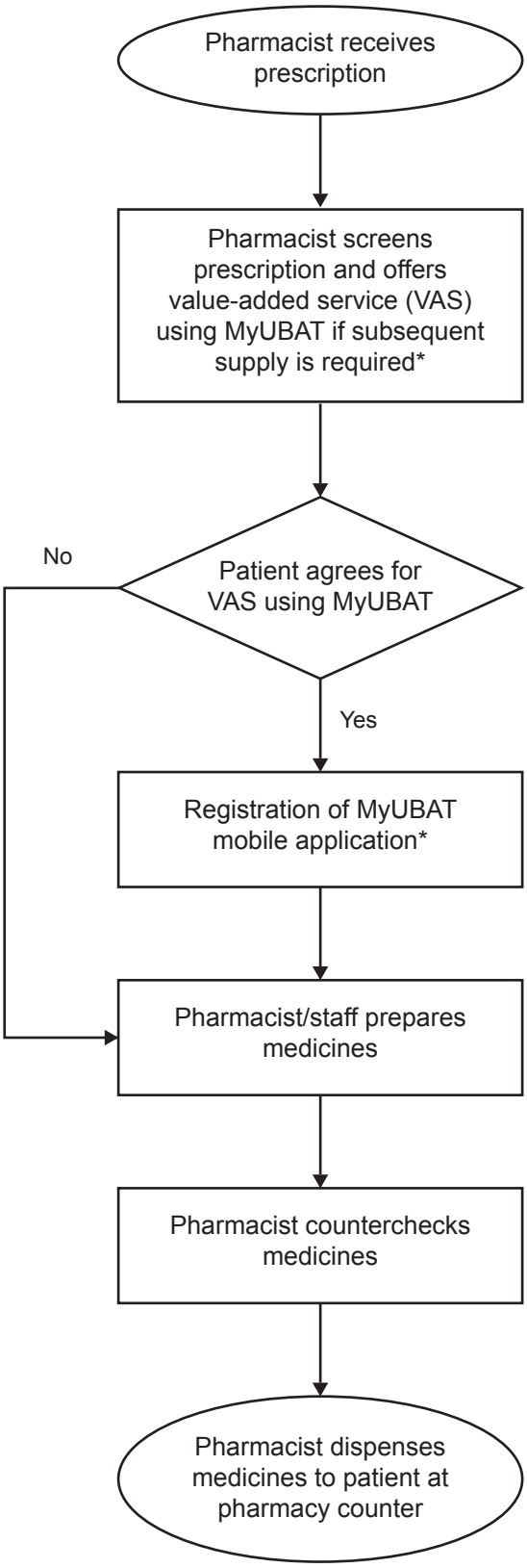


Figure 1: Process of care starting from new prescription screening by the pharmacist until medication collection by the patient at the pharmacy counter or through VAS offered

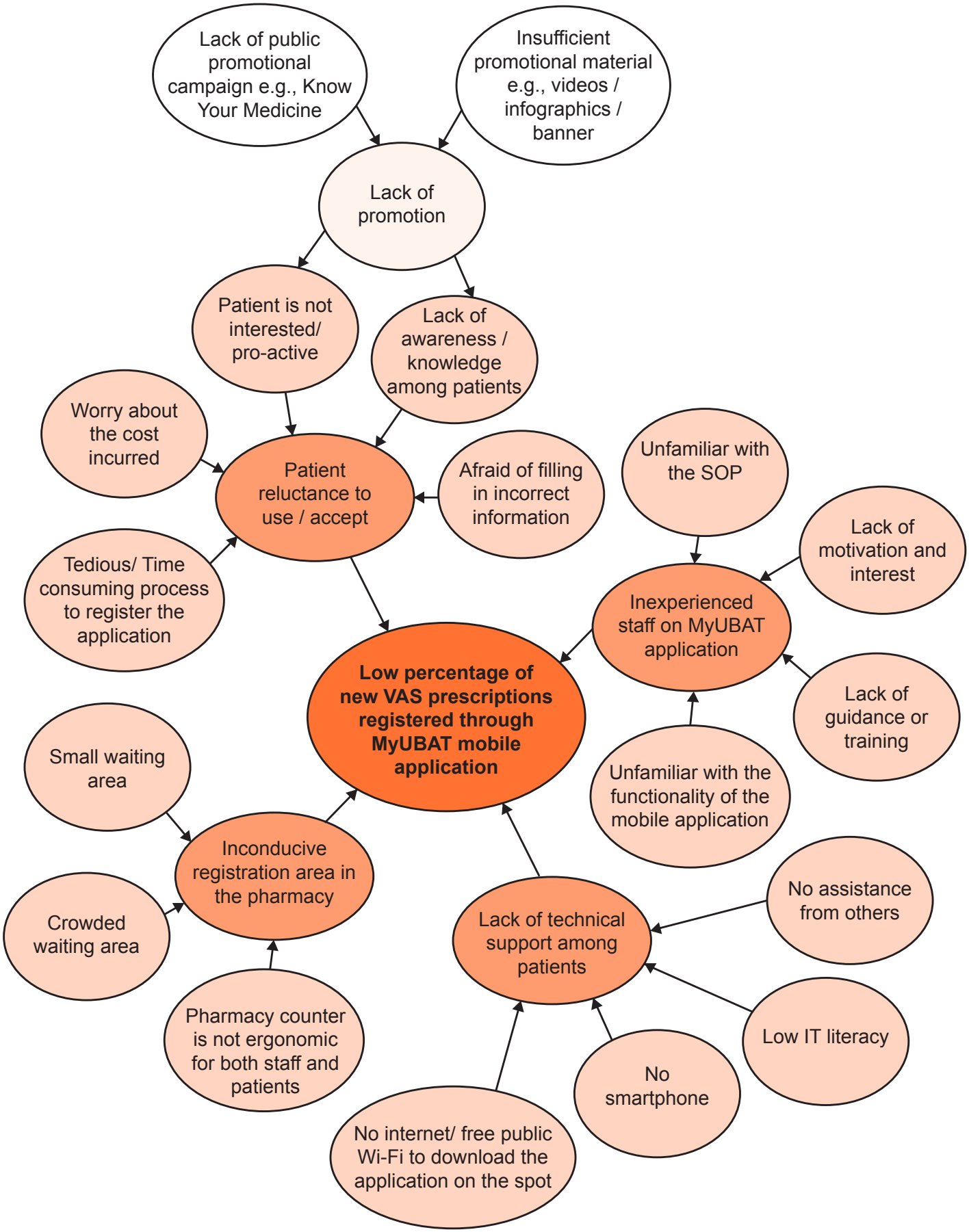


Figure 2: Problem analysis chart on the low percentage of prescriptions registered through the MyUBAT mobile application for Pharmacy VAS

Table 1: MOGC improving the percentage of prescriptions registered through the MyUBAT mobile application for pharmacy VAS

Process	Criteria	Standard (%)	Verification (%)	Cycle 1 (%)	Cycle 2 (%)	Cycle 3 (%)	Cycle 4 (%)	Cycle 5 (%)
Pharmacist screens the prescription and offers value-added service (VAS) using MyUBAT if subsequent supply is required	Ensure the prescription is for the right patient, with the right dose, frequency, duration, and route	100	100	100	100	100	100	100
	Provide a leaflet about the MyUBAT mobile application to patients/caretakers while waiting for medicine collection	100	0	0	85.5	89	93	90
	Stamp 'MyUBAT' on the prescription queue number for potential MyUBAT mobile application user	100	0	0	100	100	92.4	93.8
Registration of new VAS prescriptions	Ensure patients register new VAS prescriptions using MyUBAT mobile application on their own	15	0.54	14.5	15.9	27.2	35.6	80.8
	Ensure pharmacy staffs register VAS manually for those prescriptions that are not registered through MyUBAT mobile application	100	100	100	100	100	100	100

Strategy

A total of 11 strategies were implemented throughout the first three cycles: six in Cycle 1, three in Cycle 2 and two in Cycle 3. All the strategies were continued in both evaluation cycles 4 and 5 to evaluate the effectiveness of the strategies developed.

In Cycle 1, strategies were implemented to tackle all three main contributing factors. Firstly, a dedicated VAS dispensing counter was created at the outpatient pharmacy, and the MyUBAT promotional banner was displayed directly next to the counter. MyUBAT promotional leaflets were distributed to patients/caregivers coming to the VAS counter, and a timely introduction to this system was provided to them using a MyUBAT flipchart. Secondly, the pharmacy staff immediately assisted the patients/caregivers in downloading and registering the MyUBAT mobile application over the VAS dispensing counter. Thirdly, multiple tutorial sessions were conducted for patients/caregivers in the outpatient pharmacy waiting area to explain further about the benefits of using MyUBAT

mobile application. Fourthly, there were joint efforts between the MyUBAT & Know Your Medicine teams with the presence of Know Your Medicine ambassadors to promote MyUBAT mobile application at schools, mosques, and *madrasahs*, among others, to reach the community. These strategies allowed more opportunities to create awareness about the MyUBAT mobile application and create public interest in using this service. Fifthly, structured continuous medical education (CME) based on the 2021 Guidelines regarding Medicines Supply Management System for Pharmacy Value Added Services (MyUBAT) (3) was conducted regularly among 22 existing and ten new staff to remind them about the standard operating procedure (SOP). The sixth strategy involved the workshops and hands-on tutorials using the MyUBAT Training Mobile Application and MyUBAT Training Server for the pharmacy staff to simulate the actual scenario and ensure them to be well-equipped before attending to the patient's request. The remedial actions in Cycle 1 successfully reduced the achievable benefits not achieved (ABNA) gap, yet insufficient to attain the target. Therefore, more strategies were planned in Cycle 2.

In Cycle 2, the seventh strategy involved providing MyUBAT mobile application promotional leaflets directly at the outpatient pharmacy prescription screening station instead of only at the VAS dispensing counter. This gave patients or caregivers more time to understand MyUBAT mobile application while waiting for their medication collection. The eighth strategy involved designing the medication collection reminder note by incorporating a QR code directly linked to MyUBAT MOH's official website and attaching it to the patient's prescription. From there, patients or caregivers could choose their preferred mobile application platform, such as Apple Application Store, Google Playstore, or Huawei Application Gallery, to download MyUBAT mobile application. For the ninth strategy, a new stamp, 'MyUBAT' was designed and stamped on the queue number on the prescription during the prescription screening process to alert the staff that the patient was interested in using MyUBAT for their following medication collection.

In Cycle 3, the strategies were implemented to tackle limited technical support among the patients. As such, the tenth strategy involved inserting MyUBAT promotional leaflets into medication parcels for patients who signed up for VAS (i.e., appointment cards or postal medicines services), but have yet to register for the MyUBAT mobile application. The leaflets would be dispensed with medications to the patients/caregivers upon medication collection to create awareness among the patients' family members. This strategy focused on patients who are illiterate but interested in using the MyUBAT mobile application with assistance from their family members. For the eleventh strategy, pharmacy staff shared the free cellular internet data hotspots provided by the hospital with patients or caregivers without a cellular internet data plan on their smartphones to enable them to download the MyUBAT mobile application instantly and perform new registration/service application on the spot.

Results

The remedial actions implemented throughout this study improved the percentage of prescriptions registered through the MyUBAT mobile application: 14.5% (10 out of 69, Cycle 1), 15.9% (28 out of 176, Cycle 2), 27.2% (72 out of 265, Cycle 3), 35.6% (122 out of 343, Cycle 4), and 80.8% (122 out of 151, Cycle 5). The ABNA gap was -65.8% at the end of this study (Figure 3). The percentage of prescriptions registered through the MyUBAT mobile application for pharmacy VAS showed an increasing trend throughout the cycles.

Besides the improvement in the achievement of the standard, the critical steps showed encouraging accomplishment across the cycles (Table 1). The majority achieved more than 90% in the end, against the pre-set standard of 100% before the start of this study. The percentages of patients using the free internet data hotspots shared by the pharmacy staff provided by the hospital increased over Cycles 4 and 5 after the implementation of this strategy in Cycle 3, whereas the number of patients using their cellular internet data decreased as they started to opt for the internet data

hotspot shared by the pharmacy staff rather than using their own cellular internet data plan while registering for MyUBAT mobile application.

There were also some unexpected impacts attained from this study. For example, the percentage of prescriptions dispensed to all patients at the outpatient pharmacy counter within 30 minutes remained >95% despite the tedious MyUBAT mobile application registration process. This reflected good patient waiting time for medication collection at the outpatient pharmacy (>95%) achieved by pharmacy for this key performance indicator throughout the study. Moreover, the Pharmacy Department also indirectly managed to meet the key performance indicator for VAS, i.e., 15% out of all prescriptions received at the outpatient pharmacy requiring medication refills were registered for VAS. There was a 41.9% increment in the total percentage of prescriptions registered for VAS: 2966 in 2021 and 4208 in 2022. Only MYR 35 was involved to purchase the MyUBAT stamp, which was considerably negligible compared to the benefits obtained at the end of this study.

At the end of the study, a survey was conducted among 20 outpatient pharmacy staff to identify the interventions they perceived as responsible for improvement of the standard. Seventy-five percent (n=15) of them agreed that the most effective strategy was providing immediate assistance to patients/caregivers to download and register the MyUBAT mobile application, followed by inserting MyUBAT promotional leaflets into medication parcels for patients signed up for VAS (15%, n=3) and sharing free cellular internet data hotspots provided by hospital with patients/caregivers without a cellular internet data plan (10%, n=2).

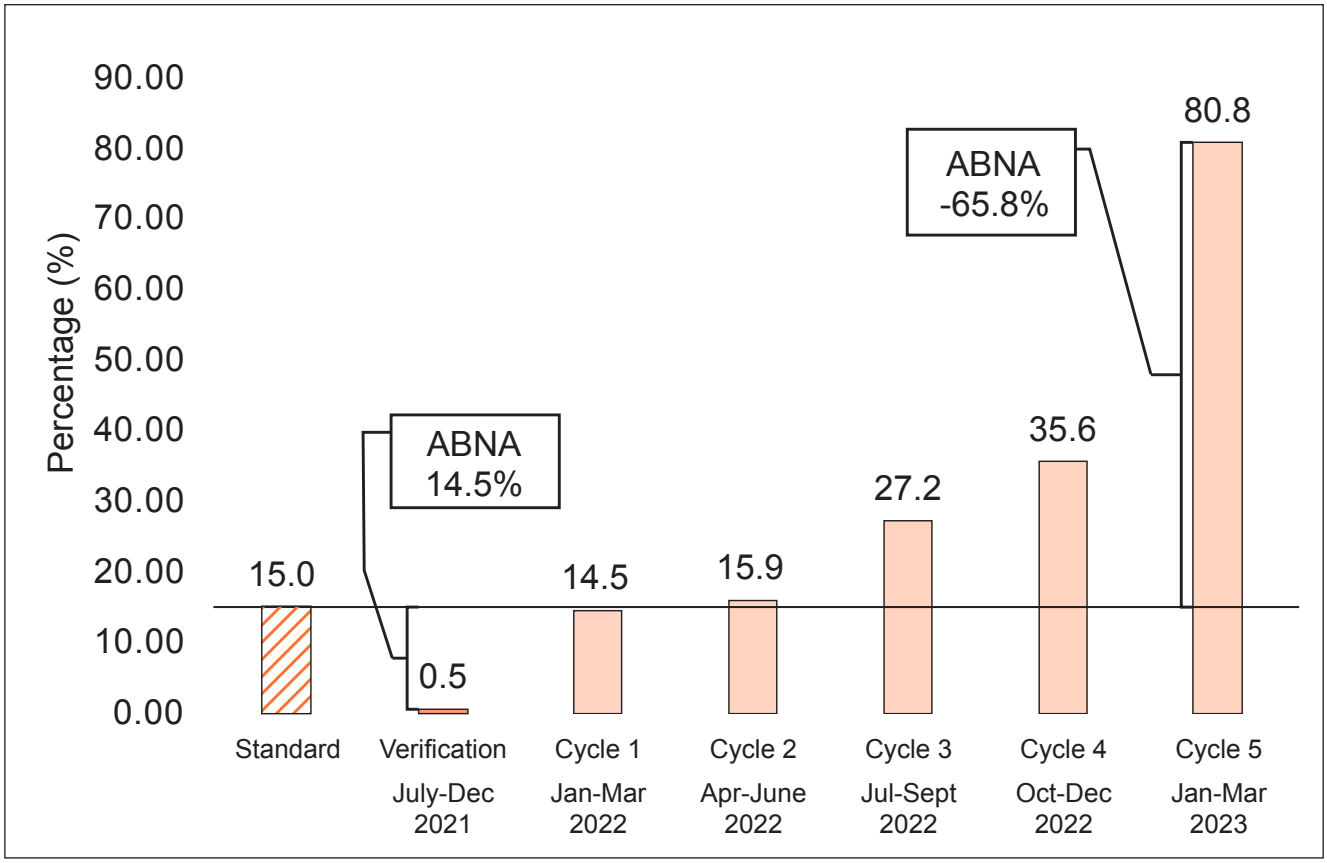


Figure 3: Achievement of the standard by cycles

Lessons and Limitations

This study highlights the importance of implementing multiple strategies to attain the standard set. Although the standard was met during the second cycle, our team members addressed patients' concerns by implementing two more strategies. These were important to ensure the study effects could be sustained or even superseded far beyond the early target. In addition, we learned that CME, workshops, and hands-on tutorials were vital to ensure that pharmacy staff were consistently equipped with the skills and knowledge to serve the patients/ caregivers right in front of the pharmacy counter. This is especially true for new or existing staff with less experience with the MyUBAT system and the need for them to update themselves regularly. A dedicated outpatient pharmacy team is also critical to continue all the strategies planned and implemented, not only during the study period but also on a daily working basis. Without their continuous commitment and dedication, the effects would not be sustained in the post-intervention phase.

Despite our team's achievements, we faced a few limitations. We identified that the steps of stamping the 'MyUBAT' stamp on the prescription queue number and attaching a medication collection reminder note with a QR Code link directly to the MyUBAT MOH's official website were not achieving the ideal 100% target. After interviewing the outpatient pharmacy staff, the reasons were due to peak hours and staff shortages, causing them not to be able to perform those two steps consistently. Persistent monitoring would be necessary to ensure the staff conducts the two steps. Importantly, we realised that patients/ caregivers without smartphones, illiterate patients, and patients without family support were among the obstacles we could not address throughout the study period. In the future, additional surveys could be conducted among patients/caregivers to identify the interventions they perceived as responsible for improvement of the standard. Perhaps these barriers could be addressed with social and financial assistance from the community.

Conclusion and the next steps

This study successfully improved the percentage of prescriptions registered through the MyUBAT mobile application for Pharmacy VAS from 0.5% in the pre-intervention phase to 80.8% post-implementation of strategies. The standard set was met, and the ABNA gap was eventually closed. The major contributing factors to these quality issues were identified and tackled. The strategies could be replicated in other healthcare facilities with similar background issues. We would expect more usage of the MyUBAT mobile application among the patients, except those without a smartphone, who are illiterate or without family support. The team members would continuously monitor the work process to ensure targets are achieved and maintained throughout the year in the hospital.

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Conflict Of Interest

The authors declare that there is no conflict of interest.

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Appendix 1: Strategies For Change

