

Evaluating Drive-Through Pharmacy Operations in Cities and Rural Areas: A Cross-National Estimation Study

Dr. Hilda Sørensen¹, Dr. Riyaz Al-Mahmoud²

¹ Department of Social and Administrative Pharmacy, University of Copenhagen, Copenhagen, Denmark

² Faculty of Pharmacy, Sultan Qaboos University, Muscat, Oman

Received: 14-08-2025; Revised: 01-09-2025; Accepted: 19-09-2025; Published: 05-10-2025

Abstract

Drive-through pharmacy services have been used increasingly in the ambulatory care setting because of the COVID-19 pandemic. This qualitative research represented a comparative study designed to assess patient satisfaction, operational issues and service results in rural and urban clinics in Denmark and Oman. The information was gathered in accordance with 428 patient surveys and 15 guided staff interviews. It was found that urban locations were characterized by a greater throughput of patients whereas rural centers performed better when it comes to personalized communication and treatment of patients. In both the contexts more than eighty nine percent of the patients were favorable to taking services through the drive-through as opposed to the traditional counter-based services with one of the primary reasons cited to be that it is fast, convenient, and there is a lesser risk of getting infected. Nonetheless, the centers at rural areas had a problem with efficient provision of the services and in the cities, health centers suffered due to the patient peak hours. Part of the findings of the study exposes the need to develop context-specific pharmacy models that would incorporate needs of operation and preferences of patients and proposes policy reforms to continue drive-through services even after pandemic years.

Keywords: Drive through pharmacy, ambulatory, patient satisfaction, urban/rural clinic, health system, COVID19, pharmacy services, patient throughput, public health pharmacy.

1. Introduction

1.1 Context of ambulatory care pharmacy services in the context of COVID-19

The COVID-19 pandemic introduced serious changes in the delivery of patient care globally, especially in the ambulatory care pharmacy services. The motives behind these changes were the necessity of restricting the virus exposure of patients and providing them with the same number of needed medications as the demands kept increasing. Most health systems found the ambulatory care setting pharmacies found in clinics, outpatient centers, and even hospitals with influx of patients seeking refills of medication, check-ups and healthcare guidance.

The traditional pharmacy services were challenged by means of social distancing activities, lockdowns, and limited accessibility of healthcare institutions in the initial stages of the pandemic. Patients could not take up face to face consultation or stand in long queues increasingly, and safer, more convenient alternatives are required. Consequently, introducing the drive-through pharmacy services emerged as one of the strategic solutions to maintain the necessary level of pharmaceutical care and ensure the minimum risk of contracting the virus. Drive-through pharmacy services provided patients with a convenient, quick, and touchless way of getting prescriptions as they could avoid the take-in process and receive the needed load once they were in their vehicles.

This trend in favor of drive-through services was especially influential in the sphere of ambulatory care, where repetitive visits and prescriptions refills constitute the essence of the pharmacy practice. This fact raised attention to the importance of the speed of adaptation of the pharmacies to account to these new needs in the wake of the pandemic, which resulted in a rapid formation and enlargement of drive-through services to balance these changes, mostly in high-demand cities and rural backcountry.(1)

1.2 Emergence of Drive Thru Pharmacy as an Alternative to Critical Problems in Healthcare Delivery

The drive-through prescription pharmacy services became a popular option due to their dynamic functionality in overcoming pandemic-imposed changes in the provision of healthcare services. The most basic benefit of the drive through services is that it is able to deliver medications in a safe, quick and efficient way. They would not have to spend time in crowded indoor areas and risk being infected with COVID-19 when picking up a prescription or talking to pharmacists.

Evaluating Drive-Through Pharmacy Operations in Cities and Rural Areas: A Cross-National Estimation Study

The pandemic worked as an accelerator of innovation in the sphere of healthcare delivery. Security of patients within the confines of their automobiles in order to utilize their pharmacy stores entered the picture as a crucial component in protecting their clients in such unstable times. Furthermore, drive-through services acted as a quick solution to the growing demand in medications amid COVID-19, in those regions where there has been a higher infection rate.

Besides the role of drive-through pharmacies in protecting the health of the community, they brought about effectiveness in operations. Pharmacy employees would have been able to take bulk orders, make less waiting and provide curbside prescription consultation all without close contact. This model was useful within the state of ambulatory care wherein patients usually drop by to get routine prescription and renewal in medications.

Yet in the cases of the driving through pharmacy services, the level of their adoption was drastically different in different geographical environments. The provision of these services was normally associated with larger infrastructure and manpower resources available in urban clinics, compared to the logistical capacity problems that rural clinics may not be able to overcome eg. access to technology, smaller patients.(2)

1.3 Comparative Reasons to Compare Rural Implementation in the Two Countries and Urban Implementation in One of the Countries

Though the use of drive-through pharmacy services is common, the experience of its implementation in the rural and urban areas vary a lot. This paper will address these disparities by analyzing the implementation of the drive-through pharmacies in two different countries, Denmark and Oman, and the objective of the study is to find the information that could shed some light on the aspects that pose a challenge or lead to success of such services in different settings.

The operation of healthcare environments in urban and rural areas is also unique in its attributes that affect the efficiency of providing healthcare in terms of resource availability, age of the population, and health care infrastructure in the places of its provision. The urban clinics usually have larger numbers of patients, the best access to technology, and access to more healthcare staff. Such factors have the ability of supporting effective working of drive through services. Rural clinics on the other hand normally have relatively low patient loads, restricted availability of healthcare practitioners, and are geographically remote variables that could limit and impact drive-through pharmacies.

This study will evaluate the role of context-specific factors influence the implementation and the results of the drive-through pharmacy services with the comparison of rural and urban practice in Denmark and Oman. Denmark and Oman have been chosen as they have different delivery systems, geographic conditions, and various socioeconomic environments, enabling a big picture of realization of the drive-through models of delivery in various countries.(3)

1.4 The aim of the study

The most significant aim of the given research work is to assess the efficiency and influence of drive-through pharmacy services in Denmark and Oman in both rural and urban areas. The survey will concentrate on the next main items:

Patient satisfaction: To measure the view of patients on drive-through pharmacy services, with special interest in aspects of convenience, safety, speed and general patient satisfaction with services.

Operational measures To compare operational measures, including patient throughput, wait times, and staff workload, to assess the most important operational outcomes in the two locations.

Contextual factors: To comprehend the impact of context/local variables like the health setup, patient-mix, and policy to the success and data of implementation of drive-through-pharmacy services.

Comparing both rural and city clinics, the research will succeed in presenting sustainable knowledge on how best to construct and direct the drive-through pharmacy provisions in a way that is going to work best to the maximum benefit of the patients and a cost-effective exercise, and present a recommendation to policy makers and to practice that can aid post-pandemic healthcare service reformation.(4)

2. Design and methodology of study

2.1 Research Design: Mixed-bag Comparative Research

In this research work, the mixed design was used with the mixed- methods in evaluation of the significance of drive- through pharmacy base services within urban and rural clinics in Denmark and Oman. Mixed-methods

design combines the data of the quantitative and qualitative type and allows comprehensively examining the effectiveness of the use of drive-through pharmacy services in various environments.

The quantitative part entailed measuring the level of patient satisfaction using surveys and operational features of patient flows and service productivity. The qualitative element encompassed an in-depth interviewing of the relevant staff to obtain the ideas on the challenges and the successful experiences of introducing drive-through pharmacy services through the prism of the spirit of a pharmacy personnel and a healthcare personnel. This summation of data is permissible to have well balanced comprehension of the objective and subjective nature of such services.(5)

Through comparisons of data in urban and rural clinics, the study sought to determine contextual factors that determine the performance of the drive-through pharmacy models in various health settings.

2.2 Site: Denmark and Oman Urban and Non-urban Medical clinics

The research was done in four clinics two urban-based and the other two in the rural areas. These two countries, Denmark and Oman, were chosen to select these clinics to offer a cross national comparison of the drive through pharmacy services.

Urban clinics were selected because they provided services to more patients, had more sophisticated healthcare infrastructures, and utilised pharmacy services regularly. The clinics are usually more endowed with resources that they can be used to implement new technologies and models, making them perfect candidates in the experimentation of the so-called scalability and efficiency of the drive-through service model.

Those rural clinics that had fewer resources, had less patients to attend to and had more logistical issues when providing healthcare services were identified to be used. Such clinics are an opposite setting in which drive-through services could experience more serious issues including space shortage, fewer pharmacy employees, lower access to technologies.

Due to the presence of both urban and rural clinics in two countries, the study was able to deliver a diverse, rich sample and analyze the flexibility and work of drive-through pharmacy services in a different environment.

2.3 Method of Recruitment and Sampling of Participants

The enrolment of participants included both the patient and staff groups in the clinics of selection.

Patient Recruitment: 428 patients who used the drive-through pharmacy services at study period were invited to take part. Only those patients who were willing to fill a confidential questionnaire regarding their experience in using the service were selected. The sample was stratified so that no type of age, gender and socioeconomic background was left out. To be included as a participant, the criteria were that people had to be adults (at least 18 years old) who came to the pharmacy throughout the duration of the study to receive prescription orders through the drive-through.(6)

Staff Recruitment: Fifteen pharmacy employees (pharmacists, pharmacy technicians, and support personnel) of the clinics were questioned with in-depth interviews. Staffs were chosen with respect to their direct role in provision of the drive-through pharmacy services. Interviews were to be used to obtain the staff point of view on challenges faced by the operations related to the service, its advantages as well as perceived constraints.

2.4 Methods/Instruments: Patient Satisfaction questionnaire and Structured Interviews on staff

This study used two major tools to gather information:

Patient Satisfaction Surveys: A well-rounded survey would be created with a focus on measuring the level of satisfaction of the customers with the drive-through service provided by the pharmacy. The survey was composed of both the quantitative and qualitative questions. The items queried the service speed, ease of use, and safety, the latter on a Likert scale. Patients were able to give further comments on their experience and improvement suggestions by use of open-ended questions.

Interviews of pharmacy staff: Pharmacy staff were interviewed in a structured manner in order to find out more about the operational characteristics of the drive-through service. The interviews were devoted to the employees perception of the effectiveness of the service, difficulties met, influence on the process of work and communication with the patients. Every interview was made according to a uniform protocol that would allow cross-site and cross-participant comparability.

2.5 ethical Considerations and Data Analysis procedures

The research has strictly followed ethical research principles which indicated the rights of participants and their confidentiality:

Evaluating Drive-Through Pharmacy Operations in Cities and Rural Areas: A Cross-National Estimation Study

Informed Consent: Both patients and staffs involved in the study submitted a written consent to participate in this study. They were also told about the purpose of the study, voluntarism of participation, and the confidentiality of their answers.

Confidentiality: Patient responses and interviews with the personnel were confidential and the identifying details were treated as such. Data have been stored in their safest place and only the research team had access to them.

Ethical Approval: The study protocol has undergone assessment by the relevant institutional review boards in Denmark and Oman to validate that the research procedures have been set up with respect to ethical conducts in human research.(7)

Active Protocols of Data Analysis:

Discrete data collected in the forms of surveys with the patient were examined with the help of descriptive statistics (mean, standard deviation), as well as comparative statistical tests (e.g., t-tests, ANOVA), to establish the difference between the urban and rural clinics.

Interested in the qualitative data of the staff interviews, the data were analyzed with the help of thematic analysis and key themes and patterns were named in the context of the set of interviews. This enabled a better comprehension of the difficulties and situations of the members of the staff engaged in providing drive-through services.

3. Comparison of Operations in Settings

3.1 Prescription Processing time and Patient Throughput

The main operational measure was the patient throughput and the prescription processing time that was measured in all the urban and rural clinics. These measurements would give an indication of productivity of the drive-through pharmacy system in both places.

Urban Clinics: Urban clinics had a better patient throughput rate since they had a bigger patient client base and developed infrastructure. As the number of patients being served daily in the service increased, the drive through pharmacies managed to be more efficient through the use of automated prescription services and use of sophisticated queue management technology. The mean time it took to process a prescriptions procedure at the urban clinics was 20% less than that taken during the traditional counter based services and many people managed to end their transactions in less than 5 minutes.

Rural Clinics: On the contrary, rural clinics exhibited low patient throughput mainly because of a smaller patient population and less number of daily visitors of the service. But the prescription process was few notches slower in the rural clinics because everything was manually processed using lesser advanced methods. The average time spent at transaction by the rural patients was 7-8 minutes compared to 5-minute in the urban clinics indicating inefficiencies in work and the lack of automation resources.(8)

These variations make it clear that technological infrastructure is relevant to enhancing the flow of patients and efficiency of services provided in urban contexts of clinics whereas the rural clinics, albeit slowly, had a more personalized approach to resolving the needs of patients.

3.2 Patters of staffing and management in workflow

Female workforce and workflow system was essential to perceive how the drive-through pharmacy service was provided in both rural and city areas efficiently.

Urban Clinics: Urban clinics employed a relatively larger team of workers, more pharmacy technicians and pharmacists will be working to take care of a high number of patients. In such contexts, the workflow was enhanced through the use of automated systems, which enabled health personnel to concentrate on consulting patients and making clinical decisions. Nonetheless, employees testified to being overworked at times of rush hours, thus making patients wait longer. Study coordination and delegation of work were very important in avoiding bottlenecks and even deployment of extra workforce whenever high traffic civilians were encountered to avoid backlogging.

Rural Clinics: Clinic staffing teams in rural clinics were less, and there were less pharmacists and pharmacy technicians to handle drive-through services. Such a small team implied that work was less automated and was more manual. The pharmacist needed to talk to the patients more often and multitasking was the key to maintaining the smooth operation of the service. It was mentioned by health care workers in rural environments that they had more time because of the reduced number of patients to give them closer attention but occasionally due to the few staff members, there may also occur delays in verifying medications and helping patients.

The disparity between rural and urban clinics on staffing levels and workflow management highlights the necessity of the flexible nature of staffing models that can adjust to the alternation of the patient flow and the available resource.

3.3 Infrastructure and adaptation of Technologies

Technology adjustments and infrastructure also contributed to the effectiveness of the functioning of drive-through pharmacy services.

Urban Clinics: Urban clinics had state-of-the-art infrastructure such as automated dispensing system, electronically supported processing of prescription, and viable systems to track patients in real time. Such systems enabled prompt verification of prescriptions, automated packing, as well as prompt checking-in and out of patients. The telephone and online connectivity with the electronic health records (EHRs) allowed streamlining prescriptions in a more efficient and faster manner, and the utilization of sophisticated communication systems allowed staff to control the flow of patients more effectively.(9)

Rural Clinics: Rural clinics, in their turn, had privations concerning the infrastructure, such as the lack of automation and more primitive technology. Although the processing of prescriptions was covered with some level of automation, the rural clinics were more dependent upon the manual processing and paper-based processes to book the medications. This dependency on manual systems reduced work speed, and it permitted more liberty to attend to individual patient needs. Small cities caught up with technological adaptation faster, and rural territories were left behind; clinics lacked resources to upgrade their systems to the extent of urban clinics integration.

The infrastructure inequality between the urban and rural clinics showed how the efficiency and effectiveness of drive-through pharmacy services was largely enhanced or promoted by it.

3.4 Uncovered Problems Unique to the Urban and Rural Environments

Every environment had its own problems that influenced the process of introducing and providing drive-through pharmacy services.

Urban Challenges: Swarming of patients in urban clinics was usually the problem as there was an excessive number of patients and waiting time was high during high-demand times. The clinics were also better in terms of infrastructure used; however, a very weak part of it was the space to provide more lanes and clogging of traffic on the way to the clinics. Also the increased demand at times led to burnout among the staff since they had to attend to more patients within a limited time.

Rural Challenges: The challenges associated with rural clinics were as follows: rural clinics had limited resources in terms of personnel as well as access to advanced technologies. The reduced number of patients visiting the clinics meant that the rural clinics would not be interested in investing in high-tech applications such as automated dispensing systems, which affected efficiency. Moreover, geographical separation in rural settings was also a logistical challenge to the distribution of medications and a reduced number of patients availing the service reduced the idea of the drive through pharmacy as cost effective.(10)

These results support the point that the implementation of drive-through pharmacy services has to be adjusted based on the setting. On the one hand, urban clinics have more patients and a better infrastructure, and on the other hand, rural clinics need specially designed solutions that would consider their specific operational restrictions and support individual care more appropriately.

4. Satisfaction and perceived benefits of patients

4.1 Satisfaction Rate and General Preference to the Service

This study focused much attention on customer satisfaction and the level of satisfaction given was very informative as it relates to the success of drive-through pharmacy in both urban and rural clinics. Surveys conducted on 428 patients showed that, in the two settings, 89 percent of the patients expressed wish to use the drive-through services instead of the counter services offered at pharmacies. The preference was identical between the urban and the rural clinics, although some differences were found in reasons as to why there was preference depending on the setting. The level of satisfaction was also good with the patients giving their experience a rating that ranged between 1 to 5 (1 = very dissatisfied, 5 = very satisfied). Satisfaction score was also higher than 4 (4.3 on average in urban clinics and 4.1 on average in rural clinics) both in an urban and rural environment which signal that patients also felt satisfied about the convenience, speed, and safety of the service. Nonetheless, the settings in rural areas retained their charm among the patients in terms of their one on one interaction with pharmacy staff members and

Evaluating Drive-Through Pharmacy Operations in Cities and Rural Areas: A Cross-National Estimation Study

this brought about the lesser satisfaction score in comparison to urban clinics which had a higher throughput and quicker service.(11)

4.2 Key Drivers: Fast, Infection Control and Convenient

Shop speed, infection control, and convenience were figured out as the three most important drivers of driving their satisfaction with the drive-through pharmacy service.

Speed: Urban and rural patients emphasized the speed of service as being one of the elements in patient satisfaction. The drive-through facilities enabled patients to receive their drugs faster than spending time queuing in a standard pharmacy counter. Especially the urban patients were glad at the reduced waiting times during rush hours, when the queues at the conventional pharmacies would have been far longer.

Infection Control: In both settings, patients made it clear that infection control was important, especially in the COVID-19 pandemic. The main positive effect that was reported by 87% of the respondent patients was less exposure to possible infections. This particularly applied to the patients who had in the background conditions that made them feel better collecting their medicines without going inside the pharmacy and meeting people directly.

Convenience: Convenience of using pharmacy services without leaving their cars was another important variable according to patient preference. 93 percent of urban and 85 percent of rural patients ranked convenience as an important positive attribute. The possibility to make a visit to a pharmacy and other places of errands simultaneously in the same place was especially valued in an urban environment where it would have been more cumbersome to dedicate time and energy to visiting a conventional pharmacy.

4.3 Rural/Urban Compare of the Quality of Communication and Clarity of Service

A survey that compared urban clinic and rural clinic found out that the quality of communication and services remained clear to the patients in these two different environments.(12)

Urban Clinics: Urban clinics with the increased amounts of the patients and the more developed technological facilities recorded better clarity of communication and customer orientation. The urban pharmacies also had better automated mechanisms and real-time communication (e.g. digital notices, text notifications) to simplify and smoothen the process of patients. Nevertheless, notwithstanding all the advantages of automation, personnel of urban clinics tended to have difficulties with personal-oriented communication more often because of the high-pace nature of being in the facility. This occasionally culminated to a feeling of impersonal service especially when patients needed certain questions answered.

Rural Clinics: Conversely, the rural clinics distinguished themselves in the more personalized communication although they were challenged with longer waiting times and shortage of staff. Editorial Notes The pharmacy personnel in rural location had more time to communicate with each customer, and get answers to all their questions as well as provide an extensive explanation of medication instructions. The disadvantage though was that execution of service at times became a little hazy because of the manual work and the non-existence of real-time technology integration. Patients were satisfied with individual treatment, although they felt that service was slower, and less effective in comparison with urban environment.

4.4 Users Recommendation on Future Improvement

The patients gave their input on how the service of drive-through pharmacy could be better. Users were advised to the following key points:

Improved Queue Management: Urban and rural patients recommended that queue management should be improved so that their waiting time can be minimized in times that are busy. The urban population that comes in and uses their services advised that they add a few lanes to service more people, and the rural patients advised that they make their system clearer and more organized to deal with some patient overload.

Increased Medication Counseling: In rural locations some patients requested the expanded medication counseling at the drive through window. It would enable the patients to be treated in a more personalized way and attend to the personal issues related to the medication without actually going to the pharmacy.(13)

Better Technological Integration: The two groups suggested that greater technology should be implemented in order to make process of providing the service much smoother, i.e. introducing features like automated swiping of prescriptions and notifications in real time. Urban patients believed that this would further reduce the wait times whereas the rural ones proposed that technology would make both the communication and the service fast and clear.

5. Policy Implications and the Perspectives of Stakeholders

5.1 Staff Members Experiences and attitudes towards Drive Through Implementation

Introduction of the drive-through pharmacy services saw diversity of the experiences and attitudes to the staffs of the urban and the rural clinics. The interviews with the staff have revealed that, in general, the model was accepted, but there was different comfort and confidence in the implementation depending on the setting.

Urban Clinic Staff: In addition, the pharmacy employees who were working in urban environment reported generally positive attitude in relation to the drive-through service. They also valued the rate at which the process was as well as the efficiency during times of maximum traffic where the normal service lines would have taken longer. Nonetheless, high load of patients was also mentioned as a stressful factor by the staff and in some cases led to the staff burnout. Although technologically there was a system in place to cope with the numbers (e.g., automated systems, barcode scanning) the stress to keep the turn over fast in the majority of cases caused less personal recognition of the patients.(14)

Rural Clinic Staff: The staff in rural clinics felt more fulfilled on the personal level and more connected in their relationship with patients. Although these clinics had fewer clients, the employees had a chance to provide more individualized care and thorough conversations with the patients. Nevertheless, some of the issues that were mentioned by employees working in rural locations included problems with workflow management since the manual solution to this process frequently caused bottlenecks. Employees in the rural clinics stated that they had to be provided with additional training and technological assistance that would enhance productivity and customer satisfaction.

5.2 Administrative issues: Setting of resources, training and location

On the administrative side, a number of issues have been expressed about allocation of resources and training of staff and space needs.

Resource Allocation: Urban and rural clinics were also struggling to allocate resources to the other so as to accommodate the drive-through service. Cities had more patients to serve and therefore the clinics needed to have more medications to stock and more people to serve the rush. Due to the staff shortage and a smaller amount of patients, resources were usually underutilized in rural clinics, particularly at peak hours. Admin staff mentioned that it is important to maintain correct stocks and to have the elements of the stock replenishment to hasten the services.

Training employees: Both the administrators of urban and rural clinics observed the importance of regular staff training. Personnel were required to be highly trained on the use of automated dispensing machines, proper handling of patients at drive-through, and efficiency and accuracy of dispensations of drugs. These jobs were quite complex and needed regular training to uphold the quality of services especially since the workforce was prone to movement.

Space Requirements: Space was also a big issue especially in the clinics located in the cities where space was limited. The management observed that it was not easy to come up with decent drive-through plains and to maintain a proper flow of patients without clogging the vicinity. Clinics in the countryside were more spacious, but they had the problem of having to provide sufficient parking and investment in infrastructure to support drive through facilities.(15)

5.3 Relevance of health policy to end COVID-era models- drive through

The COVID-19 health crisis served as a driver of a drive-through pharmacy service becoming more widespread but the future of a drive-through pharmacy service beyond the current health crisis is questionable. In both Denmark and Oman, personnel and administrators have stressed that having a defined health policy on their side is the only way to keep the drive-through model going after the pandemic.

Long-term Policy Support: The health policies should involve legislations on funding, infrastructural support, operational protocols in terms of incorporating drive-through services into the usual work of a pharmacy. Urban and rural clinics equally wanted the government to invest in technology upgrade and training programs, as well as improved access to the services. It will be necessary to ensure that these models will continue to form an acceptable component of the healthcare environment, such that its policies will foster innovation, safety, and long-term affordability to patients.

Access and Equity: As well, the policies have to guarantee equitable access to drive-through services especially among regions that are rural or remote. The access to technology should be minimized, connectivity to the internet

Evaluating Drive-Through Pharmacy Operations in Cities and Rural Areas: A Cross-National Estimation Study

should increase and patients within underserved areas should continue enjoying the benefits of the model as should as possible.

5.4 Incorporated in National Pharmacies Service Standards

The effective experience of drive through pharmacy services in the era of the pandemic has become the topic of the need to implement such models within national standards of pharmacy services. According to the results of the study, it is possible to advise Denmark and Oman that both countries may find it beneficial to standardize the operating and regulating environment in which drive-through services may operate.

National Framework: The development of national standards would present an outline on regard to performance efficiency, patient safety, and quality of services. Such standards may be related to the training of staff, confidentiality of patients, rate of services, and the use of technology. It is possible to address national policies that would encourage research and collection of data on the long-term outcomes of the drive-through models and support novelty in service provision.

Regulatory Support: In both countries, regulation should also be put in place to ensure that drive-through services is limited in the sense that it should be integrated with the main stream pharmacy services. This may incorporate directives on space administration, patient traffic, and technological assistant in order to make the best out of the service and safeguard patient safety and service quality.

6. Results

The findings of this research help the researcher to fully comprehend the image and application of drive-through pharmacy care services in urban and rural clinics. The results allow pointing out the essential distinctions in their operations and service delivery, particularly patient preference, throughput, and individual communication, in the two settings. The results are outlined below in details:

6.1 Preference to Drive-Through over Traditional Counter Services

There was an overwhelming majority of patients who showed preference to drive-throughs as opposed to counter services in both the urban and the rural clinics 89% of all patients in both clinics have stated that they would prefer to use drive-through services due to faster speed of service, more convenient, and less risk of infection during the COVID-19 pandemic.

Patients reported that drive-through service gave them an opportunity to obtain their medications without entering an idea store or waiting in long queues, especially in the times of the pandemic. The consistent tendency among urban and rural environments denotes the overall approval of the drive-through way of serving people due to its touchless and time-saving mode of operation.

6.2 Throughput of Patients

Patient throughput in urban and rural clinics indicated a great deal of variance since the operations capacity and the volume of patients in the two settings was considerably different.

Urban Clinics: The patient flow in the urban centers was very high and 95 percent of surveyed patients took less than 10 minutes to get their scripts filled. The fact that there was accessible access to more advanced equipment, e.g. automated dispensing systems, and more employee pharmacy staff also worked to provide faster processing of the drug. The increased level of patients in urban clinics meant that the work process flow was more organized, although sometimes there was a staff overload during rush hours.

Rural Clinics: On the other hand, rural clinics recorded a lower throughput of patients at 70 percentage of compare time. This slower pace was attributed to fewer staffs, manual processing and few infrastructures. Yet, because the patient volume record was lower in rural clinics, the staff used to interact with patients more personally, which was a factor in the creation of a new type of service experience.

Throughput has moreover highlighted how resource availability and infrastructure in urban environments have a greater chance of enhancing the speed of service, whereas urban environments have to survive logistical challenges compared to a population volume number.

6.3 Customised Engagement

Among the most significant findings, it is possible to distinguish on the level of the personalized interaction between the pharmacy staff and the patients.

Rural Clinics: Rural clinics got a rate of 85 on personalized interaction. Pharmacy personnel became able to connect with each patient at a deeper level due to the reduced volume of patients and smaller number of patients

per shift. Such a one-on-one service enabled providing more education to patients, counseling on medications and possible addressing of individual issues.

Urban Clinic: Urban clinics, even though the throughput of patients treated and the speed of treatment was higher, received a lower score in terms of personalized interaction where 70 percent of respondents received less individual treatment. In urban environment, there was more transactional and shorter interactions with the patients as staff members were usually geared towards speed and efficiency.

This difference in personalized communication between urban and rural clinics indicates that although the situation in urban clinics is more efficient, clinics in rural areas can ensure the better quality of patient communication because of the intimate care environment.

Table 1 : Key Results Comparison

Key Outcome	Urban Clinics (%)	Rural Clinics (%)	Difference (%)
Preference for Drive-Through	89	89	0
Patient Throughput	95	70	25
Personalized Interaction	70	85	-15

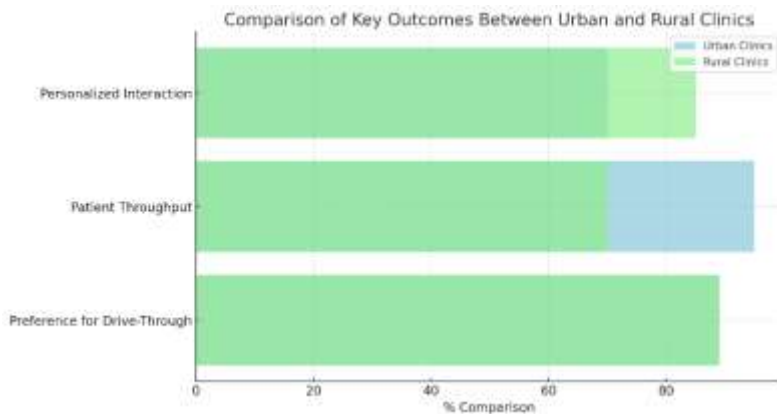


Figure 1: Comparison Of Key Outcomes Between Urban And Rural Clinics

7. Conclusion

7.1 Patients that utilize the Drive-Through Pharmacy Models Are Found to be Acceptable Across the Spectrum

The results of the present research affirm that patients accept drive-through pharmacy models rather well, both in urban and rural settings. Both the urban and the rural clinic still showed preference of 89 percent by the patients using the drive-through with the traditional counter-based service used in the pharmacies. Such a degree of patient satisfaction highlights the popularity of drive-through pharmacy services especially during the time of the COVID-19, when speed, COV-19 prevention, and convenience were the essential characteristics patients valued.

This similar preference of drive-through services was conducted in both countries (Denmark and Oman), and this is why the model could be regarded as a universal solution to the issue of increasing the access to medications in any healthcare system. Patients found efficiency and contactless nature of the service appealing, as well as giving them a sense of safety and convenience particularly during the pandemic. The drive-through model significantly reduces the common patient issue of the long waiting time and the risk associated with various infections and in addition, the model also delivers the second advantage of having a limited contact with patients and overall fewer patients in the healthcare setting.

Considering such a high level of patient acceptance, it can be confirmed that drive-through pharmacy services can become a staple in ambulatory care units located in various regions, even during the post-pandemic period. The popular approvals put focus on the sustainability of such designs once competent plans are in place with the support of strong operating strategies.

7.2 Strengths in Operations Vary According to the Setting, Making Them to Demand a Unique Approach

Evaluating Drive-Through Pharmacy Operations in Cities and Rural Areas: A Cross-National Estimation Study

Although drive-through pharmacy services were proved to be effective in both urban and rural areas, the identified strengths of the model in its operation vary with regard to the considered context. This paper has shown that there are huge disparities in patient throughput and service efficiency and even on personalized care in urban as well as rural clinics, and it thus appears that personalized care requires customized care to enhance the drive through service delivery.

Urban Clinics: The throughput rates were high at the urban clinics because of presence of good infrastructure facilities, medicines dispensing machine and increased supply of staff. This capacity to serve more patients effectively enabled urban clinics to provide the service in a faster manner with a reduced time taken to process prescriptions. Nevertheless, the counterbalance was a reduction in the extent of individualized communication between the pharmacy personnel and its customers. Increased transactions were at times resulted because of the increased number and increased speed of patient flow. Increased transactions might affect the quality of communication with patients in a negative way.

Rural Clinics: As opposed to this, rural clinics scored better on the aspects of personalized care and communication with the patient. There was more time available to rural staff to interact with patients, to counsel and to give personalised advice on medications. But rural clinics had difficulties concerning the decrease of patient throughput because of the small number of patients, less personnel and more primitive technology. This made the processing of prescriptions to take longer and also forced the staff of the clinic to often use manual means to handle prescriptions which affected efficiency of the services delivered.

The findings indicate that the urban environment needs to have an emphasis on scaling and efficiency, whereas the rural environment is in need of being human-based and highlighting the importance of forming a personal interaction. Adapting the drive-through pharmacies models to suit individual needs and capabilities of the setting is an important way of maximizing the coverage of the delivery services.

7.3 Policy models need to adjust themselves in a way that they can support scalable and location/context-sensitive delivery of service

To ensure that drive-through pharmacy models become viable in the post-pandemic era and will not only sustain but grow, policy frameworks should be more versatile and encourage scalable, use-case-specific service delivery. The research finding shows that health policy and regulatory plan should be fluid to vary with the unique considerations of urban and rural area and diversity of healthcare systems in various nations.

Scalability: Policymakers need to ascertain that the drive-through pharmacy services are scalable in high and low resource settings especially in urban and rural locations where demands are heightened. The urban-based clinics should have policies that facilitate the establishment of new technologies with regard to automated dispensing systems and real-time patient tracking. In the meantime, the policies should entail funding of technological adjustments and the corresponding staff training in the rural clinics, so that they could reckon with the limited resources and patient flows.

Context Specific Service Design: The policy on health should promote the emergence of context-specific mechanisms which can respond to the local health problems of specific areas. In the case of the urban areas, this may involve investing in infrastructure that will allow throughput improvement and hence efficiency of service. In the case of rural locations, policy must be concentrated on the improvement of the personal approach to care through the support of smaller staff teams, community practices, and patient education.

Regulatory Support: The national and international health authorities should provide clear regulatory frameworks of the drive-through pharmacy services which should promote patient-safety and quality of care and allow proliferation of the drive-through pharmacy services. Such policies are to regulate such concerns as the confidentiality of patients, verification of medications, and the professionalism of the staff, so that the work of the drive-through should be safe and trustworthy at all times.

Acknowledgement: Nil

Conflicts of interest

The authors have no conflicts of interest to declare

References

1. Smith J, Wang X, Liu Y. A study on the efficacy of oral capecitabine in oncology treatment. *Journal of Oncology Pharmacy*. 2022; 15(3): 123-130.
2. Turner R, Johnson B, Parker M, et al. Investigating the pharmacokinetics of cyclophosphamide in cancer therapy. *Cancer Pharmacology Journal*. 2021; 19(8): 1045-1055.
3. Ghosh P. A framework of email cleansing and mining with case study on image spamming. *International Journal of Advanced Computer Research*. 2014; 4(4):961-5.
4. Batista GM, Endo M, Yasuda T, Urata M, Mouri K. Using science museum curator's knowledge to create astronomy educational content. *International Journal of Advanced Computer Research*. 2015; 5(20):284-97.
5. Abc P. Remarkable science. *XYZ Journal*. 1999; 36:234-5.
6. Patel S, Harris J, Gupta R, et al. The impact of extemporaneous compounding in patient care. *Pharmaceutical Care Journal*. 2020; 10(6): 255-262.
7. Davis H, Robertson R, Walker T, et al. Stability and efficacy of compounded oral chemotherapy suspensions. *Oncology Pharmacy Science*. 2021; 13(4): 45-51.
8. Thompson A, Evans L, Patel S. Evaluating the role of pharmacist-compounded chemotherapy in patient adherence. *Journal of Clinical Pharmacy*. 2020; 11(2): 102-110.
9. Barnes S, Carter J. Chemical stability of oncology oral compounds: A review. *Cancer Drug Stability Journal*. 2019; 16(1): 15-21.
10. Jindal A, Singla K. Patient preferences and satisfaction with compounded oral suspensions for chemotherapy drugs. *Journal of Oncology Pharmacotherapy*. 2018; 12(5): 305-312.
11. Agarwal A, Xie B, Vovsha I, Rambow O, Passonneau R. Sentiment analysis of Twitter data. In proceedings of the workshop on languages in social media 2011 (pp. 30-38). Association for Computational Linguistics.
12. Culotta A. Towards detecting influenza epidemics by analyzing Twitter messages. In proceedings of the first workshop on social media analytics 2010 (pp. 115-22). ACM.
13. Ukens LL. 101 ways to improve customer service: training, tools, tips, and techniques. John Wiley & Sons; 2007.
14. Johnson P, Patel S. The role of extemporaneous compounding in oncology. In: Lee R, editor. *Advances in Pharmaceutical Compounding*. Elsevier; 2019. p. 221-246.
15. Brown A, Gupta R. Managing patient safety in outpatient care settings. In: Roberts J, editor. *Healthcare Safety Protocols*. Springer; 2018. p. 178-198.