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## A survey of drive-thru pharmacy services: Evaluating the acceptance and perspectives of community pharmacists in Saudi Arabia

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## ABSTRACT

**Background:** The practice of dispensing drugs in primary healthcare centers has shifted to community pharmacies in Saudi Arabia. These changes increase demand and mandate improving their services; one such is establishing pharmacy drive-thru services. To explore the effects of drive-thru services on the pharmacy profession, this study aimed to measure community pharmacists' acceptance, perception, and satisfaction regarding drive-thru services.

**Methods:** This cross-sectional study design was conducted in Saudi Arabia between January 2023 and May 2023—comparing the perception, acceptance, and satisfaction of pharmacists who work in a community pharmacy that provides a drive-thru service versus no drive-thru service. Community pharmacists were invited to complete an online questionnaire consisting of four sections developed from previous studies with some modifications. Descriptive statistical analysis and an independent *t*-test were utilized to test the difference between the two groups (providing drive-thru service vs. non) in their responses.

**Results:** This study included 380 community pharmacists, of whom 33 % provided drive-thru services and 67 % did not. Pharmacists' perceptions of drive-thru services differed significantly. Those with drive-thru services perceived lower convenience for delivering drug information and patient counseling, and they were concerned about the potential impact on their health effects ( $M = 3.15$ ,  $SD = 1.34$ ) compared to those without ( $M = 3.58$ ,  $SD = 1.10$ ),  $t(378) = -3.32$ ,  $p < 0.01$ ). However, they recognized the convenience of serving sick patients, the elderly, disabled individuals, and mothers with children in cars ( $M = 3.71$ ,  $SD = 1.17$ ), which was higher than those without ( $M = 4.04$ ,  $SD = 1.21$ ),  $t(378) = -2.70$ ,  $p < 0.01$ ). Regarding the current pharmacy layout suitability, pharmacists with drive-thru services found it more suitable ( $M = 3.13$ ,  $SD = 1.14$ ) than those without ( $M = 2.49$ ,  $SD = 1.14$ ),  $t(378) = 5.1$ ,  $p < 0.01$ ). However, the two groups had no significant difference in overall satisfaction.

**Conclusion:** Pharmacists working in pharmacies offering drive-thru services recognized certain benefits but also expressed concerns about health effects and decreased convenience for counseling. These findings provide valuable insights for policymakers and pharmacy management, highlighting the nuanced views of pharmacists in adopting drive-thru services.

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## 1. Introduction

The current practice in Saudi Arabia has shifted toward making the community pharmacies responsible for dispensing all the primary healthcare center's prescriptions and providing access to electronic patient medical records for a community pharmacist to enhance pharmaceutical and preventive care services. Such switching in practice will increase the demand for community pharmacies that mandate improving their services; one such is establishing pharmacy drive-thru services (Alomi, 2017). Drive-thru pharmacy service is considered among the value-added dispensing services (VAS), which services are intended to offer a convenient alternative means of delivering medication compared to traditional counter service (TCS) (Farha et al., 2017).

The attractive outcomes of adapting Drive-thru services are improved patient satisfaction and reduced long waiting times (Lau et al., 2018). Moreover, it showed that this value-added service is crucial for vulnerable populations, including older adults, people with disabilities, and women in a car with a child (Farha et al., 2017). Furthermore, Drive-thru pharmacy services address patients' issues when picking up their medications, such as the ability to find parking for their vehicles to enter the pharmacy, times when there is a high volume of patients simultaneously, and long waiting times for receiving their medications (Farha et al., 2017). However, some disadvantages are associated with the implications of drive-thru services, like an increased potential for dispensing errors and the compromised pharmacist-patient interactions that occur due to distractions from the weather and vehicle passengers (Farha et al., 2017).

Additionally, managing patients in unfamiliar situations, like having a new prescription, can be another challenging issue for the implication of this service (Lee and Larson, 1999; Liew et al., 2020). Studies that compared the drive-thru window to the walk-in window showed a rising concern regarding pharmacists' ability to provide optimal patient care (Chui et al., 2009; Lee and Larson, 1999). The encounter through the in-walk window was more prosperous, affluent, and lengthier, and the patients were more engaged and attentive during counseling on their medications (Chui et al., 2009; Lee and Larson, 1999). In addition, the importance of counseling appeared around the adverse drug events that reduced and enhanced compliance with the prescribed regimen (Schnipper et al., 2006; Smith et al., 1997).

Several community pharmacies in Saudi Arabia offer drive-thru services to dispense prescriptions, over-the-counter (OTC), and all other products in the pharmacy. Customers receive their orders through a window while they are in the car. The current practice can affect the attitude of customers by frequently ordering secondary things, which results in a high workload on pharmacists and delays in response to patients who most need this service. Based on current literature, none of the studies discussed the acceptance and perception of community pharmacists regarding the current practice of drive-thru services in Saudi Arabia. Therefore, we aimed to explore the effects of drive-thru services on the pharmacy profession by measuring community pharmacists' acceptance, perception, and satisfaction regarding drive-thru services.

## 2. Methods

### 2.1. Study design

This cross-sectional study design was conducted in Saudi Arabia between January 2023 and May 2023—comparing the perception, acceptance, and satisfaction of pharmacists who work in a community pharmacy that provides a drive-thru service versus no drive-thru service. The online questionnaire was distributed among community pharmacists in Saudi Arabia using social media platforms. This study was approved by the Institutional Review Board at Imam Abdulrahman bin Faisal University.

### 2.2. Sample size

The estimated number of community pharmacists in Saudi Arabia is 24,395 (Alshahrani, 2020). Using a single population proportion formula, considering a 95 % confidence interval and 5 % precision, the sample size required for our study was equal to 379.

### 2.3. Questionnaire

An online questionnaire was created using QuestionPro, a platform to make a questionnaire for different purposes. The questionnaire was based on four published studies, and a few changes to the questions were made to serve our study's purpose better (Farha et al., 2017; Lee and Larson, 1999; Rodrigues et al., 2014; Szeinbach et al., 2007). The questionnaire contains four sections: The first section is about pharmacist perception regarding the current application of drive-thru services in Saudi community pharmacies, categorized into negative and positive perceptions. The second section included statements regarding pharmacists' acceptance of the current implementation of this service. The third section assesses pharmacists' job satisfaction. A 5-point Likert scale was used to assess the attitude and views of participants, ranging from 5 (strongly agree) to 1 (strongly disagree).

Section four is about demographic information. This part of the questionnaire includes the respondent's age, gender, years of experience, educational level, site of work, current job responsibilities, employment status, and nationality. To ensure the validity of the research tool, the questionnaire was reviewed by community pharmacists and experts in the field and then piloted prior to disseminating the survey. To test the reliability, a Cronbach Alpha was calculated for each of the sections separately: negative perception (0.86), positive perception (0.75), acceptance (0.82), and satisfaction (0.73).

### 2.4. Statistical analysis

A descriptive statistic using the chi-square test for categorical variables and the *t*-test for the continuous variable was conducted to describe the baseline demographic of participants. We used Pearson correlation analysis to examine the strength and direction of the linear relationship between negative perception, positive perception, acceptance, and satisfaction. The Shapiro-Wilk test was conducted to check the normality of the data sample. Further, we tested the difference between the two groups (providing drive-thru service vs. non) using an independent *t*-test. We tested the assumption of equal variances, which was met based on the *p*-value obtained from Levene's test. Therefore, the data was homogeneous and had equal variance, and we reported the pooled *t*-test results.

We also created composite scores for the negative perception, positive perception, acceptance, and satisfaction using a simple average, assuming all items contribute equally to the construct. Statistical significance thresholds will be set at significance level  $\alpha = 0.05$ ; all tests will be 2-tailed. All analyses were performed using SAS statistical software (version 9.4, SAS Institute, Cary, NC).

## 3. Results

The study included 380 community pharmacists, with 33 % (125 pharmacists) working in a pharmacy offering drive-thru services, while 67 % (255 pharmacists) did not provide this service. The baseline demographic of the participating pharmacists is listed in Table 1. Overall, pharmacists working in pharmacies providing drive-thru services were slightly younger, predominantly men with less than two years of experience, and were Saudi nationals (Table 1). Figs. 1–3 show the answers of the participants. The correlation analysis presented in Table 2 reveals key relationships between Negative Perception, Positive Perception, Satisfaction, and Acceptance in the context of pharmacists in Saudi Arabia and their views on the current implementation of drive-thru

**Table 1**  
Baseline demographic of all participated community pharmacists.

Characteristics	Entire Participants		Drive-thru Service		No Drive-thru Service		p-value
	No.	%	No.	%	No.	%	
<b>Total</b>	380	100	125	33	255	77	
<b>Age</b>							
mean (SD)	30 (5)	-	29 (4)	-	30 (5)	-	< 0.05*
<b>Gender</b>							
Male	262	69.0	72	57.6	190	74.5	< 0.01**
Female	118	31.1	53	42.4	65	25.5	
<b>Experience Years</b>							
< 2 years	93	24.5	35	28.0	58	22.8	< 0.05*
2-5 years	154	40.5	57	45.6	97	38.0	
> 5 years	133	35.0	33	26.4	100	39.2	
<b>Educational Level</b>							
Technical pharmacy diploma	17	4.5	6	4.8	11	4.3	0.96
Bachelor degree	319	84.0	105	84.0	214	83.9	
Graduate studies	44	11.6	14	11.2	30	11.8	
<b>Site of Work</b>							
Independent community pharmacy	68	17.9	21	16.8	47	18.4	0.85
Regional community pharmacy	56	14.7	20	16.0	36	14.1	
Chain community pharmacy	256	67.4	84	67.2	172	67.5	
<b>Current Job Responsibilities</b>							
Managerial	131	34.5	42	33.6	89	34.9	***
Counselling & dispensing	234	61.6	82	65.6	152	59.6	
Other patient care services	15	4.0	1	0.8	14	5.5	
<b>Region</b>							
Eastern region	139	36.6	39	31.2	100	39.2	***
Western region	115	30.3	50	40.0	65	25.5	
Central region	74	19.5	24	19.2	50	19.6	
Northern region	11	2.9	3	2.4	8	3.1	
Southern region	41	10.8	9	7.2	32	12.6	
<b>Employment</b>							
Employee	372	97.9	120	96.0	252	98.8	***
Owner of the pharmacy	8	2.1	5	4.0	3	1.2	
<b>Nationality</b>							
Saudi	232	61.05	91	72.8	141	55.29	< 0.01**
Non-Saudi	148	38.95	34	27.2	114	44.71	

Note: \*p < 0.05, \*\*p < 0.01 \*\*\* no applicable statistical analysis.

services. Negative perception was found to have a moderate negative correlation with both Positive Perception ( $r = -0.38056, p < 0.01$ ) and acceptance ( $r = -0.48504, p < 0.01$ ) and a weaker negative correlation with satisfaction ( $r = -0.14708, p < 0.05$ ). In contrast, Positive Perception had a positive association with both satisfaction ( $r = 0.15905, p < 0.05$ ) and acceptance ( $r = 0.45285, p < 0.01$ ). A slight positive correlation existed between Satisfaction and Acceptance ( $r = 0.27497, p < 0.01$ ).

Table 3 presents distinct insights into pharmacists' negative perceptions of drive-thru services. The independent *t*-test model showed a marked distinction in the pharmacists' view of drive-thru convenience for patient counseling when comparing pharmacists working in community pharmacies offering drive-thru service ( $M = 3.49, SD = 1.15$ ) to those without it ( $M = 3.80, SD = 1.05$ );  $t(378) = -2.6, p < 0.01$ . Further, the independent *t*-test revealed the difference in how pharmacists perceive the impact of drive-thru services on patients' medication verification ability, comparing pharmacists in community pharmacies with drive-thru service ( $M = 3.44, SD = 1.11$ ) and those without it ( $M = 3.71, SD = 1.01$ );  $t(378) = -2.37, p < 0.05$ . The study unveils another

concern about the potential health effects of drive-thru windows on the pharmacists working in community pharmacies offering the service. Pharmacists in community pharmacies offering drive-thru services ( $M = 3.15, SD = 1.34$ ) perceive health risks from pollution on them compared to pharmacists not offering the drive-thru services ( $M = 3.58, SD = 1.10$ );  $t(378) = -3.32, p < 0.01$ . Conversely, the independent *t*-test analysis indicated the difference between pharmacists in community pharmacies with drive-thru service ( $M = 3.71, SD = 1.17$ ) and those without it ( $M = 4.04, SD = 1.21$ );  $t(378) = -2.70, p < 0.01$  regarding the positive aspect of drive-thru services in aiding vulnerable customers.

Furthermore, the independent *t*-test model showed an evident difference between community pharmacists regarding the acceptance of the current application of tie drive-thru services in Saudi Arabia (Table 4). There was a difference in pharmacists' perceptions of the suitability of their pharmacy layout for implementing drive-thru pharmacy services. This divergence is evident among pharmacists employed in community pharmacies with drive-thru service ( $M = 3.13, SD = 1.14$ ) compared to those in community pharmacies lacking this service ( $M = 2.49, SD = 1.14$ );  $t(378) = 5.1, p < 0.01$ . Another difference indicated by the independent *t*-test analysis is how pharmacists perceive the potential benefits of drive-thru pharmacy services for reshaping the pharmacy profession. This differentiation becomes apparent between pharmacists working in community pharmacies equipped with drive-thru service ( $M = 3.27, SD = 1.19$ ) and those in community pharmacies without this service ( $M = 2.86, SD = 1.21$ );  $t(378) = 3.15, p < 0.01$ . However, the analysis showed no significant difference in satisfaction between pharmacists working in community pharmacies offering drive-thru service and those in community pharmacies not offering this service.

#### 4. Discussion

The study included 380 community pharmacists, finding notable variations in the pharmacies that provided drive-thru services based on age, gender, experience levels, and nationality. Pharmacists working in pharmacies offering drive-thru services were found to be slightly younger (mean age of 29) than those not offering these services (mean age of 30). Interestingly, male representation was lower in the drive-thru service group at 57.6 %, compared to 74.5 % in the non-drive-thru service group, while female representation was higher in the drive-thru service group at 42.4 %, compared to 25.5 % in the non-drive-thru service group. However, females comprised 31 % of the overall sample, reflecting an increase in the current female presence in the profession. This increased presence agrees with another study that shows the growth in the proportion of females working in the pharmacy profession in Saudi Arabia from 12 % to 22 %, and in community pharmacies in particular from 0.3 % to 7.2 %, between 2016 and 2021 (Almaghaslah, 2023).

Further differentiation was seen in experience levels among pharmacists. Those working in pharmacies offering drive-thru services were more likely to have less than two years of experience, with 28 % of such pharmacists falling into this category compared to 22.8 % in the non-drive-thru group. In contrast, pharmacists working in pharmacies without drive-thru services were more experienced, with 39.2 % having over five years of experience. A substantial difference was also observed in nationality, with 72.8 % of Saudi pharmacists working in pharmacies offering drive-thru services as compared to 27.2 % of non-Saudi pharmacists. This implies that those pharmacists work in newly opened community pharmacies equipped with drive-thru services and run mainly by recently employed Saudi pharmacists. This hypothesis agreed with the findings of a study that showed renationalization initiatives increased the overall proportion of Saudi pharmacists to 39 % in 2021, compared to 22 % in 2016 (Almaghaslah, 2023).

In this study, community pharmacists generally recognized several advantages of drive-thru services, including speeding up prescription processing (42 %), improving accessibility (72 %), offering convenience



**Fig. 1.** A) Pharmacists' perception of the advantages of drive-thru services in community pharmacies. B) pharmacists' perception of the disadvantages of drive thru services in community pharmacies.

to vulnerable populations (72 %), and providing adequate privacy (56 %). Similar results about offering convenience to vulnerable populations and improving accessibility were revealed from a study that was done on Jordanian community pharmacists; most of them perceived that drive-thru provided a valuable service by allowing them to serve sick patients, elderly, disabled people, or women with their children in the car (Farha et al., 2017). A similar perceived conclusion was also observed in another study conducted on community pharmacists in the United States (Lee and Larson, 1999). Another perceived advantage that we observed was reducing parking problems when implementing drive-thru service.

Several studies that were conducted in the United States indicated similar perceived advantages of improving accessibility and reducing parking problems (Farha et al., 2017; Holt, 1992; Lee and Larson, 1999). Further, another study conducted in the United States aligned with our findings that pharmacists have a positive perception of drive-thru services, which may provide adequate privacy (Chui et al., 2009). The researchers revealed that drive-thru window encounters were more likely to involve at least one "more confidential" prescription compared with walk-in window encounters (Chui et al., 2009).

In contrast, in this study, we also identified significant potential

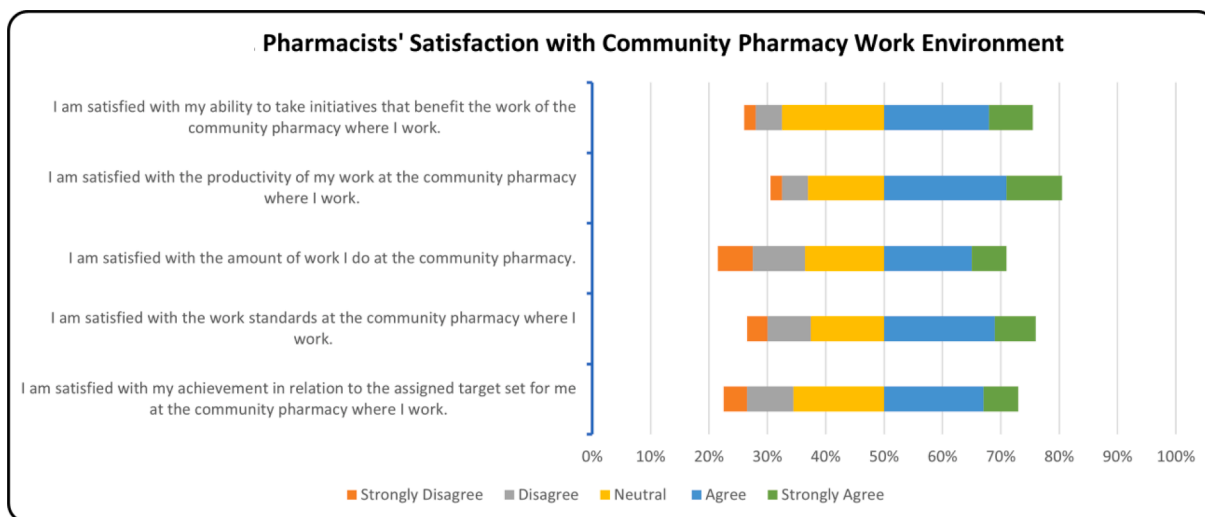


Fig. 2. Pharmacists' satisfaction with community pharmacy work environment.

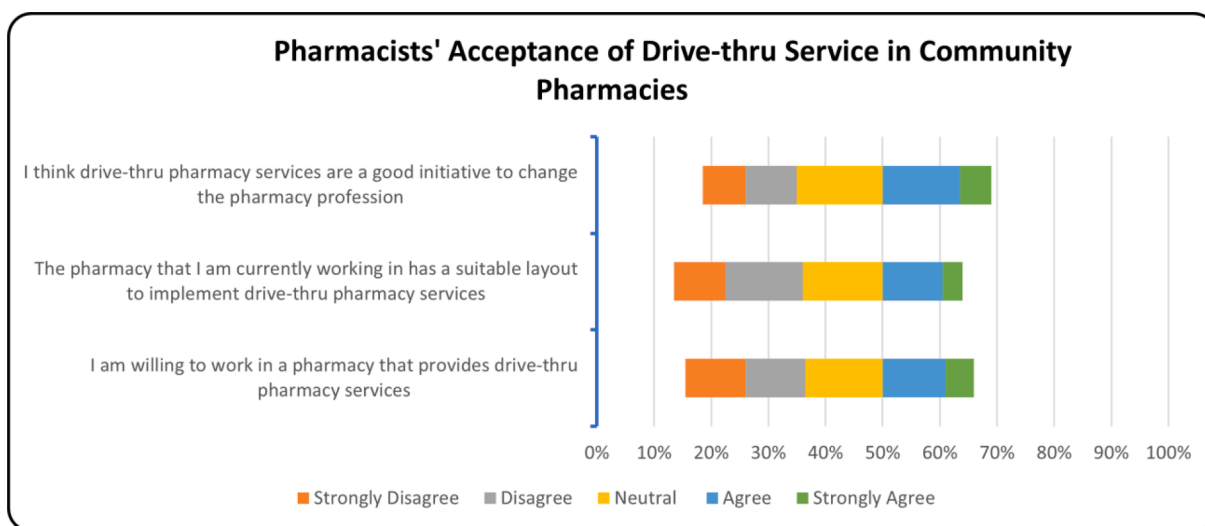


Fig. 3. Pharmacists' acceptance of drive-through service in community pharmacies.

Table 2  
Correlation Analysis Results.

	Negative Perception	Positive Perception	Satisfaction	Acceptance
Negative Perception	1.000	-0.38056	-0.14708	-0.48504
Positive Perception	-0.38056	1.000	0.15905	0.45285
Satisfaction	-0.14708	0.15905	1.000	0.27497
Acceptance	-0.48504	0.45285	0.27497	1.000

Note: \*p < 0.05, \*\*p < 0.01.

negative perceptions, including challenges in communication (62 %), impact on the professional image (71 %), dispensing errors due to fast service (53 %), and difficulty in counseling (62 %). Our findings about the negative perceptions are consistent with previous research, which found that pharmacists interacted with patients for most of the total encounters at walk-in counseling areas. In contrast, they spent only a small proportion of total encounter time with patients at drive-thru counseling areas (Chui et al., 2009; Farha et al., 2017; Odukoya et al., 2014), This could result in a lower quality of care provided to patients at

a drive-thru counseling area that could lead to increase the rate of medication error. Future research should confirm this finding in a larger, more generalizable study. The current implementation of drive-thru services in our community pharmacy study led to challenges in building communication with patients. These concerns are validated by studies that have found that pharmacy personnel provided more time and information at walk-in counseling areas than in drive-through areas, and patients who used the drive-through received less information during counseling (Chui et al., 2009; Odukoya et al., 2014). Patients were acknowledged more frequently when they came to the walk-in window and accepted counseling more often when offered (Chui et al., 2009). These findings support the hypothesis that pharmacists might perceive the drive-thru counseling area to be an inefficient means of providing adequate patient counseling. This has important implications, as patients who use the drive-thru may be less likely to receive proper counseling from the pharmacist.

Despite the perceived benefits, only 32 % of pharmacists were open to working in a pharmacy with drive-thru services, with 42 % opposing the idea. Opinions were mixed regarding viewing drive-thru pharmacy services as a positive initiative, with 38 % in agreement and 33 % in disagreement. This aligns with other research findings, where most pharmacists in Jordan are aware of drive-thru pharmacy service, but

**Table 3**  
Comparison of Community Pharmacists' Perceptions with and without Drive-thru Service.

	Drive-thru Service	No Drive-thru Service	t-value	p-value
<b>Negative Perception</b>				
Item 1: Drive-thru hinders patient interaction.	3.67 (1.18)	3.67 (1.09)	0.01	0.99
Item 2: Impacts pharmacy image negatively.	3.41 (1.22)	3.29 (1.21)	0.86	0.39
Item 3: Feels fast-food, not pharmacy.	3.67 (1.19)	3.54 (1.26)	1.01	0.32
Item 4: Speed may lead errors.	3.30 (1.11)	3.52 (1.09)	-1.89	0.06
Item 5: Errors in staff communication.	3.32 (1.12)	3.47 (1.02)	-1.31	0.19
Item 6: Inadequate counseling convenience.	3.49 (1.15)	3.80 (1.05)	-2.6	< 0.01**
Item 7: Checks for medication accuracy reduced.	3.44 (1.11)	3.71 (1.01)	-2.37	< 0.05*
Item 8: Split attention, dual service.	3.50 (0.96)	3.65 (0.91)	-1.49	0.137
Item 9: Strain from workload, demand.	3.66 (1.03)	3.49 (1.07)	1.5	0.134
Item 10: Delays due to distractions.	3.46 (1.00)	3.60 (0.95)	-1.29	0.199
Item 11: Respect diminishes at drive-thru.	3.48 (1.20)	3.56 (1.23)	-0.63	0.526
Item 12: Health risks from pollution.	3.15 (1.34)	3.58 (1.10)	-3.32	< 0.01**
<i>Total Negative Perception Score</i>	3.46 (0.67)	3.57 (0.70)	-1.47	0.14
<b>Positive Perception</b>				
Item 1: Faster prescription processing.	3.10 (1.17)	3.18 (1.25)	-0.66	0.51
Item 2: Swift non-prescription service.	3.16 (1.20)	3.22 (1.36)	-0.42	0.68
Item 3: Eases parking issues.	3.83 (1.14)	3.83 (1.18)	0.01	0.99
Item 4: Quieter pharmacy environment.	3.60 (1.17)	3.73 (1.15)	-1.03	0.31
Item 5: Aid for vulnerable customers.	3.71 (1.17)	4.04 (1.08)	-2.7	< 0.01**
Item 6: Private patient interactions.	3.56 (1.24)	3.61 (1.21)	-0.42	0.68
<i>Total Positive Perception Score</i>	3.49 (0.74)	3.60 (0.83)	-1.26	0.21

\*p < 0.05, \*\*p < 0.01.

**Note:** Values are presented as item means, and the overall mean (standard deviation) is reported for each variable.

only 27.9 % are willing to register with this service (Farha et al., 2017). Pharmacists' perceptions of the profession's barriers and underestimation by clients and physicians may also contribute to the reluctance observed in our study (Rosenthal et al., 2011). Interestingly, comparing pharmacists with and without drive-thru services revealed no significant differences in their perceptions of the advantages and disadvantages. However, those without drive-thru services demonstrated significantly lower acceptance levels, particularly concerning the suitability of their current pharmacy layout for implementing drive-thru services. A notable contrast arose in how pharmacists perceive the current potential of drive-thru pharmacy services as a beneficial initiative to reshape the pharmacy profession. One possible reason for not accepting the current practice is the malpractice due to the excessive number of community pharmacies that are owned by non-pharmacists, which puts more pressure on commercial competition rather than patient care (Abdulrahman S et al., 2016).

The study further explored pharmacists' satisfaction with their work environment. Pharmacists generally expressed satisfaction with their level of achievement (46 %), work standards (52 %), workload (42 %), productivity (61 %), and ability to take initiative (51 %). However, areas that require attention to enhance job satisfaction and performance were

**Table 4**  
Comparison of Community Pharmacists' Acceptance and Satisfaction with and without Drive-thru Service.

	Drive-thru Service	No Drive-thru Service	t-value	p-value
<b>Acceptance</b>				
Item 1: Open to drive-thru role.	2.74 (1.29)	2.82 (1.25)	-0.58	0.57
Item 2: Layout fits drive-thru.	3.13 (1.14)	2.49 (1.14)	5.1	< 0.01**
Item 3: Positive change for pharmacy.	3.27 (1.19)	2.86 (1.21)	3.15	< 0.01**
<i>Total Acceptance Score</i>	3.05 (0.98)	2.73 (0.97)	3.04	< 0.01**
<b>Satisfaction</b>				
Item 1: Satisfied with goal attainment.	3.14 (1.09)	3.33 (1.10)	-1.58	0.11
Item 2: Satisfied with work quality.	3.36 (1.05)	3.38 (1.15)	-0.17	0.87
Item 3: Satisfied with workload.	3.22 (1.30)	3.07 (1.16)	1.13	0.26
Item 4: Satisfied with work output.	3.62 (1.02)	3.64 (1.03)	-0.14	0.89
Item 5: Satisfied with beneficial initiatives.	3.46 (1.04)	3.49 (0.99)	-0.31	0.76
<i>Total Satisfaction Score</i>	3.36 (0.80)	3.38 (0.84)	-0.24	0.81

\*p < 0.05, \*\*p < 0.01.

**Note:** Values are presented as item means, and the overall mean (standard deviation) is reported for each variable.

identified, emphasizing the need for continuous evaluation and improvement within the community pharmacy environment. The study's exploration of pharmacists' satisfaction with their work environment resonates with concerns about high business running costs and the emotional exhaustion experienced by pharmacists (Abdulrahman S et al., 2016; Padilla and Faller, 2022). These factors could be addressed through targeted interventions to enhance job satisfaction and performance.

In order to enhance the efficacy and safety of drive-thru pharmacy services in Saudi Arabia, it is imperative to consider a series of structural and operational adjustments. First and foremost, standardization of drive-thru services should be prioritized, with a focus on optimizing the layout for the efficient dispensing of medications and counseling of patients. Drawing inspiration from successful practices in the United States, the Saudi Arabian drive-thru pharmacies should adopt a layout characterized by the installation of a glass barrier, serving as a protective shield for pharmacists, as more than half of participating pharmacists felt the negative effect on their health by exposure to air dust and car pollution. This finding is also consistent with another study (Farha et al., 2017). Incorporating a high-quality microphone (like a phone) system is also essential to facilitate clear and effective communication between pharmacists and patients while keeping the information private.

Furthermore, it is essential to recognize that attempting to make all products available via the drive-thru could be disadvantageous. Drive-thru pharmacies in Saudi Arabia may face limitations in terms of space and storage capacity. Thus, a strategic selection of essential OTC and prescribed medications should be prioritized rather than striving to offer every product. To address this limitation, measures should be taken to ensure that patients are promptly informed about the availability of specific medications and advised on suitable alternatives when necessary. This aspect is crucial for many reasons, including preventing potential damage to the pharmacy profession's image, as indicated by our study (57 %), where the current malpractice is likened to fast-food service rather than professional pharmacy care. This approach can also mitigate distractions for pharmacists by prioritizing prescription medication dispensing, as noted by participating pharmacists (55 %). Moreover, retaining a separate drive-thru window for refilling and dispensing prescription medication from essential OTC drugs or

cosmetics can be advantageous. This approach helps streamline the service, reducing wait times and enhancing patient convenience. By maintaining a designated window for prescription pickups, pharmacies can efficiently manage the flow of traffic and ensure that patients receive their essential medications without delays. It also allows pharmacists to provide focused attention to prescription-related inquiries, improving overall service quality.

While this study offers valuable insights into optimizing drive-thru pharmacy services, it is essential to acknowledge its limitations. Firstly, the survey-based design employed in this research may introduce inherent bias, as respondents may provide subjective responses influenced by their personal experiences and perceptions. This could potentially affect the generalizability of the findings and introduce some degree of subjectivity into the analysis. The sample selection process was not completely randomized, which could introduce sampling bias. The non-randomized sampling method may lead to the overrepresentation or underrepresentation of certain groups or perspectives within the study population, potentially limiting the study's ability to provide a comprehensive view of the subject matter. It is crucial to note that survey-based research inherently lacks depth of information. They may not fully explore the nuances, motivations, or contextual factors that underlie the subjects being studied. However, it is worth noting that this study also possesses several strengths. Despite the potential bias associated with the survey-based design, it allowed for the collection of valuable real-world data directly from individuals who have experienced drive-thru pharmacy services. The inclusion of these diverse perspectives provides a nuanced understanding of the topic and offers practical insights that can inform future improvements in drive-thru pharmacy practices. Additionally, the non-randomized sample, while a limitation, may reflect the actual community pharmacist population working in drive-thru pharmacies more accurately, thereby enhancing the study's external validity and relevance to real-world scenarios.

## 5. Conclusions

Overall, these findings shed light on the complex factors influencing community pharmacists' perception, acceptance, and satisfaction with drive-thru services, providing valuable insights for policymakers, educators, and practitioners in the field. Drive-thru services offer advantages like speeding up prescription processing and enhancing accessibility but also pose challenges in communication and professional image that might eventually jeopardize patients' quality of service. While acceptance of drive-thru services is mixed, it is essential to address concerns and consider structural improvements. Standardization, strategic product selection, and separate prescription pickup windows can optimize drive-thru pharmacy care in Saudi Arabia.

## Ethical considerations

The Institutional Review Board of Imam Abdulrahman Bin Faisal

University approved this study (IRB-UGS-2022-05-540). We obtained informed consent from all participants at the beginning of the questionnaire. In the informed consent, participants were informed about the purpose of the study. Participants were also informed that their responses would be kept anonymous.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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