

## Research Article

# Comparison of the Knowledge and Practices in Medicine Dispensing between Retail Medicine Shops and Model Pharmacies in Dhaka Metropolis

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Model pharmacy has been adopted recently to upgrade the healthcare delivery system in Bangladesh. This study was aimed to analyze and compare the effectiveness of drug dispensing patterns, practices, and knowledge of both clients and dispensers of model pharmacies over traditional retail medicine shops. Two established methods, namely, client simulated method (CSM) and provider interview method (PIM), were employed to determine the practice differences in 90 retail medicine shops and 90 model pharmacies in and around Dhaka city. The results are represented primarily in comparison with corresponding percentages. The survey results did not fully support the findings obtained from the observations of the CSM as PIM contrasted these to some extent, and the differences are statistically significant ( $p < 0.0001$ ). According to CSM, the presence of A-grade pharmacists during working hours in retail medicine shops was 0%, and 63% in model pharmacies. As reported by PIM, in the retail medicine shops, 36% of clients were ignorant of visiting doctors before purchasing medicine. On the other hand, only 18% of clients could visit doctors. As per CSM, 40% of clients did not follow doctors' recommendations for completion of the full dose of antibiotics bought from retail medicine shops and 51% did not finish full antibiotic courses collected from model pharmacies. Additionally, CSM revealed that 28% of the clients administered leftover drugs following old and obsolete prescriptions of retail medicine shops and 21% of clients followed the same practices in terms of model pharmacies. The report of CSM revealed that 95% of dispensers of retail medicine shops sold medicine without prescription except over-the-counter (OTC), and in the model pharmacies, the percentage was 77%. The qualitative findings revealed substandard practices and dispensing pattern too. Model pharmacies were established to prevent aberrant medicine dispensing patterns and ensure proper medication dispensing practices and medicine intake. This research could not verify the situation that pharmacists or owners of model pharmacies were fully abiding by the guidelines set for them by the Directorate General of Drug Administration (DGDA).

## 1. Introduction

In Bangladesh, retail medicine shops are specifically licensed outlets in the marketplaces run by regular shopkeepers. Few pharmacists have short training (either A-, B-, or C-grade pharmacist) and from where the clients purchase medicines as and when required. Retail medicine shop or retail pharmacy practice has been characterized as an incomplete or marginal profession by sociologists, and some of its tasks are done through proper judgment and expertise, but others are merely routine and repetitive tasks [1]. To ensure and materialize an effective healthcare system, pharmacists need to be available all the time with their expert opinions on medicines and need to provide basic primary health care (PHC). Hence, deploying the need to set up model medicine shops and pharmacies is essential. Model pharmacies can be defined as developing shops to ensure safe medication dispensing and patient care [2]. As per the guideline by DGDA, model pharmacy (level I) is a level of service that will be provided by an 'A'-grade registered pharmacist (having Bachelor of Pharmacy and Master of Pharmacy Degree with a valid registration number) who will remain present on the premises 24/7 days. 'B' (having a Diploma in Pharmacy) or 'C' (having completion of certificate course and known as professional dispenser) grade pharmacist personnel may assist with dispensing under the supervision of the "A"-grade pharmacist. Model medicine shops (level II) provide a level of service carried out by a person having a "C"-grade qualification at a minimum. The staff of model pharmacies must have appropriate skills, qualifications, and competencies and assume liabilities for their tasks as the pharmacist-in-charge. All "A-," "B-," and "C"-grade pharmaceutical personnel working in the model pharmacies must undergo a Pharmacy Council Bangladesh- (PCB-) approved 30-hour orientation (for "A" and "B" grade) or 80 hour dispensing training course ("C" grade) and pass the related examination. The C-grade pharmacist in the retail medicine shops, widely known as salesperson or dispenser, must have 12-week short training to avail a certificate. This certificate course is jointly conducted by the Bangladesh Chemist and Druggist Samity (BCDS) and Bangladesh Pharmaceutical Society (BPS). According to the guideline, the presence of an "A"-grade pharmacist registered by the PCB is a must to keep the business and service open [3]. All these criteria are to ensure rational use of medicines, but unfortunately, the practice is not maintained correctly as per the guideline.

In Bangladesh, unsafe use of medication, purchasing medication without a prescription or not following the prescription, random use of antibiotics, and the hazardously high proportion of antibiotic resistance are essential issues in the healthcare sector that are not appropriately focused [4–7]. DGDA, Bangladesh, as the sole regulatory body for regulating pharmaceutical industries, is yet to successfully grasping control of the predicament [8]. Emphasized these crises, The National Drug Policy, 2016, has been promulgated by the Government of Bangladesh to ensure rational and harmless use of quality drugs with good dispensing patterns and at an affordable price. The awareness for

establishing model pharmacies was generated following this policy [9, 10]. A Tanzania-based "Accredited Drug Dispensing Outlet" model worked as an information source for it. Duka La Dawabaridi (DLDB), a licensed outlet for essential medicines in Tanzania, was found to possess certain limitations in their quality of treatment, scarce storage of drugs, inexpert staff, inadequate management, and enforcement after evaluation in 2001. As a solution to these problems, Management Sciences for Health, an NGO, and advisory organization of the UK, began working with the Government of Tanzania. They ensured quality medicines and pharmaceutical services at affordable prices [11]. The history behind the establishment of model pharmacies in Bangladesh resembles that of Tanzania. This Tanzania-based Bangladesh model was established with an aim to ensure a drug-selling platform linked to primary health care and a community-level platform associated with effective public health programs. The Accredited Drug Dispensing Outlet (ADDO) model shops were supposed to make sure essential PHC services like knowing first aid for snake biting, drowning, dressing burns and wounds, temperature, blood pressure, and body weight measurement, examining urine sugar, providing DOTS services, and offering health promotion and education [12].

The World Health Organization (WHO) defines rational use of medicine as "when patients receive medications appropriate to their clinical needs, in doses that meet their requirements, for an adequate time, and at affordable prices" [13–15]. According to WHO, the dispensing process should have six steps that must be maintained by the pharmacies and to be ensured by the pharmacists [16]. The legal and regulatory framework for community pharmacies in the WHO European Region is to maintain strictly [17]. In several countries, the quality of drugs and inappropriate use of antibiotics is a growing concern [18]. From a public health viewpoint, this situation needs special attention because due to these malpractices mass population becomes more vulnerable to excess healthcare cost, adverse drug reaction, allergic reactions, toxic poisoning, exacerbation or prolongation of critical illness, antibiotic resistance, and most importantly, ineffective and unsafe treatment [19, 20]. In Bangladesh, the physicians-to-population ratio were 1 : 3600 in 2011 [21]. This critical scarcity of registered physicians creates a communication gap between physicians and patients. Therefore, it scopes for pharmacies to act as a primary intermediary to provide essential solutions to health-related problems.

Moreover, buying any medicines without prescriptions is a common and open secret practice in Bangladesh but not confessed by pharmacy owners. Due to aggressive marketing strategies of pharmaceutical companies [22], the salesperson and dispensers are falling easy prey to this insistent marketing that leads to illegal overprescribing, unnecessary and expensive drug prescribing, dispensing drugs without prescription, overusing antibiotics, and injection dispensing [23–25]. In developing countries like Bangladesh, people depend heavily on pharmacies due to practicality, shorter waiting time, cost reduction, availability of credit, and flexible opening hours [26, 27]. Hence, this study was carried

out to assess the effectiveness of newly inaugurated model pharmacies over retail medicines shops in aspects of improving dispensing practices, patterns, and knowledge of both dispensers and clients.

## 2. Methodology

**2.1. Study Method.** This study was a facility-based (medicine shop-based) cross-sectional pilot study employing a random sampling technique for exploring and comparing existing practice, knowledge, and dispensing patterns of retail medicine shops and model pharmacies.

**2.2. Study Site.** There are around 4,447 licensed retail medicine shops and 193 model pharmacies around Dhaka district as per the most recent data of DGDA, Bangladesh [10]. From May 2018 to November 2018, data on dispensing practices and patient's knowledge regarding buying of medicine were randomly collected from the salespeople/dispensers ("A-," "B-," and "C"-grade pharmacists/chemists/owners/managers) and clients (patients/customers/purchasers) of 90 retail medicine shops and 90 model pharmacies within the sampling frame of the study.

**2.3. Study Participants.** A random sampling technique was employed. At least one dispenser/salesperson (chemist/owners/managers/"A-," "B-," and "C"-grade pharmacist) and one client (patient/purchaser/respondent) from each pharmacy were covered in the study. Of the population size of 90 pharmacies, 25 samples had been discarded because of a lack of full and correct information. Finally, the study was progressed corresponding to 65 samples about dispensers (chemists/owners of the retail medicine shops/managers/"A-," "B-," and "C"-grade pharmacists).

**2.4. Questionnaire Design and Data Collection.** Three methods were used to elicit pertinent data using appropriate questionnaire sets. Those are (i) for quantitative data accumulation, structured close-ended questionnaires were designed, (ii) for qualitative data accumulation, semi-structured open-ended questionnaires was designed, (iii) Key Informant Interview (KII) and structured observation were taken as a part of the qualitative exploration for eliciting data about knowledge, perception, and practices of the clients and salesperson of both types of medicine dispensing facilities. Key informant interviews were taken with the respondents who participated in the provider interview method (PIM).

**2.5. Method Implementation.** Two different methods were employed for data collection: one is a client simulation method [28] and another is the provider interview method [29].

**2.5.1. Client Simulation Method (CSM).** Two undergraduate students (both female) were recruited to act as simulated clients and were trained for 30 days, and trial data collection

was conducted for another 30 days. They pretended in such a way that they were engaged in simple talks with the clients who came to buy medicine next to her. To reduce the Hawthorne effect, rapport was built with the customer. After building rapport with that customer, they acted as disguised clients. They bought antibiotics, sedatives, and sex-stimulating drugs without prescriptions from both the retail medicine shops and model pharmacies, and the medicines were discarded later safely. They also observe the role of pharmacists, dispensers, managers, owners, and the pharmacy personnel are unaware and blinded to the client's research agenda. Therefore, information accumulated by this method is considered precisely reflecting typical performance. This will remove any biases induced by any intervention methods. This method provides high quality of data generation by accurate observations.

In this study, the trained two simulated clients presented in the pharmacies either were asking for some prescription medicine (such as sedatives, antibiotics, cardiovascular drugs, and sex stimulants) without showing prescriptions and seeking various advice from dispensers from each pharmacy (Table 1). For this purpose, a scenario was developed realistically as much as possible using the Bengali language. Later, the scripts were translated into English (1). The simulated clients were instructed to record the whole encounter in a standardized and pretested observation within 20 minutes from leaving the pharmacy. Two simulated clients were used to accumulate all observational data and avoid the biases which are likely to arise in the data collection process. Simulated clients were instructed to buy a small number of prescribed medicines from both retail and model pharmacies and later discarded them safely. A similar session was conducted with one customer who came to the pharmacy to buy medicine for him or his family members.

**2.5.2. Provider Interview Method (PIM).** The provider interview method was applied to the same retail medicine shops and model pharmacies after five days. In this method, the interviewers collected data from clients (different) and dispensers (same) as researchers. They made the participants fill out the structured and semistructured questionnaires following KII and the structured observations method. Separate questionnaires were prepared for the dispensers, and clients came to buy medicines.

**2.6. Statistical Analysis.** All the data had been compiled and analyzed for comparison using total numbers and percentages. GraphPad Prism (version 4.0) computer program (GraphPad Software, San Diego, CA, USA) was used for *t*-test assuming sampling from a Gaussian population. Two-tailed *p* value was recommended for determining significance after the comparison of two sets of data. Results were significant when *p* values were less than 0.0001 ( $p < 0.0001$ ).

**2.7. Consent of Participants.** Oral consent was taken from all participants who participated in this study except the respondent of client simulation methods (CSM) (Table 6).

TABLE 1: Scenarios of medicine dispensing pattern presented by two simulated clients both in retail medicine shops and model pharmacies.

Scenario: buying various prescription medicines without prescription by the 1st simulated client
The 1st simulated client was a 21 year-old unmarried female buying medicine for his father for various complications. The medications include antibiotics, cardiovascular drugs, sex stimulants, and psychotic drugs. She speaks Bengali and follows the following scripts.
(Start) I would like to buy these medicines for my father
Then, she presented a written paper with all medicine names in a small amount. The paper is not a prescription; the client waited for dispensers' responses and expecting answers to some questions that provide information which are shown in Tables 2–5
Then, the simulated client was waiting for further response from the dispenser to collect all medicines and observed the dispensing pattern of other pharmacists selling drugs with or without prescriptions. She also asked the dispenser about dosage regimen, storage conditions, and ingestion criteria of medicines (described in Tables 2–5)
Afterward, the 2nd simulated client started observing how pharmacists provide information on selling medicines to other customers who came to buy drugs
(Start) Excuse me; I have come here to buy some medicine for my father; probably you too came here to buy some medication; which drug are you going to buy?
After getting a response from a nearby customer, the 2nd simulation client tried to collect her desired information from customers. She also observed whether the customers were seeking a pharmacist for advice regarding health complications, and an "A"-grade pharmacist was present in the pharmacy at that time
Both 1st and 2nd simulated clients asked some questions which are described separately in Tables 2–5. Those questions are preassigned

TABLE 2: Grades of pharmacists present in the pharmacies.

Categories of dispensers/ Pharmacist	Provider interview method		Client simulation method	
	Retail medicine shop (n = 65)	Model pharmacy (n = 65)	Retail medicine shop (n = 65)	Model pharmacy (n = 65)
A grade (graduate)	A = 7 (10.77%)	A = 45 (69.23%)	A = 0 (0%)	A = 41 (63%)
B grade (diploma)	B = 5 (7.69%)	B = 9 (13.85%)	B = 6 (9%)	B = 3 (5%)
C grade (certificate)	C = 53 (81.54%)	C = 11 (16.92%)	C = 59 (91%)	C = 21 (32%)

TABLE 3: Knowledge- and practice-based output from dispensers (A-, B-, and C-grade pharmacists/chemists/owner or manager/salespeople) from retail medicine shops and model pharmacies.

Observations	Provider interview method			Client simulation method		
	Retail medicine Shop (n = 65)	Model pharmacy (n = 65)	Two-tailed p value	Retail medicine Shop (n = 65)	Model pharmacy (n = 65)	Two-tailed p value
(1) Pharmacists/chemists knowing the difference between OTC drug and prescription drug	56 (86.2%)	65 (100%)	0.0021	35 (53.8%)	57 (87.7%)	<0.0001
(2) Pharmacists/chemists informed customers about storage condition of medicine	64 (98.5%)	65 (100%)	0.3211	41 (63.1%)	64 (98.5%)	<0.0001
(3) Pharmacists/chemists informing patient about the administration of medicine	57 (87.7%)	65 (100%)	0.0039	15 (23.1%)	45 (69.2%)	<0.0001
(4) Pharmacists or chemists informing customers about the side effects of drugs	57 (87.7%)	64 (98.5%)	0.0071	14(21.5%)	64 (98.5%)	<0.0001
(5) Pharmacists or chemists informing patient about the toxic effects	48 (73.8%)	62 (95.4%)	<0.0001	08 (12.3%)	21 (32.3%)	0.0002
(6) Pharmacist or chemists selling drugs (except OTC drug) without prescription	24 (36.9%)	07 (10.8%)	<0.0001	62 (95.4%)	50 (76.9%)	0.0003

Output from pharmacists and chemists from local and model pharmacies (n = 65). 1–6 denotes the serial number of the observations.

TABLE 4: Knowledge- and practice-based output from customers/clients from local and model pharmacies.

Observations	Provider interview method			Client simulation method		
	Retail medicine shop (n = 90)	Model pharmacy (n = 90)	Two-tailed p value	Retail medicine Shop(n = 90)	Model pharmacy (n = 90)	Two-tailed p value
(1) Customers having idea about model pharmacy and local pharmacy	1 (1.54%)	31 (47.68%)	<0.0001	4 (3.33%)	9 (10.00%)	0.0245
(2) Customers brought medicine for themselves or others	32 (49.23%)	28 (43.08%)	0.0246	40 (44.44%)	30 (33.33%)	0.0012
(3) Customers intake medicine according to doctor advice	58 (64.44%)	68 (75.56%)	0.0012	16 (17.78%)	33 (36.67%)	<0.0001
(4) Customers kept medicine away from children	82 (91.11%)	90 (100%)	0.0041	59 (65.56%)	89 (98.89%)	<0.0001
(5) Customers maintaining the storage condition	64 (71.11%)	78 (86.67%)	0.0001	44 (48.89%)	51 (56.67%)	0.0074
(6) Customers bought antibiotics and sedatives without prescription	17 (18.89%)	11 (12.22%)	0.0135	57 (63.33%)	49 (54.44%)	0.0041
(7) Customers completed the full course of antibiotics	81 (90%)	87 (96.67%)	0.0135	54 (60%)	44 (48.89%)	0.0012
(8) Customers know the difference between OTC and prescriptions drug	20 (22.22%)	25 (27.78%)	0.0245	31 (34.44%)	31 (34.44%)	—

Output from customers/patients from local and model pharmacies (n = 95). 1–8 denotes the serial number of the observations.

TABLE 5: Underlying reasons for selling and buying medicines without a prescription.

Reason for selling drugs without a prescription by dispensers (pharmacists/chemists/owner)	Provider interview method		Client simulation method	
	Retail medicine shop (n = 24)	Model pharmacy (n = 7)	Retail medicine shop (n = 62)	Model pharmacy (n = 50)
For basic need	10 (41.7%)	3 (42.9%)	32 (51.6%)	0 (0%)
Negligence of legislation	2 (8.3%)	0 (0%)	2 (3.2%)	0 (0%)
For financial purpose	5 (20.8%)	2 (28.6%)	7 (11.3%)	0 (0%)
Above all	7 (29.2%)	2 (28.6%)	21 (33.9%)	50 (100%)
<i>Ways of taking medicine by clients without doctor's advice</i>	<b>(n = 32)</b>	<b>(n = 22)</b>	<b>(n = 74)</b>	<b>(n = 57)</b>
Own opinion	18 (20%)	8 (8.89%)	23 (25.56%)	2 (2.22%)
Previous prescription	1 (1.11%)	2 (2.22%)	25 (27.78%)	19 (21.11%)
Pharmacists or chemist or medicine retailers' suggestions	13 (14.44%)	12 (13.33%)	26 (28.89%)	36 (40%)
<i>Factors influencing clients' reason of taking medication without doctor's suggestion</i>	<b>(n = 32)</b>	<b>(n = 22)</b>	<b>(n = 74)</b>	<b>(n = 57)</b>
Financial reason	6 (6.67%)	03 (3.33%)	15 (16.67%)	20 (22.22%)
Neglect hazards	14 (15.56%)	13 (14.44%)	12 (13.33%)	15 (16.67%)
Old prescription	9 (10%)	05 (5.56%)	29 (32.22%)	19 (21.11%)
All of the above	3 (3.33%)	01 (1.11%)	18 (20%)	03 (3.33%)

2.8. Inclusion and Exclusion Criteria.

3. Results

3.1. Quantitative Findings. Clients and dispensers filled up structured close-ended questionnaires in both retail medicine shops and model pharmacies that helped gather quantitative findings.

This survey was focused on comparing different factors such as the demographic characteristics of the clients and the dispensers (pharmacists), prescription pattern, quality of

health care provided, patient's safety, retailer's knowledge, clients' satisfaction, and dispensing practice in both retail medicine shop and model pharmacy. Table 7 revealed demographic features such as gender, age, educational and financial status, marital status of dispensers (pharmacists/chemists, n = 65), and customers (n = 90) obtained by the provider interview method. No demographic data were collected for client simulation methods. In the retail medicine shops, 100% of retailers were male, whereas only 6% were female pharmacists in model pharmacies. To assess the educational qualification, it was observed that 49% of clients

TABLE 6: Inclusion and exclusion criteria for the selection of the participants.

Inclusion Criteria	Exclusion Criteria
Adults $\geq 18$ years of age	Participants having mental disability
All participants regardless of sex, socioeconomic status, and education	Participants who are too sick and came to pharmacies for health care services
Ethnicity	Owners of pharmacies who did not have any A-/B-/C-grade pharmacist certification/owners of pharmacies having no health care education

in the model pharmacy were graduates, whereas in the retail medicine shop, the percentage is 21. Surprisingly, clients (96%) who came to the model pharmacies had almost no clear concept about the services of model pharmacy. It was observed that the highest percentage (33% and 50%, respectively) of middle-middle class customers went to both retail medicine shops and model pharmacies (Table 7).

According to these study findings (Table 2) on the report of CSM, there was no A-grade pharmacist in the retail medicine shops, except 9% B-grade and 91% C-grade pharmacists were present there. But in model pharmacies, 63% A-grade, 5% B-grade, and 32% C-grade pharmacists were present. Observation stated by PIM that 81% of dispensers in retail medicine shops were C-grade pharmacists, and in model pharmacies, 69% of pharmacists were A-grade pharmacists. Among 130 dispensers (A-, B-, and C-grade pharmacists/chemists/owners/managers) from both retail medicine shops and model pharmacies (Table 3), 86% of dispensers of retail medicine shop and 100% dispenser (A-, B-, and C-grade pharmacist/chemist) of model pharmacy knew about the difference between OTC drug and prescription drug as per PIM, whereas in actual 54% of dispensers of retail medicine shops and 88% of model pharmacists knew about the difference according to CSM ( $p < 0.0001$ ). 88% dispenser (retailer/salespeople) of retail medicine shop and 100% dispenser (A-, B-, and C-grade pharmacist/chemist) of model pharmacy reported that they informed clients about the mode of medicine administration during data collection by PIM. But the actual percentage was only 23% in retail medicine shops, and 69% in model pharmacy advised clients about the administration of medicine as observed by CSM ( $p < 0.0001$ ). It was also observed that merely 21% of dispensers in retail medicine shops informed clients about side effects.

In contrast, according to the provider interview method, 88% of dispensers claimed that they told the customers about the side effects of the drug (Table 3). Surprisingly, only 12% of dispensers in retail medicine shops and 32% of dispensers in model pharmacies informed customers about the toxic effect of drugs, according to CSM. Yet, the actual percentage is much higher (74% and 94%, respectively) according to PIM. On the other hand, 11% of dispensers in model pharmacies and 37% of dispensers in retail medicine shops confessed that they sold medicines informing customers of the side effects of drugs (except OTC), according to PIM. But, astonishingly, 95% of salespersons in retail medicine shops and 77% in model pharmacies sold drugs (except OTC) without prescription (Table 3).

Customers were asked whether they had any idea about the functions of model pharmacies and retail medicine shops; According to PIM, nearly 2% of retail medicine

shops and 48% of the customer of models' pharmacies claimed that they had an idea about them. According to CSM, the percentage is 3 and 10 in retail medicine shops and model pharmacies, respectively (Table 4). According to PIM, customers of retail medicine shops and model pharmacies said that 64% and 76% went to intake medicine after consultation with a doctor on average. But in CSM, the percentage was changed dramatically as only 18% of retail medicine shops and 37% of the customer of model pharmacies went to intake medicine after consultation with a doctor ( $p < 0.0001$ ). According to CSM, only 49% and 57% of customers came to retail medicine shops and model pharmacies, respectively, which had good storage facilities. According to CSM, 63% of customers in retail medicine shops bought antibiotics and sedatives without prescription, and only 60% completed the entire course of antibiotics or any other prescription medicines. Still, in model pharmacies and retail medicine shops, 54% and 49% generally did these aberrant practices, respectively. According to PIM, 22% of the retail medicine shops and 28% of customers of model pharmacies know the differences between OTC and prescription medicine. An observation pointed out by CSM in both categories of pharmacy revealing that only 34% of customers knew the differences (Table 4).

Table 5 was designed based on finding that 24 out of 65 dispensers in retail medicine shops traded prescription medicines without a prescription, according to PIM. In contrast, in the case of model pharmacies, only seven dispensers did the practices. On the flip side, 62 out of 65 in retail medicine shops and 50 out of 65 dispensers in model pharmacies barter previous prescription medicine without any new prescription, according to CSM. Hinge on this fact, Table 5 was formulated to determine the underlying reasons for trading previous prescription medicines without a new prescription by the dispensers/retailers/salespersons. Additionally, an attempt was made to find the factors influencing customers to go for this intake medicine and ways of intake and purchasing medication without doctor's advice. In PIM, 42% of dispenser/salesperson of the retail medicine shop and 43% of model pharmacy said that they sold drugs without a prescription to meet patients' basic needs. In CSM, 52% of dispenser/salesperson of retail medicine shops said that they sold drugs without prescription for meeting on-demand instant needs of the clients, 3% for the negligence of legislation, and 11% for financial purposes. The rest, 34% dispenser/salesperson of retail medicine shop and 100% dispenser/salesperson of model pharmacy, said they sold drugs for all the above reasons (basic need, negligence of legislation, and financial purpose) (Table 5). The customers

TABLE 7: Demographic data for model and local pharmacy for information collected from dispensers and clients obtained from PIM.

Parameters	Dispensers (A-, B-, C-grade pharmacists/chemists/ owners/managers)		Clients	
	Retail medicine shop ( <i>n</i> = 65)	Model pharmacy ( <i>n</i> = 65)	Retail medicine shop ( <i>n</i> = 90)	Model pharmacy ( <i>n</i> = 90)
Gender				
Male	65 (100%)	61 (93.85%)	51 (56.6%)	38 (42.22%)
Female	0 (0%)	4 (6.15%)	39 (43.33%)	52 (57.78%)
Age range				
≥18 and below 20	12 (18.46%)	2 (3.08%)	0 (0%)	7 (7.78%)
20–29	14 (21.54%)	41 (63.08%)	15 (16.67%)	17 (18.89%)
30–39	23 (35.38%)	17 (26.15%)	35 (38.89%)	20 (22.22%)
40–49	11 (16.92%)	5 (7.69%)	11 (12.22%)	23 (25.56%)
50–59	3 (4.62%)	0 (0%)	20 (22.22%)	17 (18.89%)
Above 60	2 (3.08%)	0 (0%)	9 (10%)	6 (6.67%)
Educational qualification				
No general education	0 (0%)	0 (0%)	17 (18.89%)	4 (4.44%)
Primary education	2 (3.08%)	0 (0%)	23 (25.56%)	9 (10%)
Secondary education	46 (70.77%)	21 (32.31%)	31 (34.44%)	33 (36.67%)
Graduated	17 (26.15%)	44 (67.69%)	19 (21.11%)	44 (48.89%)
Marital status				
Married	37 (56.92%)	17 (26.15%)	63 (70%)	63 (70%)
Unmarried	26 (40.25%)	48 (73.85%)	23 (25.56%)	24 (26.67%)
Others(widow)	2(3.7%)	—	4 (4.87%)	3 (3.45%)
Financial condition				
Poor	0 (0%)	0 (0%)	14 (15.56%)	1 (1.11%)
Lower-middle class	51 (78.46%)	20 (30.77%)	20 (22.22%)	14 (15.56%)
Middle-middle class	14 (21.54%)	45 (69.23%)	30 (33.33%)	45 (50%)
Higher-middle class	0 (0%)	0 (0%)	23 (25.56%)	26 (28.89%)
Rich	0 (0%)	0 (0%)	3 (3.33%)	4 (4.44%)

were also asked for ways of taking medicine without the doctor's suggestions. In commensurate with finding by PIM, 20% of customers bought medicine by own opinion (*n* = 18), 1% by previous prescription (*n* = 1), and 15% by the dispensers' (retailers/salespersons) suggestions in retail medicine shops (*n* = 13). On the other hand, 9% of customers (*n* = 8) in model pharmacies responded that they ingested medicine by their own opinion, 2% by previous prescription (*n* = 2), and 13% by dispensers' (retailers/salesperson) suggestions (*n* = 12).

According to CSM, 2% customers of model pharmacies took medicine by their own opinion (*n* = 2), 21% following previous prescription (*n* = 19) and 40% by the dispensers' (pharmacists'/chemists) suggestion (*n* = 36). The customers were questioned regarding the reasons for taking the medication without a doctor's suggestion. About 7% of retail medicine shops (*n* = 6) and 3% of customers (*n* = 3) of model pharmacy acceded to it for financial reasons. Additionally, 10% of clients of retail medicine shops (*n* = 9) and 6% of clients of model pharmacy (*n* = 5) used to follow the previous prescription. But in the case of CSM, it was seen that 17% of clients of retail medicine shops (*n* = 15) and 22% clients of model pharmacy (*n* = 20) were buying it for the reason of financial burdens, and 32% clients of local medicine shop (*n* = 29) and 21% clients of model pharmacy (*n* = 19) agreed for using the previous prescription (Table 5).

The qualitative findings acquired from key informant interview (KII) and structured observation are encapsulated as follows.

### 3.2. Qualitative Findings

*3.2.1. Qualitative Findings Based on Knowledge and Dispensing Scenario in Direct Conversation with Client and Dispenser.* All of clients and dispensers participated in semistructured open-ended questionnaires, key informant interviews (KII), and structured observations, which were the methods of gathering information from both retail medicine shops and model pharmacies by PIM only.

Most clients were not aware of model pharmacy. They did not understand functional differences between retail medicine shop and model pharmacy, and even they had no preferences to choose between them:

*"I did not hear the term "Model Pharmacy" before. Today I have just heard it from you. To me, all medicine shops are the same, and I buy medicine from any medicine shops nearer to my home as per convenience. I do not know which one is the model pharmacy and which one is the retail medicine shop."*

A few customers have a slight idea about model pharmacy, which was not for its excellent service but infrastructure. A client of model pharmacy echoed such a perception that almost reflects the same tone of others:

*"In my locality, this pharmacy (a model pharmacy) is quite large, has the air-conditioning facility, and I get all kinds of medicines here. That is why I very often go here. I think all*

*pharmacies sell medicines, of which some have a large quantity of medicine collection, and some don't have."*

It is apparent that many customers do not have a clear idea about model pharmacy. Despite having little idea of it, they are hardly satisfied with its services while buying medicines:

*"I know about model pharmacy, but the services model pharmacies are supposed to provide are absent. They do not provide primary health care services and patients consultation services as and when dedicatedly needed".*

During the qualitative study, the dispensers (A-, B-, or C-grade pharmacists/chemists/owners/managers/salespeople/retailers) mentioned many limitations causing model pharmacies not to ensure effective patient services.

Many owners of the model pharmacies pointed out the training related limitation conducted by PCB and legislation-related issues of DGDA:

*"We accepted the scheme of model pharmacy, renovated and enlarged facility according to the core requirements of it, but we did not get any technical or monetary incentives from the regulatory bodies or and they did not offer any dispensing training of our existing dispensing staffs."*

Amid 65 dispensers, 46 dispensers talked so much about the monetary benefits of model pharmacy. An owner remarked when interviewing as follows:

*"From the very beginning, the concept of model pharmacy should have been backed by Private-Public Partnership (PPP) business with such an arrangement in which honorarium of the "A" grade pharmacist will be provided by the govt and honorarium of other dispensing staffs is to be given by the owner. It is not possible for a model pharmacy to bear all the costs incurred, and therefore, we hardly make any profit".*

Another issue raised mainly by a significant number of the owners/managers of the model pharmacy is insufficient knowledge for counseling patients and monitoring dispensing process done by the appointed "A"-grade pharmacist:

*"I think both DGDA and PCB authority need to train "A" grade pharmacists professionally. In my opinion, they have limitations of knowledge for patients counseling. I am emphasizing this issue and ask to review the existing Bachelor of Pharmacy syllabus for modification".*

On the other hand, 51 retailers amongst 65 retail medicine shops made their own opinion close to the same tone:

*"I do not think those Model pharmacies are providing much better services than us. They also dispense medicines without prescriptions as we are. You know we have several*

*limitations, and most often, we sell medicine without prescriptions".*

More than 70% appointed "A"-grade pharmacists in model pharmacies expressed their job dissatisfaction, talked on low honorarium issue, and prolonged service hours as follows:

*"As an "A" grade pharmacist, we do not have any specific job responsibility. The owners of the model pharmacies generally fix up our salary ranging from 10 000 BDT to 50,000 BDT (118 USD to 590 USD) based on job experiences. They also forced a pharmacist to do his job from 9 am to 12.00 midnight within that salary range without paying for overtime. Sometimes they also compelled us to do their other works which is not related to dispensing or counseling patients".*

Almost all owners or managers of model pharmacies expressed difference of opinion about the knowledge-based dispensing and patients counseling performances done by "A"-grade pharmacists:

*"If I tell you frankly, "A" grade pharmacists need more training on knowledge-based dispensing and patients counseling, the staff, without any degree working in my institutions for a long time, is more efficient in dispensing and patients counseling. So, in terms of making a profit and ensuring good dispensing and counseling performances, this issue is sure does matter to us before recruiting an "A" grade pharmacist".*

On the other hand, 90% of "A"-grade pharmacists claimed on formulating a strict profession-based regulation by DGDA:

*"The DGDA and other concerned authorities should provide a strict guideline, and monitoring system about the job responsibilities and job security of the recently appointed "A" grade pharmacists, so that the owners of model pharmacies cannot be willful to terminate us from the job now and then. This is very disrespectful to us".*

Many "A"-grade pharmacists mentioned the lack of moral status in the job and insufficient logistic support to render good services to the patients. An "A"-grade pharmacist remarked as follows:

*"The owner of the model pharmacy most often compelled us to dispense medicine only in the front counter, which is not my job responsibilities. We do not have suitable setting arrangements and logistics both for the patients and us; even we do not have any separate counseling space for keeping patients' privacy. We almost remain standing in whole working hours at the counter to sell medicine".*

#### 4. Discussion

In Bangladesh, the model pharmacy was first launched in 2016 based on the ADDO model shop of Tanzania. The aim

of establishing a model pharmacy was to ensure safe and proper dispensing of medicine, stop the divergent practices of dispensing prescription medicine, and ensure knowledge for both clients and dispensers associated with systemic use of medication and related risk of nonproper use of medicine. After two years of the inauguration of model pharmacy, this study was designed to analyze and compare the effectiveness of drug dispensing patterns, practices, and knowledge of both clients and dispensers of model pharmacies over traditional retail medicine shops. According to this fact-finding study, the presence of an "A"-grade pharmacist was below 70%, which was supposed to be 100%. Moreover, knowledge and practice-based counseling of the clients by dispensers of model pharmacies (A-, B-, or C-grade pharmacists/chemists/salespeople) were not found satisfactory and substandard practices were reported. Only a few clients have a rudimentary idea about model pharmacies. The clients also had substandard medicine buying, administration, and storage practices in model pharmacies and retail medicine shops.

The pharmaceutical market in Bangladesh is expanding [30], and self-medication has become a rising problem. The retailers/salesperson (who could be an A-, B-, or C-grade pharmacists/chemist/owner of the shops/manager of the shop) are playing a crucial role in fostering self-medication. The problem is also in the hike as self-medication reduces the cost of physician's consultancy and diagnostic tests [31, 32]. The rapid and continuous access to mobile phones and Internet also contributes to this practice [30]. It has also been noticed that the retailers, pharmacists, and their assistants are also not following the guidelines of model pharmacy [33], which affects extensively the irrational dispensing of medicines [30]. In this study, a holistic approach has been taken to check for the quality of drug-dispensing practices in both types of pharmacies. Ethical drug dispensing is an integral part of rational therapy of drugs [8, 9, 33–37]. This study revealed that female participation both in retail medicine shop and model pharmacy as a pharmacist is rare. But as a customer, no significant differences in buying medicine were noticed.

In both categories of pharmacies, this was spotted that people aged 30 to 49 bought the highest percentage of medicine. It was also revealed that customers/patients having secondary education and graduation degrees bought more medication. Marital status did not relate to any contributory findings. Financial condition showed middle-middle class people tend to collect the lofty number of drugs (Table 7). As mentioned in this study (Table 2), it manifested that retail medicine shops run by only "C"-grade pharmacists (81%), and model pharmacies have the dominant presence of A-grade pharmacists (69%), according to PIM. Still, the actual scenario is disappointing as per CSM, 91% of pharmacists are working as "C" grade in local pharmacies with no (0%) "A" grade, and only 63% was "A"-grade pharmacist in model pharmacies, and 32% was "C" grade. These findings revealed model pharmacies are not following appropriate guidelines set by DGDA, and indeed, that is an indication of poor practices of medicine dispensing. According to Table 3, observation relating to the role of pharmacists and chemists in both model and local

pharmacies exhibited ignorance in serving patients. Only 69% of pharmacists of model pharmacies informed customers about medicine administration procedures, 32% informed about toxicity, and 77% sold medicines (except OTC) without prescription in conformity to CSM. These provide evidence of poor implementation of proper dispensing practices of model pharmacies. This also violates the aim and necessity of establishing model pharmacies to ensure good medicine dispensing practices among customers.

According to the doctor's advice, in conformity to CSM, regarding output from the customers from both model pharmacies and retail medicine shops, merely 37% of model pharmacies delivered intake medicine. Surprisingly, 63% of buyers could buy medicine from the model pharmacy without any direction from a doctor, 57% of customers were merely informed about storage conditions, and 54% of customers could buy antibiotics and sedatives without prescription in model pharmacies (Table 4). These depict inadequate monitoring and insufficient practices regarding proper medicine dispensing practices of model pharmacies. Moreover, only 49% of customers confessed that they completed the entire course of antibiotics, which in turn indicated 51% of buyers did not fill up the whole course of antibiotics. These crucial findings depicted an inferior pictorial view of model pharmacies on the aspects of patient awareness and counseling.

Table 5 represents underlying reasons for selling and buying medicines without a prescription. Almost all pharmacists of model pharmacies (50 out of 65), according to CSM, sell medicine without prescription for the reason of meeting the basic need of customers, negligence of legislation, and for financial purpose. But according to PIM, only 7 out of 65 pharmacies revealed the truth that they sell medicine for the abovementioned reasons. In addition, according to CSM, in model pharmacies, 57 customers out of 90 bought medicine according to their own opinion, previous prescription, and pharmacist's suggestions.

All these findings revealed a minimal substandard medicine dispensing pattern of model pharmacies. This study found partial validation that model pharmacies follow the standards set by DGDA in comparison with the retail medicine shops. No significant differences were found/noticed both in model pharmacies regarding proper medicine dispensing and patients counseling. Similar studies were conducted in Japan, Ethiopia, India, Zimbabwe, Sudan, Tanzania, Pakistan, Laos, Thailand, and Vietnam [31, 38–45]. Noteworthy differences were found regarding dispensers' knowledge of drugs' side effects, informing patients about the side effects, selling drugs (except OTC) without prescription, etc., among the model pharmacies and retail medicine retail according to CSM. All these are very important for proper drug dispensing [35]. Often customers' constant pressure does not let the pharmacists talk to them about drug administration, side effects, etc., at the peak hours [46]. Patients' ignorance about their therapies also contributes to irrational drug use, especially when they are poorly educated and try to reduce treatment-related expenditure by not paying a visit to the doctor and taking self-medications. Patients often cannot remember the names and doses of medicine, use leftover, date-expired drugs, and go severe during chronic

diseases such as asthma, cardiac disease, rheumatoid arthritis, and osteoarthritis [47–52].

On the other hand, qualitative findings obtained from the PIM method revealed several barriers to ensure effective client/patient counseling and knowledge of good dispensing practices. Engaging KII, semistructured questionnaires, structured observation methods as qualitative data collection tools disclosed about lack of dispensing and patients' counseling knowledge of "A" grade pharmacists, their prolonged office hour, job insecurity, substandard job environment, lack of dispensing training, and marginal salary range. Oppositely, the owners or managers of model pharmacies are disaffected by lack of dispensing training, shortfall of professional experiences of "A"-grade pharmacists, and nonadherent attitude of DGDA to monitor and regulate legislation properly for ensuring good dispensing knowledge, pattern, and practices of model pharmacies of retail medicine shops.

It can be deduced from the observation that purchasers are not aware of model pharmacies established in and around Dhaka city. This observation also reflected that DGDA, the regulatory body of Bangladesh, could not take any intervention-based measurement yet to pull proper attention of patients/purchasers or mass population regarding medicine purchase and to face difficulties to ensure healthcare services for patients or customers. For these reasons, as a pilot project, the model pharmacy was launched. According to good dispensing practices, the model pharmacy needs to follow the standards for creating and delivering good health care services. Otherwise, this pilot project may not be appreciated in the long run. The authority should take more initiatives regarding patient care services, healthcare services, and advertising to benefit model pharmacy to the masses.

#### 4.1. Statement of Limitation

- (1) The study has been done only within Dhaka Metropolitan rather than country wide.
- (2) Regardless of their socioeconomic conditions, education, and age, the participants have little idea about model pharmacy and the services it provides. So, few data had been discarded due to vague understandability.
- (3) Owners of some of both model pharmacies and local pharmacies were reluctant to provide pieces of information.

## 5. Conclusion

Standard dispensing practices of medicines and proper counseling of customers to ensure good health care practices done by existing model pharmacies are not found in this study. Better monitoring by the regulatory authorities, public awareness campaigns, implementing behavior change communication (BCC), dispersing information education and communication (IEC) materials, a higher degree of professionalism of pharmacists, technical training of

dispensers, and close surveillance by the DGDA are necessarily needed to improve the services of model pharmacies. All these combined efforts will ensure the necessity, existence, continuation, and expansion of model pharmacies in the health care system in Bangladesh.

## Abbreviations

CSM:	Client simulated method
PIM:	Provider interview method
OTC:	Over-the-counter
DGDA:	Directorate general of drug administration
PHC:	Primary health care
PCB:	Pharmacy council of Bangladesh
BCDS:	Bangladesh chemist and druggists samity
BPS:	Bangladesh pharmaceutical society
DLDB:	Duka la dawabaridi
ADDO:	Accredited drug dispensing outlet
WHO:	World Health Organization
BCC:	Behavior change communication
IEC:	Information education and communication.

## Data Availability

All data are within the manuscript; a set of questionnaires is available upon request.

## Ethical Approval

The Department of Pharmacy, East-West University, Dhaka, Bangladesh, initially approved the study protocol. The final ethical clearance was done by the Biomedical Research Centre Ethical Committee, University of Dhaka. The reference number is BMRC/EC/2018-19/241. The study was conducted under the ethical standards laid down in the 1964 Declaration of Helsinki.

## Consent

This study is noninvasive, respondent consent was taken, and personal and data confidentiality was maintained throughout the study protocol.

## Conflicts of Interest

The authors declare no conflicts of interest.

## Authors' Contributions

This work was carried out in collaboration with all authors. All the authors read and approved the final manuscript. Ms. Marium Begum, Sanzana Fareen Rivu, and Md. Ziauddin Iqbal contributed equally to this work. Mst Marium Begum and Md. Sohanur Rahman contributed equally and shared the correspondence.

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