

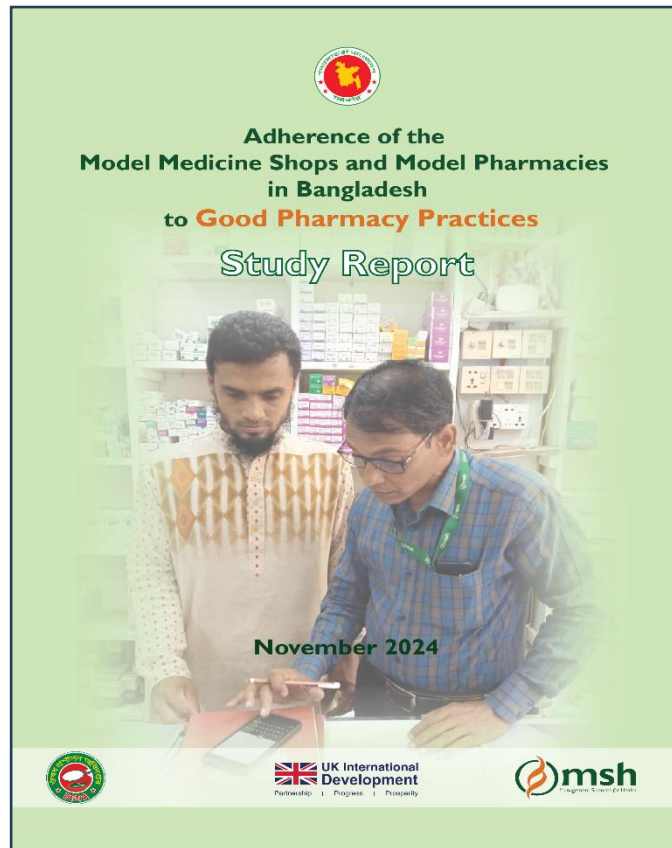


**Adherence of the
Model Medicine Shops and Model Pharmacies
in Bangladesh
to **Good Pharmacy Practices**
Study Report**



November 2024





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Summary

A cross-sectional study was carried out by the Better Health in Bangladesh (BHB), a FCDO-funded project of Management Sciences for Health, USA to assess the adherence of the DGDA-accredited model medicine shops and model pharmacies established in Bangladesh through the project. The duration of the study was 2 months from July to August 2024 on 874 model medicine shops and model pharmacies in 29 districts of the country. The medicine dispensers trained by BHB on GPP were the respondents. Among the respondents, 99.2% kept PCB documents, 87.4% displayed PCB registration certificates, 97.6% displayed drug licenses. Adherence to 3 out of 7 key GPPs was shown by 99.5% respondents, which was 90% in a similar study done in 2022. More than quarter (82.7%) medicine dispensers claimed not to sell antibiotics without valid prescription from registered physician. It was only 33.7% in the 2022 study. Among the medicine shops, 87.1% medicine shops were found to maintain antibiotic sale register, which was 94.4% in 2022 study. Regarding disposal of expired medicines, the medicine shops showed improved adherence, 97.4% in 2024 study compared to 88.5% in the 2022 study, to keeping them in separate container visibly labelled “Expired Medicines, Not for Sale”. Among the medicine shops which sell cold-chain medicines, 83.1% were seen to maintain refrigerator at 2^o-8^o degree Celsius. The study reported patient counseling rate while dispensing medicines to be 97.9% which was 55.6% in the 2022 study. Practice of labelling medicines with dosing and timing information while selling them to the clients also improved, 98.5% in the present study, which was 41.3% in the 2022 study. The medicine shops were seen to preserve all suppliers’ invoices in 96.2% cases, which was 94.1% in 2022. The study revealed variations in adherence to each of the key GPPs between the different divisions and years of accreditation, however, the model pharmacies showed better compliance compared to the model medicine shops. It is concluded that the DGDA’s medicine shop accreditation program is effective and should be continued and strengthened.

Introduction

Improving the quality and practice of medicine production, distribution, storage, and supply is essential for enhancing the efficacy and effectiveness of therapies. Globally, community-level private retail medicine shops, having trained pharmacy technicians and serving as key service providers, play a vital role in promoting the safe and effective use of medicines. However, for further improvements in pharmacy care, there is a need to train these technicians at periodic intervals to refresh their knowledge and practice on evidence-based and standardized guidelines to strengthen Good Pharmacy Practices (GPP) (1). This would lead to better health outcomes at the population level.

Over the past few decades, the role of pharmacists evolved significantly, shifting from basic drug compounding and dispensing to providing comprehensive drug information and patient care. This change has been instrumental in improving how consumers use medicines. Pharmacy care has undergone a paradigm shift, transforming from a technical supply function to a broader cognitive-based profession, leveraging pharmacists' unique expertise in the context of increasing healthcare demands, financial constraints, and predicted workforce shortages.

In response to these changes, the World Health Organization (WHO) and the International Pharmaceutical Federation (FIP) have established strategic guidelines for Good Pharmacy Practices (GPP) aimed at optimizing patient care (2). These guidelines define GPP as "the practice of pharmacy that responds to the needs of people for optimal, evidence-based care" and outline four key roles for pharmacists:

1. *Proper preparation, storage, distribution, and disposal of medications.*
2. *Effective medication therapy management.*
3. *Continuous professional development.*
4. *Contributions to community health programs.*

Despite these advancements, many low- and middle-income countries (LMICs) continue to struggle with issues like over-prescription, polypharmacy, sale of antibiotics without valid prescriptions, and inadequate training of pharmacy personnel. In Bangladesh, for instance, over 80% of the population relies on untrained or poorly trained drug shop retailers or palli-chikitsoks (village doctors), resulting in widespread misuse of medicines (2).

To address these challenges, the Directorate General of Drug Administration (DGDA) of Bangladesh adopted GPP guidelines and developed specific standards for pharmacy practices. The Better Health in Bangladesh (BHB) project, implemented by Management Sciences for Health (MSH) with funding from the UK Foreign, Commonwealth, and Development Office (FCDO), played a critical role in supporting these efforts. Since beginning of the BHB project in September 2018, the project trained 14,129 medicine dispensers (majority Grade C pharmacy technicians and few hundred Grade A pharmacists) on GPP in 32 districts, contributing to making them more knowledgeable and competent and qualified. The medicine dispensers following training, upgraded their respective medicine shops to the level of desired standards and thereafter made a district DGDA official inspect the medicine shops. Subject to the satisfaction of the district DGDA official, the medicine shop was given accreditation. The accredited medicine shops are designated as Model Medicine Shops (medicine dispenser is at least a Grade C Pharmacy Technician and floor space is at least 120 square feet) or Model Pharmacies (medicine dispenser is a Grade A pharmacist and floor space is at least 300 square feet).

Seven key GPP indicators were identified to measure the compliance of trained medicine dispensers and the retail model medicine shops/pharmacies. These indicators include:

- 1. The medicine shop does not sell antibiotics without valid prescriptions.*
- 2. The medicine shop maintains a register of the antibiotics dispensed.*
- 3. Expired medicines are stored separately in a dedicated container labeled “expired medicine, not for sale” with a maintained register.*
- 4. Temperature-sensitive medicines (e.g., vaccines, insulin) are stored at 2⁰–8⁰ C in a functioning refrigerator with temperature monitoring.*
- 5. The medicine shop provides patient counseling when dispensing medicines.*
- 6. Medicines sold are labeled with dosing and timing information.*
- 7. All suppliers’ invoices are kept for at least two years.*

A study was undertaken to see whether the model medicine shops and model pharmacies and the medicine dispensers working in these shops were adhering to the GPPs. This report presents the report of this study.

Objective

To see whether the model medicine shops and model pharmacies and the medicine dispensers working in these shops were adhering to the key good pharmacy practices (GPPs).

Methods

This was cross-sectional study conducted on 874 DGDA accredited model medicine shops and model pharmacies. One medicine dispenser, from each of them in 29 districts out of the 32 program districts of Better Health in Bangladesh (BHB) project, was the respondent. The 29 districts covered all 8 divisions of Bangladesh. There are 8,695 accredited medicine shops in these 29 districts. With the intention of including 10% of these 8,695 medicine shops which required 870 medicine shops, with decided to include 880 medicine shops in the sampling frame to avoid any risk of missing right respondents in few medicine shops. We randomly selected the medicine shops and could get responses from 874 medicine shops. Table 1 and Map 1 provide the list of the districts and distribution of the medicine shops. The duration of the study was for 2 months from July to August 2024.

The BHB engaged an independent renowned researcher who conducted a similar study in 2022 (3). But there was no allocation to repeat the study in subsequent years. Keeping in mind the project's close out in December 2024, BHB felt it necessary to repeat the study. So, an internal team was constituted and remobilized past enumerators. These enumerators were given refreshers' training and then were deployed for data collection in their respective field activity areas. The same questionnaire with little modification and same data collection techniques used in the 2022 study were re-used. The data collection tool comprised a semi-structured interviewer administered questionnaire, and an observation checklist. The questions and checklist were both online tools and included the relevant 7 key GPP indicators identified by the BHB and DGDA earlier. The sociodemographic characteristics of the respondents and few other GPP indicators were also included. Before implementing, the questionnaire and the checklist were pre-tested in similar setting and fine-tuned.

There were 8 enumerators (data collectors) and a field supervisor. They were given in-person 2 days' refreshers' training on data collection tools and techniques. During Day-1 training, they were trained on tools and techniques of online data collection, followed by practicing the online data collection tool in some nearby pharmacies. In day-2 training, also in-person, their feedback on practice was discussed and necessary changes were made in the data collection tool. One medicine dispenser, who was working in each medicine shop and who was earlier provided training by BHB on good pharmacy practice, was selected as respondent. Prior to data collection, consent was obtained from all respondents. Data were collected online using the data collector's smartphones. Field data collection was closely

supervised by the principal investigator and other research team members to ensure quality and reliable data.

The online data were directly stored in Kobo Collect BHB's repository. After the completion of data collection, the online data were transferred to a Microsoft Excel file in a laptop and cleaned. The data were then exported to statistical software SPSS version 24 for analysis. Analysis focused on exploring the status of GPP indicators in the model medicine shops and model pharmacies. Uni- and Bi-variate analyses were done to obtain the findings and generate inference. The Bi-variate analysis compared the GPP data between geographical regions (divisions), type of medicine shops (model medicine shop vs. model pharmacy), and year of accreditation. The questionnaire is annexed.

Results

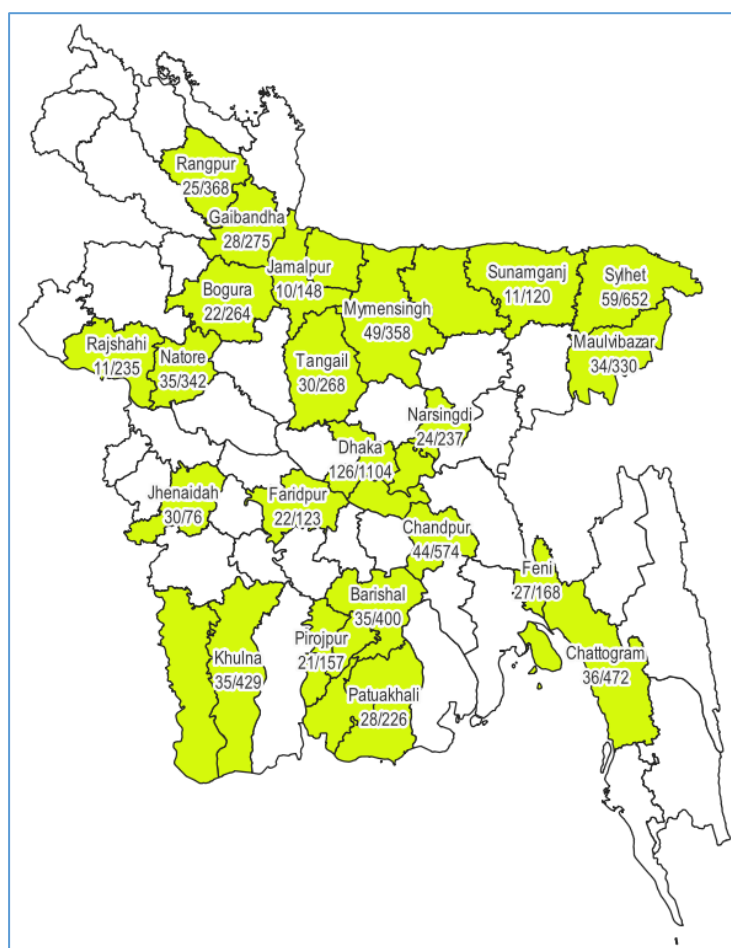
Data were collected from 874 medicine dispensers across 29 districts of all 8 divisions (Table 1) of Bangladesh with the highest number of participants from the Dhaka division (n=263; 30.1%) followed by from Barishal (n=112; 12.8%), and Chattogram (n=107; 12.2%) divisions. The lowest number of participants was from Rangpur division (n=53; 6.1%).

Table 1. Distribution of the medicine shops and respondents by district

Division	District	No.	%
Barishal	Barguna	13	1.5%
	Barishal	35	4.0%
	Jhalokathi	15	1.7%
	Patuakhali	28	3.2%
	Pirojpur	21	2.4%
	Total	112	12.8%
Chattogram	Chandpur	44	5.0%
	Chattogram	36	4.1%
	Feni	27	3.1%
	Total	107	12.2%
Dhaka	Dhaka	126	14.4%
	Faridpur	22	2.5%
	Munshiganj	26	3.0%
	Narayanganj	35	4.0%
	Narsingdi	24	2.7%
	Tangail	30	3.4%
Total	263	30.1%	
Khulna	Jhenaidah	30	3.4%
	Khulna	35	4.0%
	Satkhira	24	2.7%
	Total	89	10.2%
Mymensingh	Jamalpur	10	1.1%
	Mymensingh	48	5.5%
	Netrakona	10	1.1%
	Sherpur	10	1.1%
	Total	78	8.9%
Rajshahi	Bogura	22	2.5%
	Natore	35	4.0%
	Rajshahi	11	1.3%
	Total	68	7.8%

Division	District	No.	%
Rangpur	Gaibandha	27	3.1%
	Rangpur	26	3.0%
	Total	53	6.1%
Sylhet	Maulvibazar	34	3.9%
	Sunamganj	11	1.3%
	Sylhet	59	6.8%
	Total	104	11.9%
Grand Total		874	100.0%

Map 1 shows the distribution of the medicine shops in the 29 districts. The respective district shows the district name in the first line, number of participating medicine shops in the second line and the percentage of the medicine shops out of all 874 participating medicine shops in the third line.



Map 1. Distribution of the participating medicine shops by district (line 1: District name; line 2: No. of medicine participating medicine shops / No. of accredited medicine shops in the district)

Figure 1 shows the distribution of the participating medicine shops by their year of accreditation. More than half (52.4%; n=458) were accredited in 2022 followed by in 2020 (26.9%; n=235) and in 2021 (11.8%; n=103).

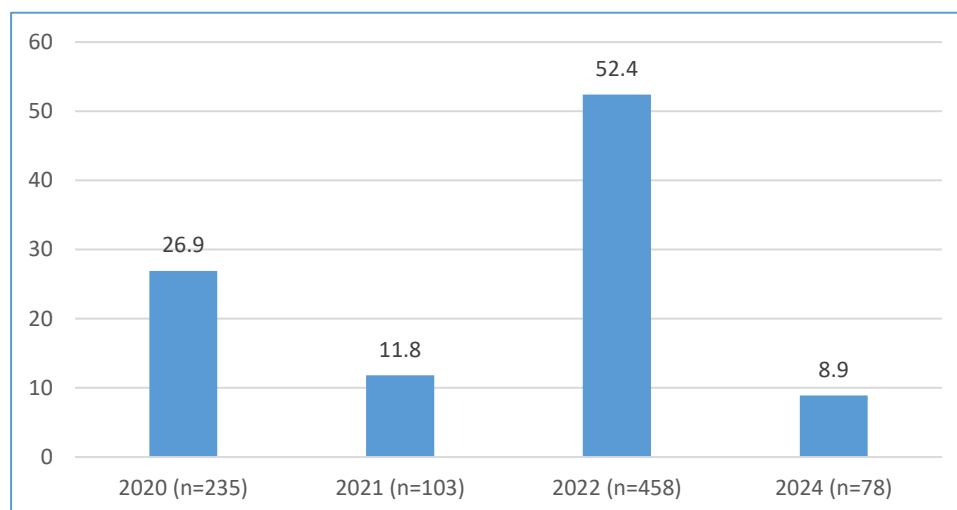


Figure 1. Percent distribution of participating medicine shops by their year of accreditation (n=874)

Table 2 shows the type of retail medicine shops and type of medicine dispensers participating in the survey. Of all 874 medicine shops, 98.6% (n=862) were model medicine shops and the rest 1.4% (n=12) were model pharmacies. Most (n=855; 97.8%) of the respondents were Grade C Pharmacy technicians. Grade A graduate pharmacists were 0.9% (n=8) and Grade B Diploma Pharmacists were 0.6% (n=5).

Table 2. Type of retail medicine shops and type of medicine dispensers

Variables	Categories	No.	%
Type of medicine shop	Model Medicine Shop	862	98.6
	Model Pharmacy	12	1.4
	Total	874	100.0
Type of medicine dispensers	Grade C pharmacy technician	855	97.8
	Grade B Diploma pharmacist	5	0.6
	Grade A Graduate pharmacist	8	0.9
	Other	6	0.7
	Total	874	100.0

Table 3 shows the distribution of each type of medicine shops (model medicine shop and model pharmacy) by their year of accreditation. It is revealed that out of the 862 model medicine shops, most (n=452; 52.4%) were accredited in 2022 followed by in 2020 (n=234;

27.1%). Of the 12 model pharmacies, half (n=6; 50.0%) were accredited in 2022 and followed by in 2021 (n=4; 33.3%).

Table 3. Year of accreditation of the participating model medicine shops and model pharmacies

Type of medicine shop	No. & %	2020	2021	2022	2024	Total
Model Medicine Shop	No.	234	99	452	77	862
	%	27.1%	11.5%	52.4%	8.9%	100.0%
Model Pharmacy	No.	1	4	6	1	12
	%	8.3%	33.3%	50.0%	8.3%	100.0%
Total	No.	214	103	458	78	874
	%	24.5%	11.8%	52.4%	8.9%	100.0%

Table 4 shows the sociodemographic and other characteristics of the respondents. The mean±SD age of the respondents was 45.14±10.6 years which varied between 22 to 82 years. The age distribution showed the highest representation in the 41-50 years age bracket, consisting of 35.0% (n=306) followed by the 31-40 years age group, encompassing 28.6% (n=250). Only 12 (1.4%) were females while the rest 862 (98.6%) were males. Regarding education, the majority of the respondents completed higher secondary school certificate (≥grade-12) comprising 34.3% (n=300) followed by those with graduate level of education (n=283; 32.4%), while 18.3% (n=160) completed secondary level education, and 15% (n=131) completed master's level education. Average (mean±SD) monthly family income of the respondent medicine dispensers was BDT 61,568±45,454.36, which varied between BDT 10,000 BDT and BDT 500,000; 30.0% (n=262) had a monthly family income between BDT 40,001 and 60,000 and 28.0% (n=245) had a monthly family income between BDT 20,001 and 40,000.

Table 4. Sociodemographic and other characteristics of the respondent medicine dispensers

Characteristic	No.	%	Mean±SD
Mean age of the respondents (years)	874		45.14±10.6
Age range (years)	874		22 - 82
Age group	22-30 yrs.	69	7.9
	31-40 yrs.	250	28.6
	41-50 yrs.	306	35.0
	51-60 yrs.	172	19.7
	61-70 yrs	65	7.4
	71-80 yrs.	11	1.3
	81-82 yrs	1	0.1
	Total	874	100.0
Sex	Female	12	1.4
	Male	862	98.6
	Total	874	100.0
Education	SSC / Dakhil	160	18.3
	HSC/Aleem	300	34.3
	Graduate/ Fazil	283	32.4
	Masters / Kamil	131	15.0
	Total	874	100.0
Mean monthly family income (BDT)	874		61,568±45,454.36
Monthly income range (BDT)	874		10,000 - 500,000
Income Group	BDT 10,000-20,000	80	9.2
	BDT 20,001-40,000	245	28.0
	BDT 40,001-60,000	262	30.0
	BDT 60,001-80,000	122	14.0
	BDT 80,001-100,000	76	8.7
	BDT 100,001-150,000	68	7.8
	BDT 150,001-200,000	12	1.4
	BDT >200,000	9	1.0
	Total	874	

Table 5 shows the PCB¹ documents availability with the respondent medicine dispensers and display status of the key documents in the medicine shops such as PCB registration certificate and drug license. All the 874 medicine dispensers except 7 (0.8%) had some kind of PCB documents to show (viz., PCB registration certificate: 53.1%; PCB receipt: 44.4%; and PCB admit card: 1.7%). Therefore, 99.2% medicine dispensers could show some kind of PCB registration documents. In almost all medicine shops (87.4%; n=764) their PCB registration certificates were displayed. The drug licenses were displayed in more medicine shops (97.6%; n=853).

Table 5. PCB documents availability and document display status in the medicine shops

PCB documents and document display status		No.	%
Available PCB documents	PCB Registration certificate	464	53.1
	PCB Receipt	388	44.4
	PCB admit card	15	1.7
	<i>Total PCB documents</i>	<i>867</i>	<i>99.2</i>
	None of the above	7	0.8
	Total	874	100.0
Display of PCB registration certificate	Yes	764	87.4
	No	110	12.6
	Total	874	100.0
Display of drug license	Yes	853	97.6
	No	21	2.4
	Total	874	100.0

Table 6 shows the data related to antibiotic dispensing practice. All medicine shops surveyed (n=874) were found to sell antibiotics. When asked, 82.7% (n=723) have mentioned that they do not sell antibiotics without a valid prescription from a registered physician. However, 17.3% (n=151) have mentioned that they sell antibiotics without a valid prescription. Dispensing antibiotics in inadequate doses is common (75.2%; 657 out of 874 respondents). Of the respondents, 24.8% (n=217) have mentioned that they do not sell antibiotics in inadequate doses. Of all 874 respondents, 63.2% (n=552) have reported that they ‘always’ counsel patients to take full course of antibiotics; 36.7% (n=321) have reported that ‘most of the time’ they advise the clients for taking full course of antibiotics; 0.1% (n=1) have mentioned that they advise the clients ‘sometimes’ for taking full course of antibiotics. The

¹ Pharmacy Council of Bangladesh

interviewers observed the respondents' antibiotics counseling practice without letting the respondents know. Among 874 respondents, 56.8% (n=496) were seen to provide advice to clients for taking full course of antibiotics; 42.8% (n=374) respondents were seen to give such advice most of the time; and 0.5% (n=4) respondents provided such advice only sometimes. It was found that 87.1% (n=761) medicine shops were maintaining an antibiotic register.

Table 6. Dispensing of antibiotics

Antibiotic dispensing practice		No.	%
Dispensing antibiotics without a valid prescription	No	723	82.7
	Yes	151	17.3
	Total	874	100.0
Dispense antibiotics in inadequate doses	No	217	24.8
	Yes	657	75.2
	Total	874	100.0
Giving advice to clients about taking full course of antibiotics	Always	552	63.2
	Mostly	321	36.7
	Sometimes	1	0.1
	Total	874	100.0
Was the respondent seen to advise clients to take full course of antibiotics	Always	496	56.8
	Mostly	374	42.8
	Sometimes	4	0.5
	Total	874	100.0
Maintained an antibiotic register	Yes	761	87.1
	No	113	12.9
	Total	874	100.0

Table 7 shows the management practice of cold chain medicines. Among 731 medicine shops from where responses were available, 99.6% (n=728) were selling temperature-sensitive medicines such as insulin and vaccine. Among the 728 medicine shops which were selling temperature-sensitive medicines, 90.5% (n=659) had functional refrigerators. However, 731 medicine shops had refrigerators. Of them 98.8% (n=722) informed that they used the refrigerator solely for storing cold chain medicines. In the 731 medicine shops having a refrigerator, 90.3% (n=660) had a temperature monitoring thermometer inside the refrigerator. Among these 660 refrigerators with temperature monitoring thermometer inside, 83.2% (n=549) were found to maintain the right temperature (2⁰-8⁰ degree Celsius) required for storing cold chain medicines.

Table 7. Management of cold chain medicines

Management practice of cold chain medicines	Yes or No	No. (N)	%
Selling cold chain medicines	Yes	728	99.6
	No	3	0.4
	Total	731	100.0
Availability of functioning refrigerator who sell cold-chain medicines	Yes	659	90.5
	No	69	9.5
	Total	728	100.0
Refrigerator used solely for storing cold chain medicines/vaccines or not	Yes	722	98.8
	No	9	1.2
	Total	731	100.0
Availability of monitoring thermometer in the refrigerator	Yes	660	90.3
	No	71	9.7
	Total	731	100.0
Storing cold chain medicines at right temperature (2 ^o -8 ^o C)	Yes	549	83.2
	No	111	16.8
	Total	660	100.0

Table 8 shows the status of client counseling and labeling of dispensed medicines with dosing and timing information. Of 874 respondents, 40.8% (n=357) have mentioned that they always counsel clients adequately while dispensing medicines; 57.1% (n=499) have mentioned that they counsel most of the time; and 2.1% (n=18) have mentioned that they sometimes counsel. When asked about practice of labeling of medicines with dosing and timing information while dispensing to clients, 56.6% (n=495) have mentioned that they always label medicines with dosing and timing information while dispensing; 41.9% (n=366) have mentioned to do it most of the time; and 1.5% (n=13) have mentioned to do the same sometimes.

Table 8. Client counseling and labeling of dispensed medicines with dosing and timing information

Client counseling	Frequency	No.	%
Counselling clients while dispensing medicine	Always	357	40.8
	Mostly	499	57.1
	Sometimes	18	2.1

Client counseling	Frequency	No.	%
	Total	874	100.0
Labeling medicine with dosing and timing information	Always	495	56.6
	Mostly	366	41.9
	Sometimes	13	1.5
	Total	874	100.0

The DGDA’s guidance calls for all medicine shops to must keep expired medicines in a dedicated closed container within the medicine shop labelled visibly as “Expired Medicines, Not for Sale” and to maintain an expiry medicine register. Among the 874 medicine shops surveyed, separate dedicated container for keeping expired medicines were found in 97.4% (n=851) medicine shops, while 92.7% (n=810) medicine shops were found to maintain a separate expired medicine register (Table 9).

Table 9. Practice for disposal of expired medicines

Practice for disposal of expired medicines		No.	%
Maintain separate expired medicine container labelled as “Expired Medicines, Not for Sale”	Yes	851	97.4
	No	23	2.6
	Total	874	100.0
Maintain an expiry medicine register	Yes	810	92.7
	No	64	7.3
	Total	874	100.0

Per DGDA’s GPP guideline, all licensed retail medicine shops must preserve suppliers’ invoices at least for two years after procurement and should have the printed “Over The Counter (OTC)” drug list available in the medicine shops. In the survey, it was found that 23.0% (n=201) medicine shops preserved suppliers’ invoices for the procured medicines at least for 2 years, and 96.6% (n=844) medicine shops could show a printed OTC medicine-list (Table 10).

Table 10. Preservation of supplier invoices and OTC medicine list

Document preservation	Yes or No	No.	%
Preserve invoices	Yes	201	23.0
	No	673	77.0
	Total	874	100.0
Preserve hardcopy of OTC medicine list	Yes	844	96.6
	No	28	3.2
	Total	872	100.0

Table 11 shows the number of different types of electronic gadgets in the medicine shops and use of pharmacy management software by them. Among the 874 medicine shops, 84.4% (n=738) of the medicine dispensers and 81.6% (n=713) of the owners possessed smart phones, and 74.5% (n=651) medicine shops had Internet connection (Table 11); 10.1% (n=88) medicine shops had desktop computers, 3.1% (n=27) had laptop computers, 0.8% (n=7) had tablet PCs and 2.7% (n=24) had printers. Only 56 (6.4%) medicine shops out of 874 were using Pharmacy Management Software. Of these 56 medicine shops, 51 (91.1%) collected the PMS from other sources, and only 5 (8.9%) received it from the DGDA (not shown in the Table 11).

Table 11. Availability of electronic gadgets in the medicine shops

No. & %	Desktop	Laptop	Tablet PC	Smart phone dispenser	Smart phone owner	Internet connect ion	Printer	Use PMS?
No.	88	27	7	738	713	651	24	56
%	10.1	3.1	0.8	84.4	81.6	74.5	2.7	6.4

There is a log frame indicator for the MSH-BHB project to see whether the model medicine shops, and model pharmacies were practicing at least 3 out of the 7 key GPP indicators.

Table 12 compares the status of the log frame indicators found in the 2022 and 2024 studies. It reveals that in 2024, 99.5% medicine shops (out of 874 medicine shops surveyed) adhere to at least 3 key GPPs. It was 90% (out of 252 medicine shops surveyed) in the 2022 survey.

Table 12. Comparison of GPP Indicators in the study from 2022 with 2024

Key GPP	Survey 2022 (total n=252)		Survey 2024 (total n=874)	
	No.	%	No.	%
Medicine shops found practicing at least 3 of 7 key GPPs	227	90.0%	870	99.5%
1. Don't sell antibiotics without a prescription	85	33.7%	723	82.7%
2. Maintain antibiotics sale register	238	94.4%	761	87.1%
3. Keep expired medicines in a separate visibly labeled container	245	88.5%	851	97.4%
4. Store temperature-sensitive medicines at 2 ⁰ -8 ⁰ Celsius inside a functioning refrigerator	129	100.0%	722	83.1%
5. Counsel clients while dispensing medicines	140	55.6%	856	97.9%
6. Label medicines with dosing and timing information while selling	104	41.3%	861	98.5%
7. Keep all supplier invoices for 2 years	237	94.1%	201	96.2%

Figure 2 compares the key GPPs by division, which shows considerable variation in each of the 7 key GPPs between divisions.

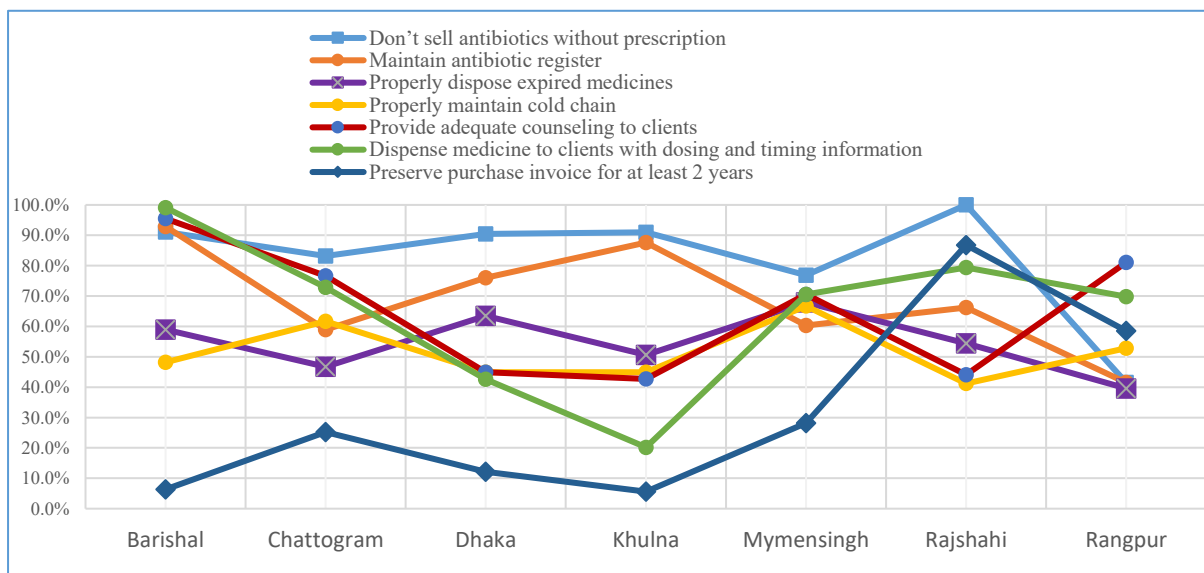


Figure 2. Comparison of key GPPs by division

Figure 3 compares the key GPPs by type of medicine shops, which shows the model pharmacies to perform better than the model medicine shops in each of the 7 key GPPs.

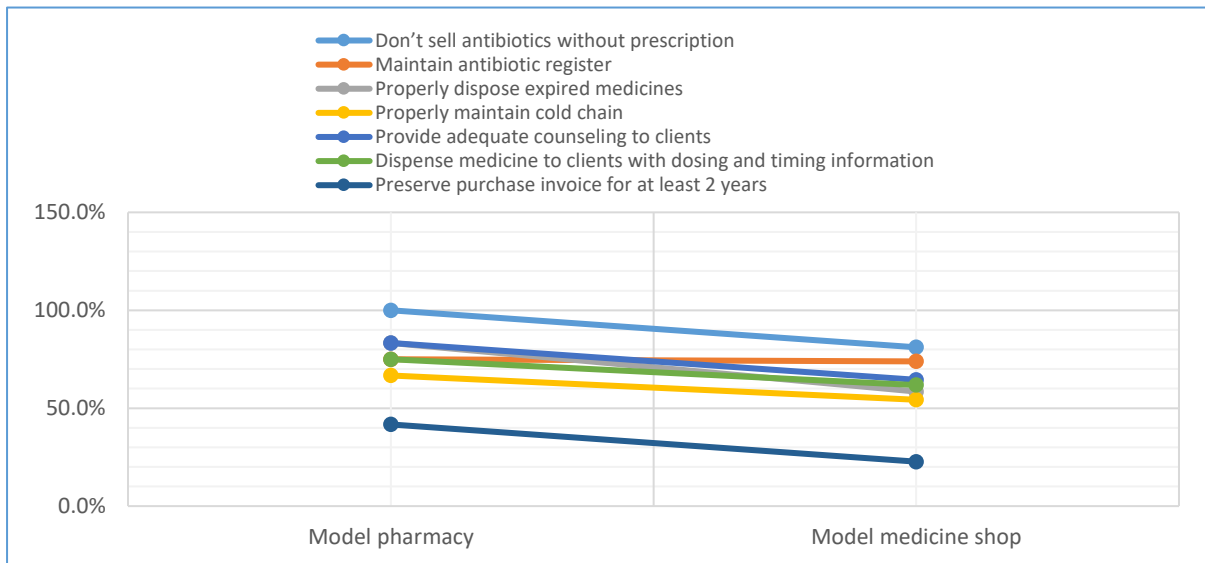


Figure 3. Comparison of key GPPs by type of medicine shops

Figure 4 compares the key GPPs by type of year of the accreditation of the medicine shops, which shows considerable variation in each of the 7 key GPPs between the medicine shops depending on their year of accreditation.

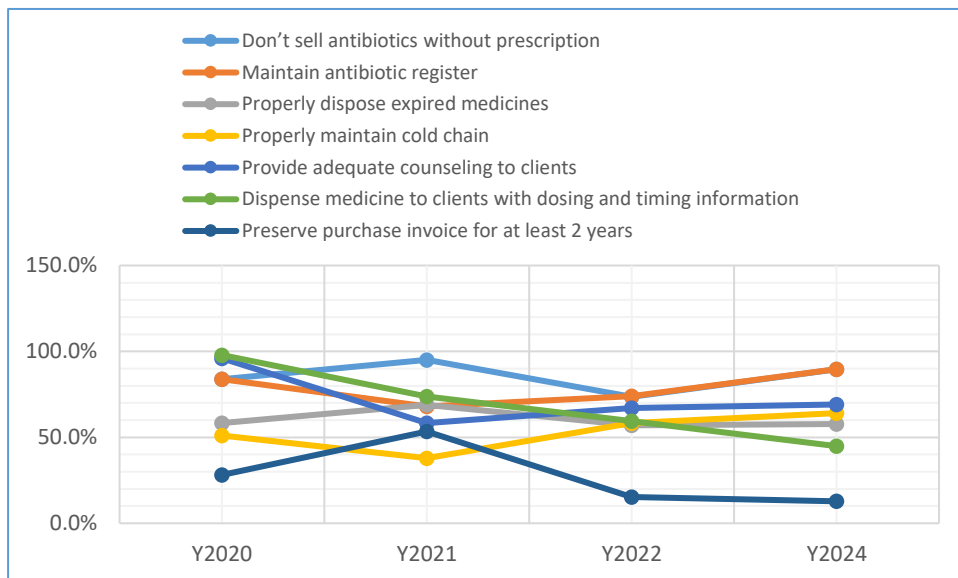


Figure 4. Comparison of key GPPs by year of accreditation

Discussion

This study is the second of its kind undertaken by BHB to understand the adherence of the accredited model medicine shops and model pharmacies in Bangladesh. The accreditation program to establish the model medicine shops and model pharmacies in Bangladesh has been done through FCDO's funding support to MSH through the Better Health in Bangladesh (BHB) project and by facilitating DGDA introduce this program in Bangladesh.

The first study was carried out in 2022 in 252 medicine shops across 5 districts in Bangladesh. In contrast, this current study has been done in 874 model medicine shops and model pharmacies in 29 districts of Bangladesh. The BHB project operated the accreditation program in 32 districts since the beginning of the project in 2018. During the 2024 study, BHB was operating in 29 districts. So, for convenience data were collected from the medicine shops in these 29 districts. The main intention of both the 2022 and 2024 studies were to see whether the medicine dispensers of the model medicine shops and model pharmacies, to whom BHB provided training on GPPs, were continuing to adhere to the 7 key GPPs which both BHB and DGDA decided jointly. It was a desire to see that at least 50% of these medicine shops would continue to practice at least 3 out of the 7 key GPPs.

The 7 key GPPs are listed below:

- i. The medicine shop does not sell antibiotics without valid prescriptions.
- ii. The medicine shop maintains a register of the antibiotics dispensed.
- iii. Expired medicines are stored separately in a dedicated container labeled "expired medicine, not for sale" with a maintained register.
- iv. Temperature-sensitive medicines (e.g., vaccines, insulin) are stored at 2–8°C in a functioning refrigerator with temperature monitoring.
- v. The medicine shop provides patient counseling when dispensing medicines.
- vi. Medicines sold are labeled with dosing and timing information.
- vii. All suppliers' invoices are kept for at least two years.

The study shows good compliance of all respondent medicine dispensers with respect to keeping PCB documents (99.2%), display of PCB registration certificates (87.4%) and display of drug licenses (97.6%).

The study shows 99.5% of the medicine shops to adhere to at least 3 out of the 7 key GPPs. It was 90% in the 2022 study (Table 12).

There has been a leapfrogging improvement in the dispensing antibiotic without a valid prescription. In 2022 study, only 33.7% of the medicine shops were found not to sell antibiotics without a valid prescription from a qualified medical practitioner (Table 12). In 2024 study, 82.7% of the medicine shops were found to not sell antibiotics without a valid prescription (Table 6 and Table 12). Two factors might have contributed to this improvement. The first, consistent communication with the medicine dispensers of model medicine shops and model pharmacies by BHB following observing the findings of the 2022 study to improve rationale antibiotic practice. The second, introduction of red-labelled antibiotic packaging by the DGDA.

In 2024 study, 87.1% of the medicine shops were found to maintain antibiotic sale register (Table 6 and Table 12), which was 94.4% in 2022 study (Table 12). Certainly, there has been some decline in this key good pharmacy practice. In a follow-up investigation with the medicine dispensers following data analysis of the 2024 study, it revealed that some negligence occurred by the medicine dispensers due to less inspection visits by the DGDA officials. It is recommended therefore that DGDA officials should enhance their inspection visits to the medicine shops and check for each of the 7 key GPPs. Indiscriminate use of antibiotics is the root cause of growing antimicrobial resistance (AMR) globally which is considered as one of the top 10 threats of global health (4). High rate of selling antibiotics without prescription is reported in Bangladesh among the medicine shops (which were not accredited) and elsewhere in low- and middle-income countries. One study in Bangladesh conducted in 2021 reported that 52.4% of respondents bought antibiotics without a physician's prescription (5). Another recent study jointly conducted by WHO and DGDA reported that the sale of antibiotics has increased by 31% in 2021 and most of the antibiotics were sold without a valid prescription from a registered physician. High rate of over the counter (OTC) selling of antibiotics have been reported from China (86.8%) (6), Zambia (7) and Cambodia (59%) (8) in recent studies. Improving the rational use of antibiotics through antibiotic stewardship program (ASP) is one of the key interventions essential to limit further emergence and spread of antibiotic-resistant microorganisms (9). In alignment with the global guidelines, Bangladesh prepared a National Action Plan in 2017 for containing AMR (10). However, implementation remains insufficient. Our study findings would stimulate

policymakers in revising policies and designing context-specific evidence-based interventions to reduce inappropriate dispensing and irrational use of antibiotics for lowering the AMR occurrence.

Regarding disposal of expired medicines, the medicine shops showed improved adherence, 97.4% in 2024 study compared to 88.5% in the 2022 study, to keeping them in separate container visibly labelled “Expired Medicines, Not for Sale” (Table 6 and Table 12). Global evidence suggests that management of expired medicine is more problematic in the supply chain management in the public sector than private sector and that is mostly due to lack of awareness and in Uganda this was due to excess donation of un-necessary drugs (11).

A decline has been seen in 2024 study about storing the temperature-sensitive medicines in the refrigerator with controlled internal temperature of 2⁰-8⁰ degree Celsius. Whereas in the 2022 study, 100% of the medicine shops were found to use the controlled and desired refrigerator’s internal temperature, in 2024 study, 83.1% of the medicine shops ensured such adherence. While enquiring about the reason, it was found that it happened due to ignorance of the medicine dispensers. They were not aware of the malfunctioning of the thermostat of the refrigerator. This can be a lesson for the medicine dispensers to check periodically the proper functioning of the thermometer or thermostat of the inside of the refrigerator (Table 6 and Table 12). Cold chain medicines are those that require special temperature-controlled cold storage to maintain their potency and efficacy. Cold chain management is important to ensure that the right quality of medicine is maintained throughout the supply chain. Cold-chain medicines include vaccines, insulin, chemotherapy drugs, and some topical preparations (12) and for them cold-chain maintenance is important since they are temperature controlled and must be maintained within a specific temperature range, usually between 2⁰ C and 8⁰ C, to maintain product’s potency and efficacy (13). During data collection, it was noted that power failure is common in locations of Bangladesh outside of capital city, and thus in many medicine shops. There is no back-up generator support to cater power failure in some of those. We recommend to having a refrigerator and a generator or any power back-up system like IPS and solar energy tapping to make mandatory for the medicine shops which sell cold chain medicines. One Indian study has reported that maintaining cold chain in both public and private sector is problematic for a variety of reasons like lack of the consolidated list of cold chain medicines, lack of standard

refrigeration guidelines for retail pharmacies, non-uniformity in storage temperature instructions on the label, inadequate patient education and lack of awareness (14).

It is fascinating to note that rate of client counseling by the medicine dispensers increased remarkably in 2024. The 2024 study reported this rate to be 97.9% which was 55.6% in the 2022 study. The DGDA is recommended to continue the encouragement to the medicine shop dispensers and owners to ensure client counseling in each instance of medicine dispensing (Table 6 and Table 12). Improvement was also seen in the practice of labelling medicines with dosing and timing information while selling them to the clients. The rate was 41.3% in the 2022 study, which was increased to 98.5% in the 2024 study (Table 6 and Table 12). Patients should be counseled well regarding medicine unit dose, frequency of administration, and duration of therapy along with drug-drug interactions, drug-food interactions, side-effects, and storage of medicines to ensure efficacy and effectiveness of treatment. One Ethiopian study reported that (93.7%; 94.4%; 91%) of the patients were told the drug unit dose, frequency of administration and duration of therapy respectively (15). Less than a third of the patients received information on drug-drug interactions, storage of medications, and side-effects. Our data suggests that there is a need to improve the scenario of counseling of patients and practice of labeling and dosing while dispensing through organizing training for both pharmacy technicians and medicine shop-owners.

A slide improvement in the practice of preserving all suppliers' invoices was also revealed in the 2024 study compared to the 2022 study. In the 2024 study, 96.2% medicine shops were found to comply this requirement, which was 94.1% in 2022 study (Table 6 and Table 12).

We tried to compare the adherence of key GPPs by geographic region (division), type of medicine shops (model medicine shop or model pharmacy) and year of accreditation. There were variations in adherence to each of the key GPPs between the different divisions and years of accreditation, however, the model pharmacies showed better compliance compared to the model medicine shops. It may be mentioned that the model pharmacies require at least 300 square feet floor space, at least a Grade A pharmacist and provision for selling cold chain medicines.

Conclusion

Given the continuation and improvement in adherence by the model medicine shops and model pharmacies introduced by the DGDA with technical assistance from BHB under a medicine shop accreditation program, it may be concluded that the accreditation program is effective and should be continued and strengthened. The revelation by the study that 99.5% accredited medicine shops comply with at least 3 out of the 7 key GPPs is strong evidence of this effectiveness. The BHB project is closing out in December 2024. However, the DGDA with the assistance of BHB developed a National Accreditation Guideline and kept allocation in the forthcoming 2024-2029 5th HPNSP Operational Plan of the DGDA to continue and strengthen the accreditation program. The continuation of the medicine shop accreditation program by the DGDA creates a great hope for the people of Bangladesh with respect to access to quality and safer medicines leading to their good and better health.

Recommendation

- DGDA officials should enhance their inspection visits to the medicine shops and check for each of the 7 key GPPs.
- Medicine dispensers should check periodically the proper functioning of the thermometer or thermostat of the inside of the refrigerator.
- DGDA should make it mandatory for the medicine shops, which sell cold chain medicines, to have a refrigerator and a generator or any power back-up system like IPS or solar energy tapping device.
- Ensure adequate counseling for each client during medicine dispensing and the practice of labeling the dispensed medicines with dosing and timing information.

Limitation

The study has been carried out in 29 districts of Bangladesh out of the 32 project districts of BHB-MSH. The selection of the study area was based on convenience as the BHB's other field activities were being done in these 29 districts during the study. However, 91% of the program districts was covered and 10% of the 8,695 (n-874) accredited medicine shops in these 29 districts were selected randomly. The study did not include any non-accredited medicine shops to compare as a control group.

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GPP Assessment Study in Bangladesh 2024
QUANTITATIVE DATA COLLECTION TOOL

Section A. Identification

1. ID of the Data Collector:
2. Drug license No:
3. Name of the medicine shop: _____
Upazila: _____ District: _____
4. Type of medicine shop:
 - A) Model Pharmacy
 - B) Model Medicine Shop
 - C) GPP trained by BHB but not yet a MP/MMS
5. Year of accreditation/declaration of Model Pharmacy/Model Medicine Shop _____
6. Who was present in the shop at the time of data collection? (Multiple response possible, *if more than one pharmacist/pharmacy technician present, interview the most regular one*)
 - A) Grade A pharmacist
 - B) Grade B pharmacist
 - C) Grade C pharmacy technician
 - D) None of the above
7. Name of the respondent: _____
8. Could the respondent show any of the followings
 - A) PCB Registration certificate
 - B) PCB Receipt
 - C) PCB Admit card
 - D) None of the above
9. Take a photo of the document:
10. Mobile phone No. of the respondent: _____
11. Age of the respondent in complete years: ____ Years (age validation) (18-99 yrs)
12. Sex of the respondent: M/F
13. Highest Education of the respondent
 - A) SSC / Dakhil
 - B) HSC / Aleem
 - C) Graduate/ Fazil
 - D) Masters / Kamil
14. Total family income per month: _____ Bdt

Section B. Observation

15. Did the medicine shop dispense antibiotics without a valid prescription?
 - A) Yes
 - B) No

16. Did the medicine shop dispense antibiotics in grossly inadequate doses?
 - A) Yes
 - B) No
17. Did the medicine shop advise patients to take full course of antibiotics?
 - A) always
 - B) mostly
 - C) sometimes
 - D) never
18. Did the patients/clients received adequate counseling while buying medicines from the medicine shop?
 - A) always
 - B) mostly
 - C) sometimes
 - D) never
19. While selling medicines, do the medicine shop label medicines with dosing and timing information?
 - A) always
 - B) mostly
 - C) sometimes
 - D) never
20. Did the medicine shop follow appropriate dress code (apron)?
 - A) Yes
 - B) No
 - C) Wear apron but not according to MP/MMS dress code
21. If yes, take a photo of wearing apron

Section C. Check

21. Did the medicine shop maintain an antibiotic register (check)?
 - A) Yes
 - B) No
22. Is the drug license displayed visibly?
 - A) Yes
 - B) No
23. If yes, take a photo of the license
24. Drug license valid up to: ____ / ____ / ____
25. Is the PCB registration certificate of the pharmacist displayed visibly?
 - A) Yes
 - B) No
26. What are the electronic gadgets/facilities available in your medicine shop (multiple answers possible)?
 - A) Desktop computer
 - B) Laptop computer
 - C) Printer

- D) Tablet computer
 - E) Smartphone of the dispenser
 - F) Smartphone of the owner
 - G) Internet connection
27. Did the medicine shop use pharmacy management software?
- A) Yes (Skip logic)
 - B) No
28. If yes, which one
- A) Pharmacy Management Software of DGDA
 - B) Other (specify)
29. Did the medicine shop sell cold chain medicines (e.g., vaccines, insulin)?
- A) Yes
 - B) No
30. Did the medicine shop have a functioning refrigerator?
- A) Yes (Skip logic)
 - B) No
31. If yes, check if the refrigerator is used for storing cold chain medicines (e.g., vaccines, insulin)?
- A) Yes
 - B) No
32. Was there a temperature monitoring thermometer in the refrigerator?
- A) Yes (Skip logic)
 - B) No
33. If yes, what is current temperature inside the refrigerator?
 _____ Degree Celsius
34. Did the medicine shop store cold chain medicines (vaccines, insulin etc.) at right temperature at the time of data collection? (2°-8° degree Celsius)
- A) Yes
 - B) No
35. Were the medicine shelves covered adequately to protect medicines from dust and dirt?
- A) Yes
 - B) No
36. What are the medicine shelving category in the medicine shop?
- OTC
 - Prescription only medicine
 - Medical device
 - Alternative medicine
 - Health and hygiene products
 - No organized shelving category
37. How did the medicine shop shelve medicines?

- A) Alphabetically
 - B) Therapeutic class
 - C) Company wise
 - D) Dosage form
 - E) Other (please mention)
38. Did the medicine shop preserve all supplier's invoices and receipts for all medicines?
- A. Preserves all for at least two years
 - B. Preserves all but does not adhere to the timeframe
 - C. Does not preserve all
39. Did the medicine shop maintain an expiry medicine register?
- A) Yes
 - B) No
40. How did the medicine shop maintain the expiry medicine register?
- A) Satisfactory
 - B) Moderately
 - C) Unsatisfactory
41. Take a photo of the expiry medicine register
42. Does the medicine shop keep "Expired/damaged medicines" in a separate dedicated container labelled as "Expired/damaged medicines–Not for sale"?
- A) Yes
 - B) No
43. Take a picture of the container
44. Has the respondent heard about DGDA-approved adverse drug reaction (ADR) form?
- A) Yes (skip logic)
 - B) No
45. If yes, does he/she maintain adverse drug reactions (ADR) form and report to DGDA as and when required?
- A) Maintains and reports
 - B) Maintains but doesn't report
 - C) Doesn't maintain but report
 - D) Doesn't maintain nor report
46. Does the medicine shop have both completed and updated list of OTC medicines in hardcopy?
- A) yes
 - B) No
47. How many C grade pharmacy technician work in this medicine shop regularly?
- _____
48. Has the respondent heard about "Good pharmacy practice" (GPP)?
- A) Yes (skip logic)
 - B) No
49. If yes, mention features of "good pharmacy practices (GPP).

a) _____

b) _____

c) _____

50. Does the respondent know about the dress code of a pharmacy dispenser working in a MP/MMS?

A) Yes

B) No

51. In your opinion, what are the barriers to improve Good Pharmacy Practice among the medicine shops in Bangladesh?

52. Geo-coordinate of medicine shop _____