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SYSTEMATIC REVIEW article

A systematic review of the medicine dispensing practice in Bangladesh

Md. Abid Hasan [1, 2 *], **Ifrat Jahan Erin** [2], **Musfirat Tania** [3]
Ejaj Sumit [1, 4], and **Raisa Tasnim** [2]

[1] Department of Pharmacy, University of Asia Pacific, Dhaka-1205, Bangladesh
[2] Department of Pharmacy, University of Science and Technology Chittagong, Chittagong-4202, Bangladesh
[3] Department of Pharmacy, Jagannath University, Dhaka-1100, Bangladesh
[4] Department of Pharmacy, East West University, Dhaka-1212, Bangladesh
[*] Author to whom correspondence should be addressed

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Abstract: To review existing research on medicine dispensing practice in Bangladesh, as well as to determine and assess the role that quacks and drug dealers play in irrational drug usage. The databases PubMed, Scopus, BanglaJOL, Embase, and Web of Science were used to conduct a literature search. To identify publications from the last 24 years, a predetermined search approach focused on implementation context, function, and automation was employed. Using predetermined inclusion/exclusion criteria, two researchers independently filtered the search results sequentially by title, abstract, and full text. A standardized form was used to extract data and evaluate its quality. The inclusion criteria were satisfied with 14 studies. The primary techniques utilized to investigate dispensing mistakes were direct observation and the review of event reports. The classification of dispensing mistakes, study methodology, and dispensing technology all affected the dispensing error rates. The most reported dispensing mistakes were giving the incorrect medication, giving the incorrect dose form, and the incorrect drug strength. The most frequent causes of dispensing mistakes were excessive workload, inadequate staffing, confusion between similar-sounding and similar-looking medications, insufficient expertise or experience, interruptions or diversions, and poor communication among the dispensary personnel. In Bangladesh, training improved the knowledge and behaviors of Grade A pharmacists about medication delivery.

Introduction

The availability of medications, fierce rivalry among pharmaceutical companies, and access to services have all had a substantial impact on global drug purchase habits and how pharmaceuticals are utilized in response to disease [1]. According to the World Health Organization (WHO), robust healthcare systems that guarantee sensible selection, reasonable costs, dependable supply chains, and sustainable funding are inextricably related to better access to drugs [2]. A third of the world's population, 50.0% of whom live in Asia and Africa, does not regularly have access to necessary medications [3]. At least 65 million people in the South-East Asian region lack access to necessary medications and vaccinations [4]. Additionally, 42 billion US dollars are spent annually on drug abuse worldwide [5]. With 134 million adverse reactions and 2.6 million fatalities each year, the severity of adverse reactions in low- and middle-income countries was concerning [6]. To cut the amount of serious, avoidable medication-related injury by 50.0% over the following five years, WHO established its 3rd Global Patient Safety Challenge [5].

For several patients in impoverished nations like Bangladesh, the only and closest place to get medications is from a retail pharmacy outside of their homes [7]. It was believed that there were an equivalent number of drug stores selling drugs without a license; however, 1,06,919 legal drug stores have been located [7]. According to the report, 92.0% of drug vendors are "C" grade pharmacists with only three months of training, and 80.0% of individuals attend retail pharmacies or are attended by untrained quack physicians, with 76.0% of them self-medicating [7, 8]. Pharmacists receive grades of "A" for bachelor's degrees, "B" for certificates, and "C" for three months of training from the Bangladesh Pharmacy Council and Bangladesh Chemist and Druggist Association. Remarkably, 95.0% of drug dealers are unconcerned with the potential negative effects of the medications that their clients or patients could experience [9]. There are plenty of opportunities to prescribe, administer, and use non-essential and harmful pharmaceuticals because of the lack of professional education and training, the drive for profit, and because they are easy prey for drug manufacturers. The fundamental causes of selling unsuitable antibiotics include ignorance, lack of access to medical facilities and services, a lack of regulations, and a heavy reliance on the information provided by pharmaceutical companies [10, 11]. Drug buying habits may be impacted by societal and economic factors that lead to needless drug purchases. To comprehend the current state and patterns of medicine dispensing procedures in Bangladesh, this review was carried out. It is anticipated that this would produce insightful information that might help policymakers and health professionals define the need and establish service delivery methods [12].

Methods

To find pertinent published publications from January 2000 to July 2024, the electronic databases PubMed, Scopus, BanglaJOL, Embase, and Web of Science were consulted. Dispensing, Drugs, Medication, Medicines, Mistake, Hospital, Error, Secondary care, Inpatient, Outpatient, Pharmacy, Pharmacist, antibiotics, polypharmacy, and prescription were the keywords utilized to find pertinent papers.

Inclusion and exclusion criteria: Articles that (i) reported on human subjects, (ii) provided quantitative outcome data on medication dispensing among Bangladeshi patients, and (iii) were published between 2000 and July 2025 (only in Bangladesh) were included. We did not include any publications that were (i) published outside of Bangladesh, (ii) not in English, or (iii) conference papers, reviews, comments, or editorial pieces.

Study selection: One author initially searched the literature before exporting the titles from the databases into EndNote. After another author checked all the titles to find pertinent research, the first author looked over the abstracts. To ascertain if studies met the requirements and to weed out titles that weren't relevant, a second reviewer independently examined the titles, abstracts, and articles.

Quality assessment: 12 criteria developed by Allan and Barker [13] and modified by Alsulami et al. [14] and Ghaleb et al. [15] to apply to any medication error research were used to evaluate the quality of the studies. The concept of a pharmaceutical error was modified to include a definition of a dispensing error instead.

Results and discussion

A total of 1340 studies were found using the keyword search across all the databases that were consulted. After removing duplicate studies, the total dropped to 640. After that, 550 publications were deleted after abstracts and article titles were examined, and any research deemed unnecessary was eliminated. 14 publications met the inclusion and quality evaluation criteria after the other twelve papers were evaluated for appropriateness. These twelve studies were all carried out in Bangladesh. We found only a limited number of published studies on pharmacy dispensing practice in Bangladesh. **Tables 1** and **1B** display a comprehensive scenario about the medicine dispensing pattern in Bangladesh. All research demonstrates strong evidence of wrong dispensing practice. The number of model pharmacies is steadily growing, and some of them have significantly improved. 95.0% of the 20 pharmacists employed software solutions for their medication

distribution system. The management system, drug distribution procedure, and counseling system were all extremely high quality. Then membership cards and discount systems are preferred by Model Pharmacy, and patients will find them to be quite acceptable [16]. Of the 15 hospitals, 67.0% provided hospital pharmacy services, 47.0% had pharmacists with a "C" grade, and 53.0% did not have a narcotic medication locker. Remarkably, about 40.0% of hospitals had no control over drug misuse, and 87.0% lacked a pharmacy and therapeutic council. Furthermore, 33.0% of hospitals lacked pharmacists, and 6.7% had graduate pharmacists (A grade pharmacists). Additionally, 60.0% of hospitals gave their patients no dosing information, whereas 67.0% of hospitals gave them information on drug use. The results of the study indicate that to enhance medical treatment with an appropriate medication management system, the relevant authorities should review the current healthcare system and act quickly to assign graduate pharmacists to every hospital [17].

Table 1A: Summary of the studies reported on medicine dispensing pattern in Bangladesh

Pharmacist grade (A/B/C)	Knowledge on OTC drug	Dispenser knowledge about dispensing guidelines	Maintain records and documents	Drugs dispensed without prescription	Antibiotics dispensed without prescription	Study Ref.
Not found	Not found	Not found	Not found	Not found	Not found	[16]
A = 6.67%, B = 13.0%, C = 47.0%	Not found	40.0% have knowledge	60.0%	60.0%	47.0%	[17]
Retail A=0%, B=9.0%, C=91.0%, Model pharmacy A=63.0%, B=5.0%, C=32.0%	Retail: 82.6% Model: 100%	Retail: 98.50% Model: 100%	Not found	Retail: 49.29% Model: 10.8%	Retail: 1 8.89% Model: 12.22%	[18]
Not found	Paper is all about antibiotics	61.0% have knowledge	Not found	50.9% antibiotic dispensed	Yes	[19]
Not found	Not found	Not found	Not found	Not found	Yes	[24]
Not found	Not found	Not found	Not found	Not found	78.0%	[9]
Yes	Not found	96.70% have knowledge	Not found	1.0%	Not found	[26]
Yes	Not found	Yes	Not found	Not found	Not found	[27]
A=0, B=5/50, C=45/50	22.0%	Yes	Not found	Not found	Not found	[12]
A = 1.58%	Not found	Not found	Not found	66.2%	Yes	[8]
Yes	Yes	Yes	Yes	Not found	Not found	[7]
Yes	Not found	Not found	Not found	Yes	Not found	[31]
Not found	Paper is All about antibiotics	Do not have knowledge	Majority do not maintain	To promote and survive Their business	51.0% had no formal license to sell antibiotics	[10]
Not found	Paper is All about antibiotics	No knowledge about antibiotics generation	Not found	Yes	Not found	[11]

The client simulated method (CSM) indicates that 63.0% of model pharmacies had A-grade pharmacists on staff during business hours, compared to 0.0% in retail pharmacies. According to PIM (provider interview method), 36.0% of customers at retail pharmacies were unaware that they should see a doctor before buying medication. However, only 18.0% of patients were able to see a physician.

Table 1B: Summary of the studies reported on medicine dispensing pattern in Bangladesh

Counselling	Compound facilities	Drug sales by requesting patients	Informing drugs using information	Trained pharmacist available or not	Study aims to improve overall service of model pharmacy	Study Ref.
Not found	Yes	No	65.0% using helpline	Yes	Spread improved model pharmacist across Bangladesh with digitalization	[16]
Not found	40.0%	Not found	67.0% Yes	As pharmacist grade	Those hospitals do not hire graduate pharmacists. To enhance the healthcare system, a graduate pharmacist should be employed by every hospital's human resource department	[17]
Retail: 7 3.80% Model: 26.20%	Retail: Yes Model: Yes	Retail: 36.9% Model: 10.8%	Retail: 73.8% Mode: 95.4%	Not found	Standard dispensing practices and proper counseling are not found in model pharmacies. Close surveillance by DGDA is necessary for improvement of model pharmacies	[18]
29.7%	Not found	Yes	24.7% took advice from a drug seller	47.7%	Antibiotic dispensing in pharmacies in Bangladesh needs improvement. Strict policies and enforcement are needed to mitigate antimicrobial resistance	[19]
Not found	Not found	Not found	Not found	Not found	Average number of drugs per prescription higher than WHO recommendation	[24]
Not found	Not found	66.2%	4.76%	38.09%	According to the survey, most medications were inappropriately prescribed without a prescription, and numerous medications with poor safety profiles were often supplied over the counter. The government must implement regulatory and instructional measures to enhance the professionalism and understanding of drug dealers, pharmacists, and assistants	[9]
95.5%	Not found	Not found	Not found	Not found	Prescribing practices in the hospital showed irrational drug therapy. Need for proper recording and analysis of therapy before prescribing.	[26]
Yes	Yes	Not found	Not found	28.6%	Training improved knowledge on Good Pharmacy Practice (GPP) in Bangladesh	[27]
Yes	Yes	Not found	Yes	Not found	Hospital pharmacy practice is just starting in some private modern hospitals in Bangladesh	[12]
Not found	Yes	Not found	Yes	Not found	Community pharmacy in Bangladesh needs development and more data.	[8]
Yes	Yes	Not found	Not found	Yes	Many pharmacies are operated by salespeople with no official training; it is typical to visit pharmacies without a prescription and receive medication without receiving counseling	[7]
Not found	Not found	Not found	Not found	Not found	Drug purchasing practices are influenced by proximity, training, and social networks. Customers rely on trust, previous experiences, and economic factors	[31]
No	No	Not found	No	Not found	Evidence-based, not profit-driven, information must take the place of the pharmaceutical industry's influence. Antibiotic awareness campaigns might be useful in altering the way that antibiotics are currently sold.	[10]
Not found	No	Yes	No	Not found	The alignment of practices with national policy might be improved by expanding access to trained physicians and improving drug store owners' training and certification	[11]

According to CSM, 51.0% of patients did not complete whole antibiotic courses obtained from model pharmacies, and 40.0% of patients did not take their prescriptions as prescribed by their physicians. Furthermore, CSM found that 28.0% of clients gave out leftover medications based on outdated prescriptions from retail pharmacies, while 21.0% of clients did the same in model pharmacies. According to the CSM survey, 95.0% of retail pharmacy dispensers dispensed over-the-counter (OTC) medications without a prescription, while 77.0% of model pharmacies did the same. Model pharmacies were created to guarantee appropriate medication distribution procedures and medicine consumption, as well as to stop abnormal prescription dispensing trends. The Directorate General of Drug Administration's (DGDA) instructions for pharmacists and proprietors of model pharmacies were not entirely followed by the participants [17]. About half of the antibiotics (327/642, 50.9%) were bought without a prescription from a licensed physician. To reduce antimicrobial resistance in Bangladesh, the necessity to enforce current regulations and put in place stringent rules. Pharmacy-targeted antibiotic stewardship programs should also concentrate on appropriate dispensing procedures [18-20].

Most of the medications were prescribed outside of the national essential medicine list, and the study revealed a tendency toward improper prescribing, including the overprescription of antibiotics and the under-prescription of generic medications. Therefore, a successful intervention program would be required to motivate doctors and other healthcare professionals to support more responsible drug use. The average number of medications prescribed per prescription was significantly higher than the WHO's recommended amount; generic prescriptions were remarkably lower, antibiotic prescriptions were significantly higher; and multivitamin and multimineral use - which were not covered by EDL-was also higher. It is proposed that regular assessment of prescribing procedures would support the advancement of rational practice [21, 22]. Additionally, students' involvement in the assessment process may enhance future prescribers' comprehension and impression of the prudent use of medication [23]. According to the survey, most medications were inappropriately prescribed without a prescription, and numerous medications with poor safety profiles were often supplied over the counter. The government must implement regulatory and instructional measures to enhance the professional conduct and knowledge of drug dealers, pharmacy assistants, and pharmacists. For the public to avoid self-medication, health education is also crucial [24]. It is imperative that policymakers, particularly the Drug Administration of Bangladesh, develop relevant regulations and see to their implementation. To stop patients from being mistreated, the Bangladesh Medical & Dental Council must also act against quacks [9].

For the inpatients at the hospital under study, medication mistakes during the prescription phase were very common. Organizational issues such as the lack of quality assurance procedures, mistake reporting systems, and routine checks may have contributed to the errors described here, given the growing complexity of treatment for critically sick patients. The absence of clinical pharmacists and the prescribing medical interns' lack of careful monitoring may have made matters worse. Hospital administrators should work to raise healthcare personnel’s awareness of the potential for pharmaceutical mistakes throughout the prescription process. It is highly advised that quality assurance procedures be implemented and that regular inspections be conducted under the careful observation of prescribing intern physicians [25]. Through the Better Health in Bangladesh initiative, Management Sciences for Health provided Grade C pharmacists with training that improved their understanding of Good Pharmacy Practice (GPP) and dispensing procedures in Bangladesh. GPP implementation in Bangladesh will be aided using appropriate government monitoring systems and training for drug distributors [26]. According to Bangladesh's National Drug Policy 2005, licensed pharmacists shall oversee the distribution and use of medications in hospitals and retail pharmacies. However, the truth is that, except for a small number of high-level private institutions, no graduate pharmacist works in Bangladesh's government hospitals or retail pharmacies. The Bangladeshi healthcare system cannot be improved by these one or two facilities. The profession has a severe lack of government attention in addition to a shortage of human resources. The government should really take the first step by requiring all hospitals

to have at least one pharmacist with a doctorate [27]. Bangladesh's community pharmacy industry is still in its infancy. To grow Bangladesh's community pharmacy industry, the government and pharmacy regulating body should take adequate action. The results of therapy are being significantly impacted by a knowledge gap among community pharmacists on the safety, use, and storage of medications. This is partially because there are not enough pharmacists with the necessary training and education. To assist patients in using medications in a safe and efficient manner, the community pharmacy profession must be promoted [8, 28, 29]. The private drugstore industry in Bangladesh is now primarily unregulated, unaccountable, and operated by salespeople who receive most of their training informally through "apprenticeship." It was highly usual for customers to visit pharmacies without a prescription and for poor dispensing procedures to lead to the OTC sale of all medications. Shop inspections are erratic, unplanned, and punitive, and the current procedure discourages them and takes a long time for them to apply for a license. To improve the current chaotic situation and mainstream these shops into the existing Primary Health Care infrastructure, immediate measures are required, such as a "crash" program to train the salespeople, regular, thorough, and problem-solving inspection visits, enhancing the technical and human resource capacity of the regulatory authority, and making the licensing process "user-friendly" [7].

Drug buying habits are impacted and molded by social networks, sellers' training, customers looking for medical attention, and the closeness of pharmacies that provide easy access to medications. The sociocultural behaviors of customers while buying medications are based on their confidence in the vendors, their prior experiences with the pharmaceutical, economic considerations like financing or paying in installments, and avoiding consulting costs. People purchase medications according to their requirements, either with a prescription or for self-medication [22, 29]. They may purchase a partial course of medication and may not always finish the prescribed course of treatment. In addition to visiting customers in case of an emergency, the drug dealer frequently works harder to market generic medication alternatives. From a legal and pharmaceutical perspective, these activities may be viewed as the illegal and needless sale of medications, but consumers believe that their drug purchases and usage are reasonable due to a lack of understanding, access to doctors, and healthcare facilities. Both buyers and sellers are breaking the law by purchasing and consuming prescription-only medications without a prescription. The government may enhance drug dispensing, sale, and purchase procedures by educating and training merchants and customers. To guarantee the supply of safe, high-quality medications and their sensible usage, monitoring and regulation alone are insufficient. Given that drug buying and selling activities differ among urban slums and suburban regions, it is important to consider the local context of both sellers' and buyers' drug practices to guarantee the prudent use of medications as well as a sustainable healthcare system and services [30].

The pharmaceutical sector, which sells antibiotics even when clients are not always in need, has a big impact on sellers. Due to inadequate training, the dispensers are unable to properly distribute antibiotics, which leads to inadequate consumer instructions and the possibly dangerous practice of returning unsold medications for future sales. All these elements contribute to the extensive abuse of antibiotics in the research region, which in turn leads to the development of antibiotic resistance [19, 20]. To improve this situation, the Directorate General of the Drug Administration Bangladesh would need to strengthen the regulatory process, closely supervise the relevant authority, provide trustworthy information to drug sellers that is not influenced by the pharmaceutical industry, and support community and drug dispenser awareness programs that increase knowledge of antibiotic resistance through efficient communication, education, and training [10]. Both urban and rural drug store owners had little awareness of the BPMI and the National Drug Policy; better enforcement and education should improve antibiotic stewardship. Furthermore, creating a more practical national drug policy may also contribute to enhancing stewardship. The World Health Organization advises all relevant interested parties and stakeholders in the development of an effective national drug policy, including academic institutions, non-governmental organizations, professional associations, consumer groups, physicians, pharmacists, nurses, other ministries (trade, industry, and higher education), and local and foreign

pharmaceutical industries. To assess the policy's implementation with all relevant stakeholders in a National Drug Policy forum, WHO also suggests that the National Drug Policy committee hold monthly meetings. Prioritizing the creation of a practical drug policy that can support responsible antibiotic stewardship requires political commitment [11].

Conclusion: According to Bangladesh's 2005 National Drug Policy, licensed pharmacists should oversee the distribution and use of medications in hospitals and retail pharmacies. However, the truth is that, except for a small number of tertiary private institutions, no graduate pharmacist works in Bangladeshi government hospitals or retail pharmacies. A key component of the health care system is the pharmacist and pharmacy service. Physicians, pharmacists, nurses, and other healthcare professionals must collaborate to provide the best possible treatment. It is important to emphasize that if collaboration is disrupted, the entire health system will be affected, and patient care will never be provided.

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