ORIGINAL ARTICLE

Prescription Practice and Its Error Patterns in Outdoor Departments of Selected Bangladeshi Tertiary Care Hospitals

A.S.M. Monjur Al Hossain[1], Ananya Saha[2], Uttom Kumar[1], Sreedam Chandra Das[3], Md. Momin Islam[4], K.M. Yasif Kayes Sikdar[1], Fahmida Tasnim Richi[2], Ahona Maheen[5]

[1] Department of Pharmaceutical Technology, University of Dhaka, Dhaka 1000, Bangladesh
[2] Department of Pharmaceutical Chemistry, University of Dhaka, Dhaka 1000, Bangladesh
[3] Department of Clinical Pharmacy and Pharmacology, University of Dhaka, Dhaka 1000, Bangladesh
[4] Department of Meteorology, University of Dhaka, Dhaka 1000, Bangladesh
[5] Department of Pharmaceutical Sciences, North South University, Bashundhara, Dhaka-1229, Bangladesh

ABSTRACT

Introduction: Prescription can be referred to as the main part of the health care system. Most of the patients in Bangladesh prefer tertiary care hospitals. So, we decided to assess the prescription pattern and prescription errors in different tertiary care hospitals in Bangladesh. **Methods and materials:** Prescriptions were collected from the outdoors of the general medicine department of three tertiary care hospitals. The prescription data were presented in frequency, mean, percentages etc. A Chi-square test was also performed and different crosstabs were presented to show the relationship between different variables. **Results:** Among the patients, 55.9% were female and 25.1% were male. Patients from the age group 25-40 were the most common (34.5%), and the child (0-14) patient percentage was low (1.2%). A total of 501 prescriptions contained 1717 drugs. The average number of drugs per prescription was 3.42. A trend of writing an excess number of medicines was noticed among the prescribers. Anti-ulcerants were the most frequently seen treatment category, where proton pump inhibitors (PPIs) contributed to almost 60% of cases. There were several prescription errors noted in the survey, such as avoiding generic prescribing (100%) and essential drugs, and omission of information related to diagnosis (100%), patients' age (20.56%) and gender (18.97%). **Conclusion:** Prescription errors can lead to severe consequences, including adverse health outcomes and, in extreme cases, mortality. Addressing these errors through better regulations, healthcare provider training, and digital systems can significantly improve overall healthcare efficiency.

Malaysian Journal of Medicine and Health Sciences (2025) 21(6):1-8. doi:10.47836/mjmhs.v21.i6.1402

Keywords: Prescription, Tertiary hospital, Prescription errors, Essential drugs, Generic prescribing

Corresponding Author:
A.S.M. Monjur Al Hossain, PhD
Email: monjur.shiplu@du.ac.bd
Tel: +8801756306309

INTRODUCTION

The correct use of medicine is very crucial in disease prevention and management (1,2). According to the World Health Organization (WHO), more than half of all patients do not take their prescription or dispensed medicines as directed, and half of all drugs are prescribed, delivered, and sold wrongly (3). The procedures involved in prescribing medicines are prone to make errors and such an error can occur at any step from medication to administration (4,5). Among medication errors, prescription errors and prescribing faults are regarded as major concerns (6). In developing countries like Bangladesh, irrational drug prescribing is a serious health issue (4).

A prescription error could involve a blunder in the prescription writing procedure that causes incorrect direction about one or more of the standard prescription features, such as recipient identity, drug identity, formulation, dose, route, timing, frequency, and duration of administration, among others (7). Importantly, prescription errors can result in increased length of hospital stay, medical cost, mortality, morbidity etc. (8,9).

Monitoring and analyzing prescription trend is a good way to make sure that drugs are being used correctly (10). A few prior studies in Bangladesh revealed some

major mistakes in prescription and dispensing patterns. The majority of drugs were prescribed by their brand names (more than 90% of prescriptions) (11,12). In several studies, no medications were prescribed under their generic names. Polypharmacy was also prevalent (76.5% of prescriptions in research comprised four or more medicines). The majority of prescriptions included two antibiotics and the bulk of which were prescribed without a culture sensitivity test. The percentage of antibiotic prescriptions was greater than the WHO recommended for underdeveloped nation (11,12). Because of the awful handwriting of prescribers, the names of the medications were abstruse to understand, resulting in the most prevalent prescription mistakes. The strength of the medicines was not specified, although these pharmaceuticals were available in a variety of strengths on the market. Inappropriate abbreviations and prescriptions with therapeutic repetition have been found (4). In developing countries like Bangladesh, 55.57 % of antibiotics are given for suspected illness, whereas for proven cases, the proportion is only 33.46 % (13). Recent research findings reveal that 37.31 % of antibiotics were prescribed to satisfy patients and 40.22 % were given for colds and fevers without a diagnosis of a disease (14). The cost of medications can be reduced substantially only by giving them to the ones they need. Abir et al. reported that only 41% of the prescriptions from four different public hospitals in Dhaka, Bangladesh, contained critical medications, despite the norm being 100% (14).

Interestingly, a few researches have been performed so far on prescription patterns and prescription errors in tertiary care hospitals in Bangladesh and those performed included only one tertiary care hospital. Some studies involved a particular district, where some addressed particular therapeutic classes, such as proton pump inhibitors (PPIs), antibiotics etc. Several types of research have been conducted on secondary hospitals or primary healthcare centers (4,13-17). Here, prescriptions were collected from the outdoors of the general medicine department of the tertiary care hospitals located in three different districts in Bangladesh. Therefore, the present study will provide new and more detailed insight into the prescribing patterns and prescription errors that exist in Bangladesh's tertiary care health settings. The Bangladeshi healthcare system is facing several prescription-related challenges, including inadequate pharmacist training and recognition, which leads to job dissatisfaction and affects the implementation of Good Pharmacy Practices (GPPs) (18). The widespread presence of unqualified practitioners dispensing medications without prescriptions undermines national drug policies and contributes to inappropriate medication use (19). Additionally, ethical concerns arise as pharmaceutical companies influence prescribing behaviors through marketing practices, increasing healthcare costs and compromising patient care (20). Weak pharmacovigilance systems hinder adverse drug reaction monitoring due to low awareness and limited regulatory enforcement (21). Addressing these issues requires stronger regulations, enhanced pharmacist training, ethical marketing practices, improved pharmacovigilance frameworks, and greater digital integration to ensure safer and more effective healthcare delivery. The findings from the study may enable administrators to advance and upgrade healthcare plans, as well as to formulate effective prescription drug monitoring strategies.

MATERIALS AND METHODS

Data collection

We randomly selected three tertiary-level hospitals in Bangladesh out of 25 tertiary hospitals: Dhaka Medical College Hospital, Sylhet M A G Osmani Medical College Hospital, and Shahid Ziaur Rahman Medical College Hospital, Bogura (22). Then, a convenient random sampling technique was utilized from March 2021 to May 2021 to collect prescriptions from this hospitals. We went to the outpatient general medicine department of these hospitals and captured photos of the prescriptions of each patient with their prior consent. Rasoft Inc., a US-based company, determined the sample size (23). A minimum of 474 respondents was required to achieve a 95% confidence level with a 4.5% margin of error. Additionally, 5% of the population was classified as unresponsive. Therefore, the total required sample size for this study was 498. To account for potential non-responses, we collected more than 498 samples, resulting in a final sample size of 501.

$$n = \frac{z^2\,pq}{E^2} = \frac{1.96^2*0.5*(1-0.5))}{0.045^2} = 474$$

In the study, we followed the guidelines of the WMA Declaration of Helsinki (section 12).

Study measures

The sociodemographic characteristics, like age and gender, diagnosis and treatment presented in the selected prescriptions were noted carefully.

According to Age Categories, Life Cycle Groupings database (24), we have classified Child: (0-14), Young: (15-24), Adults category divided into two as adults (25-40) and Senior adult (41-60), and Older: (60+).

Data analysis

DIMS software was used to identify the generic names of the prescribed drugs. Data were manually input into Microsoft Excel 2016 for analysis. After that, the Statistical Package of Social Science, also known as IBM SPSS 25, was used to perform the statistical analysis of the data. Data from the prescriptions were presented in different forms such as frequencies, mean, percentage of medicines, number of drugs per prescription, number of essential drugs per prescription, number of therapeutic classes, etc. Patterns of prescribing different medicines

have been discussed according to different age groups, genders and therapeutic classes, and related crosstabs were formed.

Prescription error determination

Different types of prescription errors were listed according to good prescription guidelines by WHO and previous studies on prescription errors (11). As described previously, both types of prescription errors, omission errors and commission errors, were tried to retrieve from prescription orders. In this study, we have incorporated details on the measures taken to ensure the validity and reliability of data collection. Specifically, we have described the training process for researchers involved in data extraction, the involvement of multiple researchers in independently reviewing prescriptions, and the assessment of inter-rater reliability to ensure consistency in identifying prescription errors. The omission errors included errors involving prescribers (lack of patient name, age, prescriber signature, patient's next visit date, diagnosis, etc.) and errors involving medications (lack of route, dose, frequency, dosage form, strength, amount, etc.). Commission errors, on the other hand, incorporate the errors of providing incorrect information, such as incorrect dose, strength, drug name, dosage, drug-drug interaction, and so on (2,10,25)

Ethical Statement

The research study was carried out according to the Helsinki, though no direct human and animal-related clinical research was involved. The project proposal, research integrity and ethical standards have been approved by the Chairman, Department of Pharmacy, University of Dhaka, Bangladesh (memo no.: pharm. B/56(A) 20-21, Dated:28/12/2020).

RESULT

In this survey, 501 prescriptions were examined. Male and female percentages, age group percentages, therapeutic classes of drugs and patient groups were investigated. Among the patients, 55.9 % were females and 25.1 % were males. The most common age group was 25-40 (Table I). Alarmingly, age and sex-related information were absent in almost 21 % and 19 % of the surveyed prescriptions, respectively. Missing this information indicates the need for interventions to ensure proper prescribing practices.

There were a total of 1717 drugs across the 501 prescriptions. The average number of drugs per prescription was 3.42. The prescriptions with three drugs were the most common, with a frequency as high as about 36%. The second most frequent category (21.40%) of prescription orders contained four drugs. Two drugs were prescribed in approximately 19% of prescriptions. There were only approximately 6% of prescriptions that contained a single medication. Notably, more than four drugs were prescribed in about 17% of the prescriptions, with the highest number of medications being prescribed eight. Prescriptions containing a large number of medications have the potential to cause serious consequences, such as drug-drug interactions, adverse effects, patient noncompliance, enhanced resistance, and prescription errors, among others (26).

Table I: Demographic details of the patients in surveyed prescriptions

Characteristics	Frequency
Age	
Age absent	103 (20.6%)
0-14	6 (1.2%)
15-24	69 (13.8%)
25-40	173 (34.5%)
41-60	120 (24%)
60+	30 (6%)
Gender	
Not written	95 (19%)
Female	280 (55.9%)
Male	126 (25.1%)

Next, we determined the number of essential drugs per prescription based on the 21st essential drug list published by the WHO, which was updated in July 2019 (27). Essential medications offer low-cost treatments that are connected with fewer prescription errors. A total of 240 prescriptions (~48%) were found to be devoid of any essential drugs. Three or more essential drugs were prescribed in only 8 (1.6%) prescriptions. Two essential drugs in each were found in 40 (8%) prescriptions. Almost 43% of the prescriptions reviewed (n=213) contained only one essential drug in each (Fig. 1).

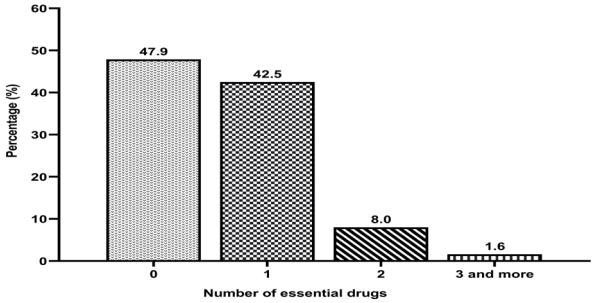

Fig 1: Distribution of essential drugs in prescriptions

Table II: List of prescribed drugs and their frequencies

Drug classes	Frequency (%)
Anti-ulcerants (PPI and Antacids)	373 (74.45)
Vitamin-minerals	248 (49.50)
Analgesics	212 (42.32)
Anti-allergics (Antihistamines and LTRA)	122 (24.35)
Antidepressant	87 (17.37)
Muscle-relaxant	68 (13.57)
Single antibiotic	62 (12.38)

continue

Table II: List of prescribed drugs and their frequencies (cont.)

Drug classes	Frequency (%)
Antiemetic	62 (12.38)
Skin products	44 (8.78)
Antifungal	39 (7.78)
Combined antibiotics	33 (6.59)
Antiepileptic	31 (6.19)
Anti-hypertensive	28 (5.59)
Adrenergic	20 (3.99)
Antidiabetic	13 (2.59)
Steroids	11 (2.19)
Laxative	11 (2.19)
Anti-spasmodic	10 (1.99)
Antitussive-expectorant	7 (1.39)
Antigout	7 (1.39)
Cardiovascular drug	7 (1.39)
Antihelmintic	5 (0.99)
Antiprotozoal	4 (0.80)
Antidiarrheal	3 (0.59)
Oral contraceptive	3 (0.59)
Anticholinergic	2 (0.39)
Antiarthritic	1(0.19)
Nasal decongestant	1 (0.19)

Table III: Most commonly prescribed therapeutic classes and generic drugs

Therapeutic class	Frequency (%)	Generic	Frequency (%)
PPI	298 (59.48)	Esomeprazole	177 (59.4)
Vitamin Mineral	248 (49.50)	Calcium and vitamin D	121 (48.79)
Analgesics	212 (42.32)	Naproxen	65 (30.66)
Anti-histamine	88 (17.56)	Fexofenadine hydrochloride	28 (31.82)
Antidepressant	87 (17.37)	Flupenthixol	29 (33.33)
		Melitracen	
Antacid	75 (14.97)	Sodium alginate, Sodium bicarbonate and Calcium carbonate	55 (73.33)
Muscle relaxant	68 (13.57)	Tizanidine	25 (36.76)
Single Antibiotics	62 (12.37)	Azithromycin	19 (30.65)
Combined Antibiotics	33 (6.58)	Cefuroxime +Clavulonic acid	26 (78.79

Among 1717 medicines of 28 therapeutic classes from 501 different prescriptions, PPIs, vitamin-mineral, analgesics, antihistamines, antidepressants, antacids and muscle-relaxants were the most frequently prescribed classes of medications (Tables II and III). According to Table IV, PPI, analgesics and antacids were prescribed more frequently for females than males ($p < 0.05$). On the other hand, the prescription frequency of antihistamines and combined antibiotics was higher for males than females ($p<0.05$, Table IV).

Table IV: Prescription pattern of most common drugs according to gender

Therapeutic class	Female (%)	Male (%)	p-value
PPI	208 (74.28)	60 (47.61)	<0.01
Vitamin-mineral	89 (31.78)	30 (23.80)	0.205
Analgesic	147 (52.5)	43 (34.12)	<0.01
Anti-histamine	43 (15.35)	32 (25.39)	<0.05
Antidepressant	57 (20.36)	23 (18.25)	0.076
Antacid	36 (12.85)	5 (3.96)	<0.01
Muscle-relaxant	43 (15.35)	13 (10.31)	0.546
Single antibiotics	32 (11.42)	21 (16.66)	0.377
Combined antibiotics	15 (5.53)	14 (11.11)	<0.05

Anti-ulcerants were the most frequently seen treatment category, where PPIs contributed the most, which is almost 60%. Interestingly, Esomeprazole as a single generic covered almost all of PPIs usage (Tables II and III). Although this category of medication was less prescribed for children (~17%), the most prevalent age group was found to be the older population (73.33%) (Table V). There is a significant variation in PPI usage among different age groups ($p<0.01$, Table V).

Table V: Prescription pattern of most common therapeutic classes according to age

Frequency (%) of Therapeutic classes	Age groups					p-value
	0-14	15-24	25-40	41-60	More than 60	
PPI	1 (16.66)	43 (62.31)	111 (64.16)	86 (71.66)	22 (73.33)	<0.01
Vitamin-mineral	1 (16.66)	18 (26.08)	45 (26.01)	72 (60)	9 (30)	0.447
Analgesic	1 (16.66)	31 (44.92)	74 (42.77)	68 (56.66)	13 (43.33)	<0.01
Anti-histamine	3 (50)	17 (24.63)	37 (21.38)	9 (7.5)	6 (20)	<0.01
Antidepressant	3 (50)	13 (18.85)	37 (21.38)	23 (19.16)	1 (3.33)	0.183
Antacid	0 (0)	1 (1.44)	15 (8.67)	17 (14.16)	3 (10)	<0.01
Muscle relaxant	0 (0)	7 (10.14)	21 (12.13)	27 (22.5)	0 (0)	<0.05
Single Antibiotics	2 (33.33)	13 (18.84)	23 (13.29)	9 (7.5)	3 (10)	0.181
Combined antibiotics	0 (0)	5 (7.25)	13 (7.51)	9 (7.5)	5 (16.67)	0.093

Vitamins and minerals were the most commonly prescribed therapeutic class after PPIs, with the frequency found to be almost half of the prescriptions surveyed (Table II). Calcium and Vitamin D were more prevalent in this class, with almost ~49% of prescriptions containing this therapeutic class (Table III). No significant association was observed among the

different age groups of vitamin prescription (p>0.05, Table V).

Analgesics were the third most commonly prescribed therapeutic class, with naproxen being the most prescribed generic (30.66 %) (Table III). The usage of analgesics was more frequent in senior adult patients. Interestingly, high-level use of PPIs in senior adult patients (~72%) sounds correlated with the significant use of analgesics (p<0.01), as these two classes of medications are more commonly prescribed in combination (Table V).

A non-avoidable percentage of anti-histamines (88, 17.56%) and antidepressants (87, 17.37%) were also prescribed, where fexofenadine hydrochloride and the combination of flupenthixol-melitracen being the most frequently used respectively. No association was observed among the age groups of antidepressant prescription (p>0.05, Table V), but a significant association has been observed for anti-histamine prescription among different age groups (p<0.01, Table V). Antihistamines are associated with considerable drowsiness and fatigue in a significant number of people (28).

Although not as high as PPIs in use as anti-ulcerants, antacids were found to be prescribed significantly (p<0.01) in almost 15% of cases. A commercially available combination containing Sodium alginate, Sodium bicarbonate and Calcium carbonate appeared to cover almost three-quarters (73.33%) of antacid usage (Table III). Prescription order with an antacid was found more prevalent in senior adult patients, albeit the usage was only 14.16% (Table V).

Muscle relaxant was noticed to be present in a good number of prescriptions (68, 13.57%) with p<0.05. In addition, the usage of this class of medication was more prevalent in the senior adult patient group (27, 22.5%), and Tizanidine was the most prescribed muscle relaxant (25, 36.76%) (Tables III and V).

Antibiotics, both single and combination, were found in 12.37% and 6.58% of prescriptions, respectively (Table II). These percentages both individually (p>0.05) and in combination (p>0.05) were less than the recommended percentage of WHO (15-25%). 19 Other therapeutic types of medications such as antihypertensive, anti-diabetic, anti-arthritic, and antifungal were not as commonly prescribed.

A substantial amount of prescription errors has been reported while examining the prescription trend (Table VI). Many omission errors were noted, and several principles for safe prescribing were disregarded. Certain patient information was missing; 39 prescriptions lacked the patient's name, 103 prescriptions lacked the patient's age, and 95 prescriptions lacked the patient's gender.

Table VI: Prescription errors found in the study

Errors	Frequency	Percentage (%)
Errors of omission linked to patients		
The patient's full name was not written	39	7.79
Age not mentioned	103	20.56
Gender not mentioned	95	18.97
Errors of omission linked to prescriber		
Prescription date not mentioned	26	5.19
Prescriber information not mentioned	7	1.4
Diagnosis not mentioned	501	100
Illegible handwriting	19	3.8
Errors of omission linked to medicine		
Strength not mentioned	5	1
Generic name not used	501	100
Errors of commission		
Incorrect strength	0	0
Wrong drug name (not spelling)	0	0
Wrong dosage form	0	0

Seven prescriptions lacked prescriber information (name, signature, and registration number). Five prescriptions lacked the drug's strength, while 26 prescriptions lacked the date. There was not a single prescription issued with the generic names of the medications. To avoid confusion, it is important to prescribe medications using their generic names. While generic prescribing has several advantages and disadvantages, the benefits can often outweigh the problems (4). Nineteen prescriptions had illegible handwriting, and 29 of the 530 prescriptions obtained had to be excluded initially from the study due to the unreadable handwriting. No prescription contained a diagnosis.

DISCUSSION

The survey aims to better understand the pattern of prescription and subsequent mistakes in Bangladesh's tertiary care facilities. 501 prescriptions were reviewed, and investigations were conducted into demographic data such as age and gender, number of medications per prescription, therapeutic classes of pharmaceuticals, essential drugs, and, particularly, prescription errors.
Gastrointestinal (GI) disorders are very common in Bangladesh and thus, anti-ulcerant medications are mostly observed for local patients (29). In this study, a similar observation has been found. The highest number of prescriptions was observed for anti-ulcerant groups, where PPIs accounted for almost 60% of total prescriptions. Among the PPIs, Esomeprazole has been prescribed mostly (59.4%), and similar findings have been reported by researchers (30). PPIs usage have a wide range of short- and long-term adverse effects. Possible short-term side effects include headache,

vertigo, rash, and gastrointestinal problems such as nausea, vomiting, and pain. Long-term PPIs usage has been connected to several health problems, including dementia and kidney damage, in addition to infections and poor nutritional absorption. Therefore, for a short period of time, researchers advise utilizing the lowest effective dose (27,31-34). Lifestyle changes and the use of H2 blockers may generate better results than PPIs, lowering their use (35).

According to our findings, Anti-ulcer medications are prescribed in over 50% of cases without a medical indication. PPIs with antacid preparation, the proportion touches approximately 75%, which is similar to previously published data (36,37). Antacid preparations, particularly the non-systemic ones, offer a good treatment modality for the management of heartburn and indigestion. However, the advent of a more potent class of drugs, like PPIs, might be related to the lower use of antacids for managing these conditions.

Following PPIs, vitamins and minerals were the therapeutic class most often prescribed, accounting for nearly half of all prescriptions. While vitamins and minerals are beneficial for reducing deficiencies and speeding up the healing process, some prescribers add them without providing an explanation, which is seen as unreasonable and puts an extra cost on the patient. A high frequency of prescribing vitamins and minerals in female and senior adult patients seems logical, as progressive bone demineralization happens with age and is more prevalent in females (38).

The third most often prescribed therapeutic class was analgesics, among which naproxen is the most frequently prescribed generic (30.66 %). Previously, the high prevalence of analgesic prescription among adults and a positive correlation between PPI and analgesic combination has been reported (29). Similar observations have been found here where a high percentage of PPI usage (~72%) in elderly adult patients appears to be associated with analgesic use, given that these two drug groups are typically provided in combination. Analgesics may cause a variety of adverse effects, including fatigue, rash, dry mouth, constipation, and gastrointestinal problems. It should be used carefully under the supervision of registered physicians for a few days at a time. Nonsteroidal anti-inflammatory medicines (NSAIDs) can raise the risk of kidney damage, skin reactions, and gastrointestinal bleeding in children when used excessively or over an extended time (39,40). Additionally, the prescription percentages of anti-histamine and antidepressant were not different from each other, but the proportions were not non-negligible. Among the anti-histamine drugs, fexofenadine hydrochloride is the most prescribed generic (31.82%) which indicates that the patient had been suffering from allergy-related discomfort. Anti-histamines are associated with considerable drowsiness and fatigue in a significant number of people (30). On the other hand, among the antidepressant classes, the most common combination was melitracen and flupenthixol. However, the combination of flupentixol and melitracen was banned in India in 2013 by the country's health ministry due to the risk factor for human health (12). Flupentixol may increase the risk of cardiovascular disease, cerebrovascular side effects, stroke, and venous thromboembolism, among other adverse effects (34). Furthermore, almost 19% of antidepressant prescriptions are found for the age group of 15-24, which is alarming. Therefore, physicians should be careful with a view to prescribing antidepressants for adolescents. Otherwise, there may be the possibility of misuse of the drug as self-medication practice is very common in our country (41). The proportion of antibiotic prescriptions is much lower than the WHO recommendation, which is a good sign. In the present study, the proportion of prescriptions of single antibiotic and combinations is reported as only 12.37% and 6.58%. Azithromycin and cefuroxime-clavulanic acid combination were found to be the widely prescribed drugs in this study. However, the latest essential drug list includes only Azithromycin. The prescriber did not write substitute drugs from the essential drug list.

Examining the prescription trend, a significant number of prescription errors have been reported. Numerous omission mistakes were observed, and several safe prescription guidelines were broken. Prescription orders with missing medication strengths might have significant consequences, hence there should be enough cross-checking mechanisms in place to catch these problems and fix them, including software, chemist interventions, etc. Prescriptions that are written without a date on them are likewise more likely to be abused arbitrarily. Notably, patients won't be informed when their prescriptions need to be renewed to continue receiving therapy. Importantly, generic prescribing is not available. A few studies revealed a lack of prescriber interest in generic prescribing and a lack of belief in the increased effectiveness of generic prescribing in certain countries such as Malaysia and Bosnia and Herzegovina (42-44). On the other side, a survey indicates that physicians in the United States of America support generic prescribing (45). While generic prescribing has several advantages and disadvantages, the benefits can often outweigh the problems (4). Therefore, to avoid confusion, it is important to prescribe medications using their generic names. There were many prescriptions with illegible handwriting, which complicated medicine identification. This might result in therapy being delayed, unneeded tests being performed, erroneous doses being administered, discomfort, and even death. A study says that poor handwriting kills many people in Europe yearly (46). Diagnosis provides both the patient and the dispenser with information regarding their disease

condition (47). The diagnosis was nearly absent in all the prescriptions. The absence of a diagnosis can result into catastrophic complications. Patients do not receive appropriate treatment without a diagnosis.

Approximately half of the prescriptions (240) were missing essential drugs. Prescribing less essential pharmaceuticals implies that the physician is either unconcerned about the patient's prescription expenditure or is unaware of the benefits of prescribing essential drugs.

In this study, approximately 17% of prescriptions had five or more drugs and about 75% of prescriptions contained three or more medications. This result is approximately twice or more than the WHO's ideal threshold for tertiary hospitals (1.6-1.8). All this information falls under Polypharmacy. The appropriate usage of various medications improves patient health outcomes such as life expectancy and quality of life, and this is acceptable. However, using many medicines without proof can result in drug-drug interactions and adverse drug events (ADEs) (48,49).

However, the high prevalence of polypharmacy, excessive use of PPIs, limited essential drug prescriptions, and omission errors in Bangladesh stem from several factors. Physicians often follow habitual prescribing patterns influenced by pharmaceutical marketing (20), while weak enforcement of regulations allows brand-name prescribing over cost-effective generic alternatives (17). Additionally, patient expectations for multiple medications contribute to overprescription (4), and the lack of electronic prescription systems increases errors (21). Overburdened healthcare providers in tertiary hospitals, facing time constraints, may rely on routine prescriptions rather than individualized evaluations, further exacerbating these issues (16).

The findings of this study align with previous research in Bangladesh and other developing countries, revealing common trends such as high rates of brand-name prescribing, omission errors, and polypharmacy. Similar to Sultana et al. (2015), over 90% of prescriptions in Bangladesh were issued by brand names, with low essential drug usage (4). Polypharmacy remains prevalent, as seen in Nepal and India, with an average of 4-5 drugs per prescription exceeding WHO recommendations (50). The overuse of PPIs and vitamin-mineral supplements, reported by Rashid et al. (2022), continues to be a concern (30). However, this study found a lower antibiotic prescription rate (12.37%), suggesting an improvement in antibiotic stewardship compared to previous studies that reported excessive use (13).

Strengths and weaknesses of the study

The study was carried out by collecting prescriptions directly from patients. As the general medicine group was chosen, it provided a wide range of drugs being used. The study included a large sample number of 501 prescriptions containing 1717 drugs.

This study isn't without its limitations. This study examined outpatients only and did not include inpatients. This study examined only three tertiary-level hospitals; however, this does not represent all tertiary-level hospitals, and because all three hospitals were government-run, private hospitals were not represented.

CONCLUSION

Prescription errors are unavoidable in our healthcare system. Therefore, writing prescriptions is tricky. The majority of studies in Bangladesh show that in tertiary hospitals, prescription writing practices do not comply with standard protocol and generic prescription practice is missing. The current research shows low compliance with legal prescription writing standards, necessitating a full understanding of disease pathophysiology, medication characteristics, and interactions. This highlights the necessity of pharmacists and medical educators to emphasize exact and comprehensive prescription drafting. The government should enforce stringent criteria to guarantee that prescriptions are written correctly and without error. This study also highlights the prevalence and causes of prescription errors in Bangladesh, providing valuable data for policy development. It suggests improving prescription regulations, enhancing healthcare provider training, and adopting digital systems to reduce errors. Moreover, the findings lay the groundwork for future research on intervention effectiveness, regional variations, and technological solutions to enhance patient safety in the country further. Additionally, three or more medicines per prescription and missing essential drugs are noted, which is alarming for the healthcare system. Anti-ulcerates, vitamin-mineral, analgesics, and antidepressants need to be prescribed judiciously as for antibiotics. The research findings may help healthcare policymakers formulate appropriate strategies to ensure the rational and safe use of drugs.

ACKNOWLEDGEMENTS

The authors are grateful to the Department of Pharmacy, University of Dhaka, Bangladesh for providing continuous support to carry out this research.

REFERENCE

1. Shanmugapriya S, Saravanan T, Rajee SS, Venkatrajan R, Thomas PM. Drug prescription pattern of outpatients in a tertiary care teaching hospital in Tamil Nadu. Perspect Clin Res. 2018;9(3):133–8. doi: 10.4103/picr.PICR_86_17
2. Shrestha R, Prajapati S. Assessment of prescription pattern and prescription error in outpatient

Department at Tertiary Care District Hospital, Central Nepal. J Pharm Policy Pract. 2019;12(1):1–9. doi: 10.1186/s40545-019-0177-y
3. Gashaw T, Sisay M, Mengistu G, Amare F. Investigation of prescribing behavior at outpatient settings of governmental hospitals in eastern Ethiopia: an overall evaluation beyond World Health Organization core prescribing indicators. J Pharm policy Pract. 2018;11:1–11. doi: 10.1186/s40545-018-0152-z
4. Sultana F, Rahman A, Paul TR, Sarwar MS, Islam MAU, Rashid M. Prescribing pattern and prescription errors: a study at a tertiary care hospital of Bangladesh. Bangladesh Pharm J. 2015;18(1):20–4. doi: 10.3329/bpj.v18i1.23509
5. Velo GP, Minuz P. Medication errors: prescribing faults and prescription errors. Br J Clin Pharmacol. 2009;67(6):624–8. doi: 10.1111/j.1365-2125.2009.03425.x
6. Dean B, Barber N, Schachter M. What is a prescribing error? BMJ Qual Saf. 2000;9(4):232–7.
7. Aronson JK. Balanced prescribing. Br J Clin Pharmacol. 2006;62(6):629.
8. Hinckley CM. Make no mistake—errors can be controlled. BMJ Qual Saf. 2003;12(5):359–65.
9. Van Den Bemt PMLA, Postma MJ, Van Roon EN, Chow M-CC, Fijn R, Brouwers JRBJ. Cost-benefit analysis of the detection of prescribing errors by hospital pharmacy staff. Drug Saf. 2002;25:135–43. doi: 10.2165/00002018-200225020-00006
10. Ofori-Asenso R, Agyeman AA. Irrational use of medicines—a summary of key concepts. Pharmacy. 2016;4(4):35. doi: 10.3390/pharmacy4040035
11. Begum MM, Uddin MS, Rahman MS, Nure MA, Saha RR, Begum T, et al. Analysis of prescription pattern of antibiotic drugs on patients suffering from ENT infection within Dhaka Metropolis, Bangladesh. Int J Basic Clin Pharmacol. 2017;6(2):257–64. doi: 10.18203/2319-2003.ijbcp20170317
12. Lamichhane DC, Giri BR, Pathak OK, Panta OB, Shankar PR. Morbidity profile and prescribing patterns among outpatients in a teaching hospital in Western Nepal. McGill J Med MJM. 2006;9(2):126.
13. Ata M, Hoque R, Biswas RSR, Mostafa A, Hasan FU, Barua HR. Antibiotics prescribing pattern at outpatient department of a tertiary medical college hospital. Chattagram Maa-O-Shishu Hosp Med Coll J. 2018;17(2):36–9. doi: 10.3329/cmoshmcj.v17i2.39775
14. Abir MWDMK. Evaluation of prescriptions using WHO indicators in public health care sector of Dhaka, Bangladesh. 2018;
15. Saha S, Hossain MT. Evaluation of medicines dispensing pattern of private pharmacies in Rajshahi, Bangladesh. BMC Health Serv Res. 2017;17:1–8. doi: 10.1186/s12913-017-2072-z
16. Rahman MM, Munia AT, Sikdar KMYK, Sarkar MR. A cross-sectional study on current prescription trends and errors in outpatient department of a Bangladeshi secondary care district hospital. Perspect Clin Res. 2022;13(3):161–7. doi: 10.4103/picr.PICR_245_20
17. Sayeed MA, Iqbal N, Ali MS, Rahman MM, Islam MR, Jakaria M. Survey on antibiotic practices in chittagong city of Bangladesh. Bangladesh Pharm J. 2015;18(2):174–8. doi: 10.3329/bpj.v18i2.24318
18. Chakma N, Ali SB, Islam S, Momtaz T, Farzana N, Amzad R, et al. Exploration of Challenges and Opportunities for Good Pharmacy Practices in Bangladesh : A Qualitative Study. 2025;1–14. doi: 10.3390/pharmacy13010026
19. Nizame FA, Shoaib DM, Rousham EK, Akter S, Islam MA, Khan AA, et al. Barriers and facilitators to adherence to national drug policies on antibiotic prescribing and dispensing in Bangladesh. J Pharm Policy Pract [Internet]. 2021;14(1):1–13. doi: 10.1186/s40545-021-00342-7
20. Chowdhury J. Ethical Considerations in Pharmaceutical Gift-Giving Practices : A Case Study of Bangladesh. 2025;6256(2022):33–44.
21. Sharma D. Challenges and Opportunities in Pharmacovigilance Implementation in Bangladesh : A Review of Reporting Systems , Awareness , and Regulatory Challenges and Opportunities in Pharmacovigilance Implementation in Bangladesh : A Review of Reporting Systems , Aw. 2025;(January).
22. Web-1. Hospital Services Management [Internet]. [cited 2025 Mar 17]. Available from: http://hospitaldghs.gov.bd/list-of-2ndary-tertiary-level-hospital/
23. Web-2. Sample size calculator [Internet]. [cited 2025 Mar 17]. Available from: http://www.raosoft.com/samplesize.html
24. Web-3. Age Categories, Life Cycle Groupings [Internet]. [cited 2025 Mar 17]. Available from: https://www.statcan.gc.ca/en/concepts/definitions/age2
25. Ni KM, Siang CS, bin Ramli MN. Noncompliance with prescription writing requirements and prescribing errors in an outpatient department. Age (Omaha). 2002;130(32.7). doi: 10.52494/GUBZ9393
26. Babalola CP, Awoleye SA, Akinyemi JO, Kotila OA. Evaluation of prescription pattern in Osun state (Southwest) Nigeria. J Public Heal Epidemiol. 2011;3(3):94–8.
27. Ozdemir PG, Karadag AS, Selvi Y, Boysan M, Bilgili SG, Aydin A, et al. Assessment of the effects of antihistamine drugs on mood, sleep quality, sleepiness, and dream anxiety. Int J Psychiatry Clin Pract. 2014;18(3):161–8. doi: 10.3109/13651501.2014.907919
28. Teleha M, Sles6rov6 L. Activity and variability of aminopeptidases and gamma-glutamyl transpeptidase of the cutaneous mucous membrane in the cow's rumen. Vet Med (Praha). 1976;21(4):201–8.

29. Siddique RAH. Prevalence of peptic ulcer disease among the patients with abdominal pain attending the department of medicine in Dhaka Medical College Hospital, Bangladesh. IOSR J Dent Med Sci. 2014;13(1):5–20.
30. Rashid MM, Sultana J, Jahan A, Saifuddin M, Reza MS. A Study on the Prescription Trend of Proton Pump Inhibitors in Major Divisions of Bangladesh. Bangladesh Pharm J. 2022;25(2):209–17. doi: 10.3329/bpj.v25i2.60972
31. McCarthy DM. Adverse effects of proton pump inhibitor drugs: clues and conclusions. Curr Opin Gastroenterol. 2010;26(6):624–31. doi: 10.1097/MOG.0b013e32833ea9d9
32. Lin D, Eke C, Cai C, Thrift AP, Shukla R. Decreasing overall and inappropriate proton pump inhibitor use: perspective from a large safety-net healthcare system. Clin Gastroenterol Hepatol. 2020;18(4):763–6.
33. Nieto-Martнnez R, Marulanda MI, Gonzбlez-Rivas JP, Ugel E, Durбn M, Barengo N, et al. Cardio-metabolic health Venezuelan study (EVESCAM): design and implementation. Invest Clin. 2017;58(1):56–69.
34. Song HJ, Jiang X, Henry L, Nguyen MH, Park H. Proton pump inhibitors and risk of liver cancer and mortality in patients with chronic liver disease: a systematic review and meta-analysis. Eur J Clin Pharmacol. 2020;76:851–66. doi: 10.1007/s00228-020-02854-8
35. Yasunaga C, Nakashima Y, Sueishi K. A role of fibrinolytic activity in angiogenesis. Quantitative assay using in vitro method. Lab Invest. 1989;61(6):698–704.
36. Hasan MQ, Mondal NT, Parvin R, Perveen I. Uses of proton pump inhibitors and their prescribing pattern among the patients attending the out-patient department at a tertiary care hospital in Bangladesh. J Enam Med Coll. 2020;10(1):10–6. doi: 10.3329/jemc.v10i1.45060
37. El Zahran T, Al Hassan S, Khalifeh M, Aboukhater D, Hammoud L, Al Hariri M, et al. Melitracen and flupentixol (deanxit) use disorder in Lebanon. Heliyon. 2023;9(5).
38. Malkin JD, Goldman DP, Joyce GF. The changing face of pharmacy benefit design. Health Aff. 2004;23(1):194–9. doi: 10.1377/hlthaff.23.1.194
39. O'Neil CK, Hanlon JT, Marcum ZA. Adverse effects of analgesics commonly used by older adults with osteoarthritis: focus on non-opioid and opioid analgesics. Am J Geriatr Pharmacother. 2012;10(6):331–42. doi: 10.1016/j.amjopharm.2012.09.004
40. Becuş T, Becuş-Laurenţiu M, Szabo A, Kelemen J. Anatomo-clinical considerations on a case of tuberous sclerosis. Neurol Psihiatr Neurochir. 1969;14(6):549–58.
41. Jami MABS, Biswas K. A cross-sectional study regarding the knowledge, attitude and awareness about self-medication among Bangladeshi people. Heal Policy Technol. 2023;100715. doi: 10.1016/j.hlpt.2022.100715
42. Kumar R, Hassali MA, Saleem F, Alrasheedy AA, Kaur N, Wong ZY, et al. Knowledge and perceptions of physicians from private medical centres towards generic medicines: a nationwide survey from Malaysia. J Pharm policy Pract. 2015;8(1):11.
43. Čatić T, Avdagić L, Martinović I. Knowledge and attitudes of physicians and pharmacists towards the use of generic medicines in Bosnia and Herzegovina. Med Glas. 2016;14(1):25–32.
44. Kaur S. Generic prescribing in India: A stumbling block. 2020;
45. Choudhry NK, Denberg TD, Qaseem A, Physicians CGC of the AC of. Improving adherence to therapy and clinical outcomes while containing costs: opportunities from the greater use of generic medications: best practice advice from the Clinical Guidelines Committee of the American College of Physicians. Ann Intern Med. 2016;164(1):41–9. doi: 10.7326/M14-2427
46. Bekele NA, Tadesse J. Prescription auditing based on World Health Organization (WHO) prescribing indicators: A case of Dilla University referral hospital. J Drug Deliv Ther. 2018;8(6-s):21–5. doi: 10.22270/jddt.v8i6-s.2165
47. Sokol DK, Hettige S. Poor handwriting remains a significant problem in medicine. J R Soc Med. 2006;99(12):645–6. doi: 10.1177/01410768060990121
48. Afshar S, Roderick PJ, Kowal P, Dimitrov BD, Hill AG. Multimorbidity and the inequalities of global ageing: a cross-sectional study of 28 countries using the World Health Surveys. BMC Public Health. 2015;15:1–10. doi: 10.1186/s12889-015-2008-7
49. Gnjidic D, Le Couteur DG, Kouladjian L, Hilmer SN. Deprescribing trials: methods to reduce polypharmacy and the impact on prescribing and clinical outcomes. Clin Geriatr Med. 2012;28(2):237–53.
50. Anya SE, Hydara A, Jaiteh LES. Antenatal care in The Gambia: Missed opportunity for information, education and communication. BMC Pregnancy Childbirth. 2008;8:1–7. doi: 10.1186/1471-2393-8-9