

Quality of Prescription Writing Practices in a Tertiary Care Teaching Hospital of Bihar: A Cross-Sectional Study

Running Title: Quality of Prescription Audit

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Abstract

Introduction: Prescription is an important order which is given by the doctor to their patients. For the maximum benefit of the patients the prescription order should be according to the predefined pattern. Prescribing errors are very common in clinical practice, which may cause harm to the patient rather than benefit. To reduce the prescription error and promote rational prescribing, continuous monitoring of prescription in the form of prescription audit is required. **Objective:** To assess the quality of prescriptions from different OPD (Out Patient Department) in a Tertiary care teaching hospital, Patna, for its legibility and completeness. **Methodology:** It is descriptive cross-sectional study conducted in Out Patients Department of Tertiary care teaching hospital, Patna from 10th June 2019 to 20th July 2019. In this study Non probability purposive sampling was done to ensure maximum variability. **Results:** In this maximum number of prescriptions collected from Medicine department (21.5%). The average number of drugs prescribed per prescription is 3. Drugs were prescribed by their generic name in only 10% of prescriptions. Frequency, route and duration of administration of drug were mentioned in 86.7%, 79.3% and 69.6% of prescriptions respectively. Out of total prescriptions only 42.5% prescriptions were easily legible. **Conclusion:** In this study most of the prescription parameters were not according to the WHO standard, which can cause harm to the patients rather than benefit. **Recommendation:** For quality improvement of prescriptions there is need to train the doctors to write prescription according to the guidelines and also time to time monitoring by hospital authority.

Keywords: Prescription, Legibility, Generic, Quality

Introduction

All India Institute of Medical Sciences (AIIMS), Patna was established in 2012, under the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) [1]. Till date, the Institute has served around 11 51 795 patients in OPD and another 54 388 in emergency. With an average of 1000 OPD patients per day, the institute generates around 1000 prescriptions a day [2].

Prescription is an important order which is given by the doctor to their patients [3]. The goal of the prescription is to achieve the desired therapeutic effect without producing toxicity or harming the patients. So, for the maximum benefit to the patients, the prescription order should be as per a predefined pattern. Prescription errors are very common in clinical practice. These are due to ineffective use of the inputs from various sources such as patients, academic literature, professional colleagues, public commercials, and government regulations [4]. Worldwide, it is estimated that over half of all medicines are—prescribed, dispensed or sold inappropriately, also, half of all patients fail to take their medicine correctly [5]. Nowadays, the irrational use of drugs is one of the most common problems faced by public healthcare providers and administrators in many countries[6]. As per the World Health Organization (WHO),“rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost to them and their community” [7].

Irrational prescription includes—misuse, overuse, and underuse of medicines which may further result in an unsafe treatment, exacerbation of the disease, health hazards, economic burden on the patients and wastage of resources [3, 8]. Examples of irrational use of medicines include: poly-pharmacy, inadequate dosage, use of antimicrobials even for non-bacterial

infections, excessive use of injections despite appropriate oral forms being available, self-medication and non-compliance to dosage regimens.

To promote a rational prescription practice, a continuous monitoring of prescription in the form of prescription audit is required. Prescription audit is a tool to assess the quality of medical care, it is based on documented evidence to support diagnosis and treatment. Medical audit is the systematic, critical analysis of the quality of medical care, including the procedures used for diagnosis and treatment, the use of resources, the resulting outcome and quality of life of the patients. It is a continuous cycle, involving observation of practice, setting standards, comparing practice with standards, implementing changes and observing the new practice [9]. So far, no audit has been conducted in AIIMS, Patna regarding the quality or burden of prescriptions. Hence, we tried to assess the types of errors in writing the prescriptions at AIIMS, Patna by analyzing the data obtained from an undergraduate student project which was a part of teaching curriculum.

Objective

To assess the quality of prescriptions from different Out Patient Departments (OPDs) in a tertiary care teaching hospital in Patna, for errors, legibility and completeness.

Materials and Methodology

Study Place: OPDs of a tertiary care teaching hospital (AIIMS, serving an average of 1000 OPD patients per day) in Patna.

Duration of the Study: From 10th June 2019 to 20th July 2019.

Design of the Study: Descriptive cross-sectional study.

Inclusion and Exclusion Criteria: All new prescriptions, from all the OPDs run

by resident doctors (senior resident and junior residents), collected during a definite time 10 am to 11.30 am (student's short project posting)/were included in the study, while all the prescription from super-specialty clinics and those prescribed by faculty/consultants were excluded.

Sampling Technique: Non-probability purposive sampling was done to ensure maximum variability. All the prescriptions generated during the study period from all the OPDs run by resident doctors were included.

Sample Size: As the data collection was made by the students as part of a student project so the sample was collected only during 1.5 hour daily (10 am-11:30 am), hence the sample size was all the possible prescriptions recorded during that time (convenience sampling).

Data Collection: The study was carried out over a period of 1 month in the OPDs of a tertiary care teaching hospital of Patna. For data collection a WHO core indicator based proforma was designed, which included the indicators—legibility, number of drugs per prescription, mentioning route, dose, duration, advice for follow-up, doctor's signature etc. On the basis of legibility and other characteristics mentioned, the prescription errors were found out. Pre-testing was done on 50 proforma for its feasibility and necessary corrections were made. Final proforma were converted to Google Form and the link was shared with 20 MBBS students. Each department OPD was allotted to two students. Each prescription was scanned and later filled in Google Form to avoid any mistake. The data was monitored on daily basis.

Before data collection, the Head of Department (HOD) of each department was informed by e-mail about the data collection.

Statistical Analysis: All the data from hospital OPD was stored in Google spreadsheet and downloaded in excel format. For statistical analysis of the data, Statistical Package for the Social Sciences (SPSS) version 20 software (provided by Public health foundation of India-PHFI) was used. The outcomes were expressed as frequency and percentage. Chi-square test was used as test of significance, a p-value of <0.05 was taken as significant. The variables used for analysis were contribution of prescription by different OPDs (Medicine, Pediatrics, Pulmonary Medicine, General Surgery, Psychiatry, Orthopedics, Obstetrics & Gynecology, ENT, Ophthalmology, and Skin) for number of drugs per prescription, other parameters, and legibility of prescriptions.

Results

Table 1 shows the number of prescriptions collected from different departments. Around 1132 prescriptions were generated during the time slot of the data collection which were taken for the analysis. Maximum number of prescriptions were collected from the Medicine department (21.5%), followed by Paediatrics (17%), Pulmonary Medicine (10.2%) and General Surgery (9.8%). While, minimum number of prescriptions were collected from Skin and Venereal disease department (4.2%). Around 60.7% prescriptions were collected from medical departments (Medicine, Paediatrics, Pulmonary Medicine, Psychiatry, and Skin) and 39.3% were from surgical departments (General Surgery, Orthopaedics, Obstetrics & Gynaecology, ENT, Ophthalmology).

Weight was mentioned in 94.2% of prescriptions in paediatrics, 65.3% of prescriptions in medicinal departments, while only 10.7% of prescriptions in surgical departments (Table 2). Single drug was prescribed in 13.7% prescriptions, two drugs in 20%, 3 drugs

in 22.4% prescriptions and more than four In some cases, the need of prescribing medication was ascertained only after the advised investigations. Because of this, in 10.1% prescriptions no drugs had been prescribed. The average of three drugs was prescribed per prescription (Table 3).

Drugs were prescribed by their generic name in only 10% of prescriptions. Doses were mentioned in 56.4% of prescriptions. Frequency, route, and duration of administration of drug were mentioned in 86.7%, 79.3%, and 69.6% of prescriptions, respectively. Drugs were prescribed in capital letter in only 14.1% of

drugs 18% prescriptions. prescriptions. 80.4% prescriptions had doctor's full signature at the end of the prescriptions (Table 4).

Forty-two percent prescriptions were easily legible (readable). Majority of the prescriptions (56.9%) were difficult to read, and around 0.6% prescriptions were illegible (not readable at all) (Table 5).

The medical departments prescriptions were more legible as compared to those of surgical departments ($p= 0.04$) (Table-6).

Table 1: Contribution of prescription by different OPD (N=1132)

Name of OPD	Number of prescriptions	[%]
Medicine	243	[21.5]
Paediatrics	192	[17.0]
Pulmonary Medicine	115	[10.2]
General Surgery	111	[9.8]
Psychiatry	90	[8.0]
Orthopaedics	89	[7.9]
Obstetrics & Gynae	87	[7.7]
ENT	81	[7.2]
Ophthalmology	77	[6.8]
Skin & Venereal disease	47	[4.2]

Table 2: Number of prescriptions with weight of the patient mentioned-(N=1132)

Department	Weight Mentioned			
		Yes*	Partial#	Total
		N [% with 95% CI]	N [% with 95% CI]	
Medical		268 [54.1, 49.7-58.4]	227 [45.8, 41.5-50.2]	495 (100%)
Surgical		48 [10.7, 8.2-14.0]	397 [89.2, 85.9-91.7]	445 (100%)
Paediatrics		181 [94.2, 90.0 -96.7]	11 [5.7, 03.2 - 09.9]	192 (100%)
Total number of prescriptions				1132

Table 3: Number of drugs per prescription-(N=1132)

Number of drugs per prescription	Number of prescriptions	[%]
0*	114	[10.1]
1	155	[13.7]
2	227	[20.0]
3	254	[22.4]
4	178	[15.7]
>4	204	[18.0]
Average number of drugs per prescription	3	

* 0 drug/ prescription- No drug mention on the prescription.

Table 4: Analysis of different parameters of prescriptions (N=1132)

Parameters	Number of Prescription		
	Yes*	Partial#	No\$
	N [% with 95% CI]	N [% with 95% CI]	N [% with 95% CI]
Drug Prescribed by generic name	106 [10.0, 07.8-11.2]	60 [5.7, 04.1-06.7]	966 [85.3, 83.1-87.2]
Dose of drug*	609 [53.8, 50.8-56.6]	159 [14.1,12.1-16.1]	364 [32.1, 29.5-34.9]
Frequency of drug	982 [86.7, 84.6-88.6]	39 [3.45, 2.5- 4.6]	111 [9.8, 8.2-11.6]
Route of drug	898 [79.3, 76.8-81.5]	16 [1.4, 0.87-2.2]	218 [19.3, 17.0-21.6]

Duration of Drug	788 [69.6, 66.8-72.2]	67 [5.9, 4.6-7.4]	277 [24.5, 22.0-27.0]
Drug prescribed in Capital letter	160 [14.1, 12.2-16.2]	-	972 [85.9, 83.7-87.7]
Advice for follow up	502 [44.3, 41.4-47.2]	-	630 [55.7, 52.7-58.5]
Doctor's full signature	910 [80.4, 77.9-82.6]	-	222 [19.6, 17.4-22.6]
Date below prescription	317 [28.0, 25.4-30.6]	-	815 [72.0, 69.3-74.5]

*Yes- If given parameter mention for all the medicine/prescriptions.

#Partial- If given parameter not mention for any of the prescribed medicine.

\$No- If given parameter does not mention for all the medicine/Prescriptions.

Table 5: Analysis of prescription on the basis of legibility (N=1132)

	Number of Prescription	[% with 95% CI]
Legible with ease	481	[42.5, 39.6-45.3]
Legible with difficulty	644	[56.9, 53.9-59.7]
Illegible	7	[0.6, 0.3-1.3]

Legible (readable), Illegible (not readable at all)

Table 6: Comparison of Departments on the basis of legibility (readability)

Department	Illegible N[%]	Legible with difficulty N [% with 95% CI]	Legible with ease N [% with 95% CI]	p-value
Medical	6 [0.8]	373 [54.2]	308 [44.8]	0.04
Surgical	1 [0.2]	271 [61.3]	173 [38.8]	

*The number and percentage in illegible, legible with difficulty and legible with ease are presented in the table but p-value was calculated after merging 'illegible' & 'legible with difficulty'.

Discussion

Since incorrect prescription can lead to ineffective and unsafe treatment, which may cause exacerbation of the condition or harm the patients, additionally increasing extra load in terms of money to the patients. So, time to time audit of prescriptions plays a very important role. Prescription audit is one of the most useful approach to improve the quality of patients care in medical settings [9, 10]. It is a process to identify and correct the errors in the prescriptions. Several studies show that through these audits clinicians benefited in the form of professional satisfaction and knowledge [11-13].

In our study, a total of 1132 prescriptions were analysed. Patient's details (name, age, sex, and address) were mentioned in all the prescriptions, as these details are printed at the time of registration itself. The average daily prescription generation from all the OPDs is around 1000 with 80% prescriptions being new and 20% from follow up patients. Of the total prescriptions, the maximum were contributed by the Department of Medicine, while the skin & venereal disease department contributed the minimum number of prescriptions. This may be because the maximum number (21.5%) of patients first comes in contact with the medicine department for their general complaints—from where they get referred to different departments. Similar pattern of contribution of prescriptions from different departments were found in a study by Bandyopadhyay et al in a tertiary care teaching hospital of eastern India [9].

Weight plays a major role in the distribution of a drug in body's tissues and it's clinical effect; this is more important in paediatric patients. Therefore, it is important to mention weight in the prescription [14]. In our study, weight was mentioned in around 94.2% of paediatric prescriptions, in 65.3% prescriptions of other medicine departments, and only in

10.7% prescriptions of surgical departments.

Doctors are known for their poor handwriting which leads to medication errors, dispensing wrong drugs, that may in turn lead to adverse reactions [15]. In the present study, we found that more than half prescriptions were difficult to read, although 42.5% were legible; there was a significant statistical difference between surgical and medicinal departments ($p = 0.04$). To minimise errors resulting from poor handwriting, capital letters should be used in prescriptions, and if possible, providers should switch to electronic prescription systems [15]. In our study, only 14.1% prescriptions are written in capital letters. This practice may be due to overflow of the patients (around 1000 OPD per day with average time per patient being 10 minutes) or due to the habit of writing in running letters by the doctors. Whereas in a study by Hamid et al, 65% compliance was achieved in documentation of age, generic drug name prescription and capital-letter prescription which is in contrast with our study [16].

To reduce the cost of medicines for the patients, in April 2017, the Government of India intended to ensure that doctors prescribe medicine by their generic name as these are cheaper than their respective brand name [15]. In our study, medicines were written by generic name in only 10% of prescriptions. 84.2% prescriptions were by brand name, while in rest of prescriptions some medicines were prescribed by brand name and some by generic name. A study by Singh et al in a rural hospital of Delhi, shows that majority of drugs (85.8%) were prescribed by their generic name. This was due to repeated circulars and regular monitoring by hospital authority [15].

According to many studies incorrect dose and duration for drug administration were most common prescription errors worldwide [17, 18]. This prescription error

may lead to treatment failure, antibiotic resistance and adverse drug reaction, because the strength of drugs may differ in different brands [19]. In present study, dose of drugs were mentioned in 56.4% of prescriptions; frequency and duration of drug administration were mentioned in 86.7% and 69.6% of prescriptions, respectively. Follow-up advice was mentioned in 44.3% prescriptions, while doctor's signature with date were present in only 28% prescriptions.

Polypharmacy (multiple medicines) [20], a common finding in many of the prescriptions, may lead to different drug interactions which may further increases the adverse drug reactions, and also the cost of health care for the patients. As per the recommendation of WHO, only two drugs should be prescribed per encounter. In this study, the average number of drugs per prescription was three. In a study by Bandyopadhyay et al in eastern India, an average of 4.4 drugs was prescribed per prescription. The average number of drugs per prescriptions was 3 from some previous studies of India [21]. The average number of drugs per consultation in a study by Singh et al was 3.02 [15], another study reported this to be 3.1 in secondary level hospitals [22], similar to our study.

Conclusion

In this study we found that most of the prescription parameters were not followed
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exactly according to the WHO standard, the legibility was also not very good in all the prescriptions. There is a scope for improvement in the quality of these prescriptions if addressed regularly to the residents (Senior and junior residents) prescribing in the OPDS.

Recommendation

For quality improvement of prescriptions there is need to train the resident doctors to write prescriptions according to the guidelines, and also time to time monitoring by hospital authority/senior faculty.

Ethical approval

As the study project was part of a undergraduate (MBBS) student project which falls under the teaching curriculum, the ethical clearance was not sought. Declaration of Helsinki has been followed throughout the research work.

Conflict of Interest

There are no conflicts of interest involved.

Author's Contribution

Shradha, Pankaj - Literature search, data analysis, statistical analysis, manuscript preparation, Manuscript editing

Shamshad, Pragya - Design , intellectual content, Manuscript editing, Manuscript review

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