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Original Research Article

Outpatient Prescription Audit at a Tertiary Care Center in South Asia

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Abstract

Background: Globally medicines prescribed, dispensed or sold are inappropriate. Irrational use of medicines includes problems like polypharmacy, overuse, underuse or misuse of drugs adding to burden of morbidity and mortality. There is wastage of resources, drug stock depletions. Prescription audit is a quality improvement process that seeks to improve patient care through promotion of rational use of drugs. This study aimed to assess prescription pattern and prescribing behaviors of the medical professionals according to the WHO-recommended core prescribing indicators at a tertiary care center in the region of south asia.

Materials/Patients & Methods: It is a Cross- sectional, Observational study, conducted at a Tertiary care center. Data collected prospectively for a period of 1 month. Total 600 patients recruited. Simple Random sampling method was used. Case record form consisting of all relevant demographic & auditing parameters is used. Hospital Pharmacy dispensing point is used for data collection. Data collection was done by investigators. Evaluation of Prescribing indicators, Patient-care indicators, Health Facility indicators, Other Medication related problems was done. Statistical analysis was done using frequencies, averages/means, and percentages.

Results: Total 600 prescriptions were evaluated for the Audit, out of which 46.8% were Male & 53.16% were Female cases. Majority of the study subjects belonged to the age group of 41-50 years (19.33%). The average number of drugs per encounter was 3.95±1.8 and the percentage of drugs prescribed by generic name was 56.75% (n=1348) while 43.24 % (n=1027) of drugs were prescribed with brand names. 32.16 % of the dispensed drugs were not from hospital formulary. Out of total drugs prescribed only 49 (2.06%) were not from NLEM/State EML. In other words, 97.93 % of drugs were prescribed from NLEM/State EML. 38 % (n=228) prescriptions contained at least an antibiotic. The number of antibiotic drugs were 228 (13.30 %.) and percentage of prescriptions prescribed with at least an injection was 5.5 % (n=33).

Conclusion: This study on prescription pattern audit done using the WHO core prescribing, patients care and health facility indicators highlights that generating data on morbidity, which forms the basis for preparing the list of essential medicines. Mechanisms necessary for improving prescription practices are suggested. On comparing the current usage of drugs with the standard treatment guidelines will enhance the effectiveness of treatment and render it cost-effective.

Keywords: Outpatient, Prescription Audit, Tertiary Care Center.

Introduction

Globally, it is estimated that over half of all the medicines prescribed, dispensed or sold are inappropriate, and that half of all patients fail to take their medicine correctly. [1] The overuse, underuse or misuse of drugs may lead to widespread health hazards like antibiotic resistance, adverse events adding to the burden of morbidity and mortality as well as wastage of scarce resources. It may also cause distortion of health budgets (10%–40% is spent on medicines), depletion of drug stocks, and increased prices of medicines. [2]

Prescription audit is defined as the review and the evaluation of the health care procedures and documentation for the purpose of comparing the quality of care that is provided, with that of accepted standards. Studying the prescription audit is that part of the audit which seeks to monitor, evaluate and if necessary, suggest modifications in the prescribing practices of medical practitioners. Prescription audit is a quality improvement process that seeks to improve patient care. It aids health professionals to make sure their patients receive the best possible care. [3]

Prescription auditing has the tremendous potential to promote the rational usages of drugs and essential medicine. Essential medicines are one of the vital tools important to improve and maintain health. However, for too many people across the world medicines are still unaffordable, unavailable, unsafe and improperly used. [4]

We aim to assess prescription pattern and prescribing behaviors of the medical professionals according to the WHO-recommended core prescribing indicators & few other indicators, at one of the tertiary care center of south asia.

Objectives

A prescription audit was conducted among outpatient attendees of a representative sample of the GGG hospitals, at the behest of the Government of Gujarat. The objectives of the audit were,

- To monitor and suggest modifications in the prescribing practices in the healthcare facilities for better patient outcomes
- To suggest modifications for minimizing out of pocket expenses for the patient
- To minimize wastage of health resources, with special reference to medicines.

Material & Methods

The present cross sectional observational study was conducted at Shri M.P. Shah Government Medical College & GGG Hospital, Jamnagar. Prior approval from the Institutional Ethics Committee (IEC) was taken. Prescription data was collected from the patients attending all the clinical out patients departments of our hospital. OPD case papers or prescription slips or OPD cards were utilized for this purpose. Complete Safety & Confidentiality of all data was insured by the investigator. Hospital pharmacy dispensing point was used for data collection. The patients who attained the out-patient department of all ages and any gender were used to collect the prescription data. Prescription data from in patient's department, from casualty, medical surgical emergency department were excluded from study.

A Case record form (CRF) consisting of all relevant demographic & auditing parameters such as prescribing indicators, patient care indicators and health facility indicators was used. The study was performed over a period of 3 month. Random sampling method was used for data collection. Half quantity data was

collected in first fortnight & remaining half quantity in later fortnight of month.

The WHO guidelines and methods were observed to ensure data reliability. [5] Data from the prescriptions were recorded in the data collection forms, excluding patient name, hospital registration number, and address based on the following parameters.

The names and number of the drugs prescribed were noted down along with dosage forms, route of administration, dosage, frequency, and duration of treatment to assess the (WHO) core prescribing indicators, namely: [5]

Prescription data were entered in Microsoft excel file for analysis. Continuous variable as mean ± standard deviation and categorical variable as percentage were expressed. Frequencies, averages/means, and percentages were computed for different indicators.

Results

A total of 600 prescriptions were assessed. Majority of the patients was from age group of 41-50 years (19.33%) followed by 21-30 years of age group (18.33%). About 281 (46.8%) of the prescription encounters were from male OPD and (319) 53.1% from female OPD. The mean age was 39.80 years ± 19.29, with a range of 1month and 90 years. All the prescriptions had the patient identifiers such as name, age, sex and address mentioned. Few other patient related parameters like Date of Prescription, registration number, patient's names, Symbol Rx mentioned were complete i. e. 100% amongst all encounters. Body weight was mentioned in 84 (14%) patients only.

When we glance at prescriber designations out of 600 encounters, majority of the prescriptions were done by resident doctors (49.33%) followed by consultants (2.51%). In majority of the prescriptions designation was not mentioned accounting for (n=289) 53.16%.

On analysis of completeness of prescription, out of total of 600 prescriptions major number 460 (76.66%) of prescriptions has at least one drug for which dose was not mentioned. The number of prescriptions where dosage formulation, frequency, duration & route of administration was not mentioned for at least one of the drugs were 5 (0.83%), 3(0.5%), 6 (1%) & 3 (0.5%) respectively. Similarly, out of total 600 encounters, history of allergy not mentioned in 600 (100 %), Instructions to patients were not mentioned in 596 (99.93%) prescriptions & dispensing instructions were not mentioned in 599 (99.83 %) prescriptions. Non pharmacological instructions to patients were given in 147 patients 24.5 % only. In majority of prescriptions 443 (73.8 %) instructions were not mentioned. For 1.66 % of cases these were not applicable. In 87 % of prescriptions follow up visit was not mentioned. Number of complete prescriptions were only 3 (0.5%) in all sense reflecting poor quality of prescribers.

Table 1: Sociodemographic details and completeness of the prescription in relation to patient and prescriber identifiers, diagnosis, and instructions

Variables	Number of prescriptions/ encounters, *n* (%)
Total number of prescriptions (n)=600	
Age	39.80 years ± 19.29
Gender	
Male	281 (46.8)
Female	319 (53.1)
Patient identifiers	600 (100)
Prescriber identification	321 (46.84)

Instructions non pharmacological	147 (24.5)
Instruction to the patients not mentioned	596 (99.93)
Dispensing Instructions not mentioned	599 (99.83%)
Follow up visit not mentioned	522 (87)
Possibility of extra expense to patients	161 (26.83)
Prescriptions without diagnosis with complaints only	415 (69.16)
Prescriptions without diagnosis & complaints	105 (17.5)
Investigations advised in patients	281 (46.8)
Fresh prescription not written (continued previous treatment)	73 (12.16)

There is possibility of extra expense to patients for the medicines in 26.83 % (n=161) of prescriptions. In these prescriptions at least one drug is present which was unavailable from hospital formulary at the time of dispensing, so patient has to bear its cost unwillingly by making an outside purchase. The percentage of prescriptions without diagnosis with complaints only were 69.16 % (n=415), while 17.5 % (n=105) of prescriptions found to be without diagnosis & complaints. At least one investigation was advised in 46.8% of encounters. We have noted some extra finding which is worth noting for everyone's (prescribers, pharmacist and patients) benefit, Fresh prescription not written {Previous visit treatment continued (ct. all)}. Percentage of such prescriptions is 12.16 % (n=73).

Table 2: Completeness of the prescription with regard to the dosage regimen of the total drugs prescribed

Variables	Number of prescriptions, *n* (%)
Dosage not mentioned	460 (76.66%)
Formulation not mentioned	05 (0.83%)
Frequency not mentioned	03 (0.5%)
Route not mentioned	03 (0.5%)
Duration of treatment not mentioned	06 (1%)

On department wise data, we found that Medicine department leads all prescriptions with 181 (30.16%) followed by Orthopedics 80 (13.33%) and Skin & VD with 73 (12.16 %) of prescriptions.

Regarding legibility of prescriptions, it was assessed mainly on the basis of readability pertaining to drug and prescriber's handwriting it is assessed using a 3-point Likert scale.[6] Grading done as, grade 1- Illegible, Grade 2- Moderately Legible, Grade 3- Fully Legible. 535 (89.16 %) of prescriptions were in major group with (grade 2) as moderately legible. 7% prescriptions noted Illegible, while only 3.8% of the prescriptions had grade 3 legibility.

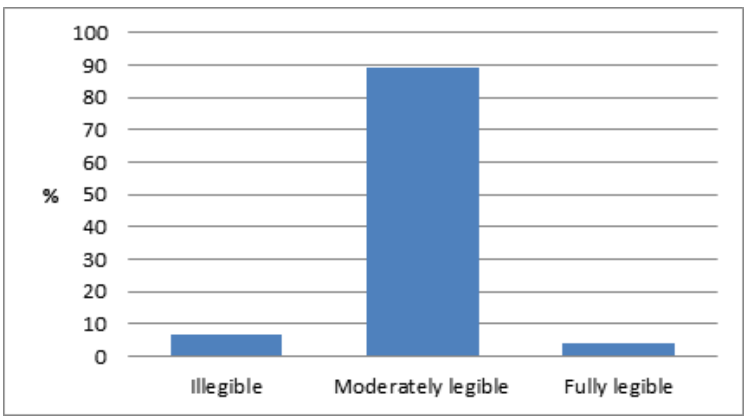

Fig 1: Legibility grading of the prescriptions

The WHO core prescribing indicators analysis revealed that the average number of drugs per encounter was 3.95±1.8 and the ppercentage of drugs prescribed by generic name was 56.75% (n=1348) while 43.24 % (n=1027) of drugs were prescribed with brand names. 32.16 % of the dispensed drugs were not from hospital formulary. Out of total drugs prescribed only 49 (2.06%) were not from NLEM/State EML. In other words, 97.93 % of drugs were prescribed from NLEM/State EML. 38 % (n=228) prescriptions contained at least an antibiotic. Number of antibiotic drugs were 228 (13.30 %.) and percentage of prescriptions prescribed with at least an injection was 5.5 % (n=33).

Out of total 600 prescriptions 314 (52.3%) were having at least one FDCs. Total number of FDCs prescribed were 379(15.95%). Prescriptions with monotherapy (single drug) were 33 (5.5 %) while 567 (94.5 %) were having more than one drug.

Table 3: Results of world health organization core prescribing indicators (total encounters=600; total drugs=2375)

Core prescribing indicator	Total drugs/encounters	Values ±SD
Average number of drugs prescribed per encounter	2375 (600)	3.95±1.2
Percentage of drugs prescribed by generic name	1348 (550)	56.75%
Percentage of drugs prescribed by brand name	1027 (477)	43.24%
Percentage of drugs NOT from Hospital formulary	242 (193)	10.18%
Percentage of encounters with an antibiotic prescribed	316 (228)	38%
Percentage of encounters with an injection prescribed	46 (33)	5.5%
Percentage of drugs prescribed out of the National List of Essential Medicines (NLEM)	49 (44)	2.06%
Percentage of prescription with tonic/Vitamins prescribed	549 (276)	46%
Percentage of prescriptions with at least one Fixed Dose Combinations (FDCs)	379 (314)	52.3%
Prescriptions with monotherapy	33	5.5%
Prescriptions With Polytherapy (more than one drug)	567	94.5%

Data expressed as frequency and percentages; mean±SD. SD: Standard deviation

The Patient care indicators analysis revealed that the **a**verage dispensing time was 1.22 minute. Percentage of drugs actually dispensed was 89.81 % &Percentage of drugs adequately labelled were only 2.86% (n=68).

Table 4: Patients care indicators

S. N.	Criteria	Values
1	Average dispensing time	1.22 minute
2	Percentage of drugs actually dispensed	89.81 % (2133)
3	Percentage of drugs adequately labelled	2.86 % (68)

The Health Facility indicators analysis revealed that availability of Essential medicine list & Key drugs list at different OPDs and drug delivery points. It was checked by observation and by consulting with responsible staff.

Table 5: Health Facility indicators

S. N.	Criterion	%
1	Availability of Essential medicine list	**90**
2	Availability of Key drugs	**92**

Discussion

Prescription is an important intervention by the treating medical professionals. Consequently, its ethical and legal responsibility of the practitioner to write complete and legible prescription. The present study evaluates drug prescribing indicators, patient care indicators, health facility indicators & few other medication related problems at a tertiary health care center which is a teaching hospital also. From the results we can get some possible reasons for omissions and inaccuracies in prescription writing that could aid in guidance for future initiatives aimed actuality improvement.

Based on the WHO core prescribing indicators, a total of 600 prescriptions were analyzed. Apart from the primary use of WHO core prescribing indicators in evaluating the prescriptions, a secondary level follow-up assessment based on the diagnosis and treatment was undertaken to scrutinize the core drug indicators in issue. [5] In this study, the average number of drugs per prescription was 3.95 ± 1.2, which is higher than the rural hospital prescription audit done in 2019. [7] However, the optimal value recommended by the WHO is 1.6–1.8 drugs per encounter. Another recent study from south India by Meenakshi et al. [8] found the average number of drugs per encounter was 2.38 ± 1.1. The higher number of drugs per encounter in this study was further followed up by evaluating the diagnosis for which the drugs were prescribed. It was found that the majority of the prescriptions were prescribed for patients with multiple diseases and co-morbidities indicating polypharmacy to be appropriate. Earlier stated that the majority of the patient data were from medicine clinic and non communicable disease patients are frequently visiting outpatient department leads to higher number of average drug per encounter.

The percentage of drugs prescribed by generic name in this study was 56.75% which is comparable with the study done by Potharaju and Kabra in Maharashtra, wherein 60% of the drugs were prescribed in generic name. [9] Another study by Meenakshi et al. found the percentage of drugs prescribed by generic name in this study was 55.4%. In this study, the majority of the prescriptions had at least one or more drugs prescribed with generic names which could be attributed to the regular prescription audit by the hospital followed by feedback to prescribe by generic names. Further, to promote generic prescribing, in 2018, the Drug Technical Advisory Board of India has recommended to provide a discrete area, especially for generic medicines in pharmacies along with displaying a signboard mentioning “Generic medicines are also available” at prominent places within the premises of the hospital. [10]

The percentage of antibiotics prescribed was optimal at 13.3% compared to the WHO recommendation (20%–26.8%). [7,8,11] One of the main reasons could be due to the hospital policy on rational use of antibiotics such as selective reporting of antimicrobial susceptibility to minimize the inadvertent use of high end and reserve drugs.

Our results found a very low percentage (1.93%) of drugs prescribed as injection as against the optimal value (13.4%–24.1%) recommended by the WHO.[7,12] Oral route was the major route of administration noted in our study. Considering the low rate of injectables prescribed, the practice of use of injections mainly at indoor wards admitted patients, the accident and emergency department in the hospital could be taken into account.

The percentage of drugs prescribed from the NLEM was about 98% in this study comparable to the study done by Aravamuthan et al. [13] at rural pharmacies in South India where 99.8% of the drugs were prescribed from NLEM. This is in contrast to the finding by Meenakshi et al.8 found that the

percentage of drugs prescribed from the NLEM was about 88% in this study. Further evaluation also revealed that more than half of the prescriptions had at least one FDCs prescribed.

In our study, all of the prescriptions were complete pertaining to patient identifiers as the patient details in all the prescriptions such as name, age, sex, and hospital registration number. Similar findings were also seen in a study done by Singh et al. [7] and Meenakshi et al. [8] wherein the reason was also due to printed details.

Almost 87% of the prescriptions had missing advice to follow-up. Out of the 2375 drugs were prescribed, about 460 (76.66%) of the drugs had no dosage mentioned compared to the study done in secondary level hospital settings wherein dosage was mentioned only in 38.8% of the tablets.9 There was less than 2% of the prescription with not mentioned frequency, duration, dosage formulation and route of administration. Missing out prescriber's signature and dosage of drug formulations are potential risks of medication errors. Switching over to electronically generated prescriptions could minimize the rate of errors with regard to completeness and legibility of the prescriptions compared to handwritten ones. [14]

In our study we found that majority of the prescriptions (99%) were incomplete. The prescriptions were incomplete with regard to follow-up advice, reasons for referrals, dos and don’ts, drug formulation, and direction of administration. Dosing errors and omitting the duration of treatment were also common prescribing errors. The main reason of the incomplete prescriptions may be the huge patients load on doctor at our institution as it is the single major tertiary care centre. Most drugs are available in variable strengths and dosage forms and thus it poses problems for dispensing. It can also lead to issues such as treatment failure, antibiotic resistance, and adverse drug reaction which are associated with under dosing or overdosing. Wrong dose, dose omission, and wrong duration were the most common types of prescribing errors found in many studies worldwide. [15,16]

In our study, prescriptions with monotherapy (single drug) were 33 (5.5 %) while 567 (94.5 %) were having more than one drug. The purpose of this indicator is to measure polypharmacy, and the WHO recommends 2 drugs per encounter. Polypharmacy increases the cost of health care for patient as well as government and it can also result in adverse drug reaction due to drug–drug interaction. In our study, majority of the drugs were prescribed by generic names and were prescribed from the EDL available in the hospital. This could be due to repeated circulars from the hospital authorities and government to prescribe generic drugs and refrain from prescribing medicines, which are not mentioned in the current EDL. Furthermore, the hospital has been carrying out regular monitoring and reporting and surprise checks to ensure compliance. [17]

The doctors are infamous for their illegible handwriting, and this can cause medication errors, dispensing of wrong drugs that can lead to side effects to the patients. We found that 7% of prescribing doctors had illegible handwriting which is lower than the study done by Singh et al. [7] which had 15% of illegible prescriptions. In our study, the prescription was moderately legible in 89.16%, only 3.8% of prescriptions were fully legible. These details are important to identify the prescribing doctor, therapy related details of drugs and validate the authenticity of prescriptions. To avoid such errors, the use of capital letters while prescribing drugs should be encouraged and if possible, switch to electronic prescribing system should be made.

The average drug dispensing time, which is the average time that personnel dispensing drugs spend with patients, was 1.22 min which is comparable to the study

done by Singh et al.7 found the average dispensing time of 1.2 min. This is the time between arriving at the dispensary counter and leaving and does not include waiting time and this time needs to be more for pharmacists to explain the dosages, necessary precautions, and adverse reactions associated with any particular drug therapy. The availability of EDL enhances rational prescribing and quality of care, and it was encouraging to see that most of the OPDs in the hospital had a copy available at the time of the study.

In our study, the percentage of the drugs actually dispense was 89.81% with only 2.86% of the drugs adequately labeled. The main reason for these is high number of the patients, large crowd at dispensary point and shortage of pharmacist at our tertiary care center.

Our study highlights that implementing strategies by the hospital to curb inadvertent use of antibiotics and by establishing guidelines on the use of injections in OPD would pave the way for more rational use of medicines and ultimately to a better health care to the community.

Moreover, prescription audits done at various institution levels would aid to compare drug use pattern and provide suggestions to improve prescribing behavior among the institutes. Furthermore, it should be carried out at regular intervals for rationalizing drug prescriptions and continuous quality improvement of any hospital.

Our study has few limitations. First, patient healthcare indicators like average consultation time, patient's knowledge of correct dose couldn't be recorded due to lack of human resource & lack of co-operation from hospital staff. Secondly, availability of key drugs- a Health facility indicator couldn't be obtained because of unavailability and lack of co-operation from hospital staff. Lastly, in case of the legibility assessment, all the scoring was done by the researcher alone. His familiarity with the OPD medicines and the environments could introduce a researcher bias. However, on-site pharmacists anecdotally reported difficulty in reading approximately less than once amongst 10 prescriptions dispensed.

Conclusion

In conclusion, prescription audit is an important mechanism to improve the quality of care afforded by the hospitals and it is evident from the prescription pattern audit done using the WHO prescribing and other indicators, the prescribing pattern of antibiotics, and injection use were in accordance with the WHO standard recommendations. Our study highlights the need to train our prescribing doctors to write rational prescriptions and adhere to the WHO standards for prescriptions for the quality improvement of hospitals. Therefore, education to prescribers with good prescribing practice and strict regulation of antibiotic policy in outdoor patients in private hospitals is required. Regular audit by the hospital on prescription pattern and prescribing behavior, followed by constructive feedback and continuing medical education on good prescribing habit adhering to clinical guidelines, ensures quality health care. Comparing the current usage of drugs with the standard treatment guidelines will enhance the effectiveness of treatment and render it cost-effective.

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