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Research Article

Study to Conduct Prescription Audit as per Objective Elements of NABH in Medical and Surgical Wards of a Tertiary Care Teaching Hospital

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Abstract

Background: Prescriptions play a crucial role in modern healthcare, serving as a fundamental tool for physicians to communicate treatment plans and medication recommendations to patients. Writing prescriptions must comply with good practice guidelines, which can be developed through training. The aim of this study was to evaluate adherence to NABH norms on prescription writing of doctors and perform a prescription audit based on objective elements of NABH.

Methods: A prospective observational study was carried out in the Medical and Surgery Wards of a tertiary care teaching hospital for 3 months with 300 samples. A checklist aligned with NABH objective elements was used for data collection. Compliance percentages for each element were calculated using MS-Excel, and statistical analysis was performed using SPSS.

Results: For the prescription audit, 300 samples were evaluated. 22% lacked patient ID numbers, 89% missed bed numbers, and 95% omitted patient weight. 100% of prescriptions contained at least one drug not written in its generic name. Errors were found in strength (9%), route (20%), and dose frequency (4%). Allergy information was absent in 65%, while 32% lacked a diet plan. Potential drug-drug interactions were identified in 26%.

Conclusion: In relation to doctors' prescribing patterns, several errors were identified after data analysis. These findings highlight the necessity of educating prescribing doctors to write rational prescriptions and adhering to NABH standards to improve patient care and hospital quality.

Keywords: Accreditation, Compliance, NABH, Prescription audit, Quality, Tertiary care teaching hospital.

INTRODUCTION

A prescription is one of the most important therapeutic decisions a doctor can make for a patient. The Latin word praescriptus, which consists of the prefix Prae, which means "before," and scriber, which means "to write," is where the word "prescription" originates. In 2004, Sarkar PK stated that prescription writing is an art, but unlike other types of art, it must adhere to good practise standards[1]. The ability to prescribe more effectively can be enhanced through training. In 2017, Panayappan L et al. stated that prescription audit is a process that actively monitors changes for improvement in the standard of medical care[2]. It is an approach to quality improvement aiming to enhance patient care.

The National Accreditation Board for Hospitals and Healthcare Providers (NABH) was founded and programmed for accreditation of healthcare organizations and institutions as a board and part of the Quality Council of India[3]. The International Society for Quality in Healthcare (ISQua) has granted accreditation to the Fifth Edition NABH hospital standards, which were introduced in January 2020. The following are uniform objective elements provides by NABH to be followed by doctors while writing medication orders.

- **Patient information:** Patient information must be present in order to identify each patient. Basic demographic information, including name, age, sex, address, identification number, and weight should be on the medical administration page.
- **Drug information:** All doctors are required to write the drug name in capital letters, clearly noting all the necessary details (frequency, dosage form, route, strength), without using any unacceptable abbreviations or overwriting. This is because drugs come in a variety of dosage forms and strengths. Always use the leading tr (e.g., 0.1 mg) instead of the trailing zero (e.g., 1.0 mg). The phrase "discontinue" must be used when a medication needs to be stopped.
- **Prescriber information:** A prescription order can only be written by a registered practitioner. Every drug prescription must include the doctor's name and signature. If there are any questions about the medication or treatment plan, the physician could be contacted directly.

- **Legibility:** The prescription written should be legible. Nurses are sometimes misled by the doctors illegible handwriting and dispense look-alike drugs to patients. In India, unfortunately, fewer doctors are adhering to prescription guidelines, and there is less knowledge and documentation of adverse drug reactions and medication errors.

The majority of mistakes are made by junior staff members, and improper prescription and other mistakes typically result from a lack of knowledge or training. Lesar TS, Briceland, and Stein (1997) state that aside from understaffing, other factors linked to prescribing errors include tasks outside of the norm, caring for another doctor's patient, and lacking the necessary skills and knowledge of applicable laws and regulations[4]. Mortazavi SA and Hajebi G (2010) have stated that errors of omission and errors of commission make up the majority of prescription errors[5]. Errors of omission refer to important information missing from the prescription, whereas errors of commission refer to inaccurate information being written in the prescription.

A study conducted by (Wittich, Burkle and Lanier, 2014) on medication errors: an overview for clinicians concludes that a significant effect of medication errors is that they lower patient satisfaction and encourage a rising mistrust of the healthcare system[6]. In addition to the financial burden (Whittaker, Miklich, Patel, and Fink, 2018) patients suffer psychologically and physically as a result of prescription errors[7].

MATERIAL AND METHODS

This prospective and observational study was conducted in the three Medicine and three Surgery Wards (Inpatient Department) of CSSH, Meerut, Uttar Pradesh, over a period of three months (February 1, 2023 – April 30, 2023). A total of 300 prescription samples were analysed, where each new prescription order for the same patient was considered a new sample. Simple random sampling was employed to ensure unbiased selection.

Prescriptions included in the study were obtained from the Medical Administration Record (MAR) sheets of the selected wards. Outpatient department prescriptions, verbal orders, prescriptions from critical care areas, and those following MOM standards 1, 2, 3, 8, 9, 10, and 11 were excluded. Data analysis was performed using MS Excel to generate tables, charts, and graphs, while SPSS software was used for statistical analysis. Compliance percentages for each objective element were calculated, and relevant comparisons were made based on the results. A checklist was designed based on the objective elements of NABH 5th Edition (MOM 4, 5, 6, and 7) to assess prescription compliance. Over the entire study period, the following parameters were audited:

PATIENT INFORMATION

- **IP No**
- **Age**
- **Sex**
- **Weight**
- **Diagnosis**
- **Diet plan**

DRUG INFORMATION

- **Drug Name (Generic Name)**
- **Drug Name in Capital letter**
- **Strength of Drug**
- **Route of Administration**
- **Frequency of Dose**
- **Allergy detail**
- **Drug-Drug Interaction**
- **Dosage Error**
- **Non-standard abbreviation used**
- **Legibility**
- **Over writing**
- **Narcotic drug**

CONSULTANT PROFILE

- **Super Specialist Doctor**
- **Specialist Doctor**
- **Senior and Junior Residents**

CONSULTANT INFORMATION

- **Name**
- **Signature**
- **Seal**
- **Date**
- **Time**
- **Designation**

RESULTS

A total of 300 IPD prescriptions were collected and analysed. The audit parameters are divided into four categories i.e., Patient Information, Drug Information, Consultant Profile and Consultant Information, with sub parameters within each category. Prescription sheets were audited from Male and Female Medicine Ward, Male and Female Surgery Ward, General Medicine and General Surgery Ward of a Tertiary Care Teaching Hospital.

Table 1: Errors in Patient Information

Parameters	No. of Drugs Without Error	No. of Errors	Percentage of Errors
IP No	233	67	22%
Bed No	32	268	89%
Name	300	0	0%
Age	288	12	4%
Sex	286	14	5%
Weight	14	286	95%
Diagnosis	291	9	3%
Diet plan	205	95	32%

Every prescription that was audited showed 100% compliance with the patients' names being mentioned. Out of 300 prescriptions, n=67 (22%) did not include the patient's IP number. The failure to include the bed number in n=268 prescriptions (89%), the omission of the patients' ages in n=12 prescriptions (4%), sex of patients in n=14 prescriptions (5%), the failure to indicate the patient's weight in n=286 prescriptions (95%), omission of diagnoses in n=9 prescriptions (3%), and inaccuracy in describing the patient's diet plan in n=95 prescriptions (32%) were all errors of omission.

The Chi-square tests of Senior & Junior Residents and Specialist Doctor with Weight have a Chi-square value of 26.682,43.841 and P value = 0.000 This shows that there is an association between the two categorical variables, viz. Senior & Junior Residents and Specialist Doctor with Weight test results and their values are statistically significant.

DRUG INFORMATION

Table 2: Errors Involved in Generic Name and Capital Letter.

Parameters	No. of Drugs Without Error	No. of Errors	Percentage of Errors
Generic Name	0	299	100%
Capital Letter	292	6	2%
Strength of Drug	270	28	9%
Route of Administration	239	59	20%
Frequency of Dose	285	13	4%
Allergy detail	104	195	65%
Dosage error	298	0	0%
Non-standard abbreviation	298	0	0%
Legibility	10	10	3%
Over writing	294	5	2%

One or more prescribed medications are not written with the generic name within a single patient's prescription which make the non-compliance rate to 100% out of 300 prescriptions analysed. Majority of the time the prescribe drugs are written in their brand name. However, in the case of using capital letters, the audited prescriptions had a 100% compliance rate.

Out of 300 prescriptions audited n=28 prescriptions (9%) fail to specify the drug strength. Route of administration was available in n=239 (80%) of the prescription although errors were found in n=59 (20%) of the prescription. In 95% (n=285) of the prescription sheets analysed, the frequency of the dose was clearly stated, lowering the non-compliance rate down to 4%.

The patient allergies were not specified in n=195 (65%) prescriptions, however in 35% of the others, it was mentioned whether the patient encountered any known allergies. The dosage error regarding the usage of trailing zero was not found.

There was no usage of any non-standard abbreviation while writing the prescription. 10 prescriptions (3%) have legibility errors while only 2% of the time was there an overwriting error.

The Chi-square tests result of Senior & Junior Residents with Capital letter, legibility and over writing have a Chi-square value of 12.5411,16.576, 18.744 and P value = 0.014, 0.002, 0.001. This shows that there is an association between the categorical variables, viz. Senior & Junior Residents and Capital letter, legibility and over writing test results and their values are statistically significant.

The Chi-Square tests result of Specialist Doctor with Route of Administration and Drug-drug interaction have a Chi-square value = 15.446, 11.636 and P value = 0.004 and 0.020. This shows that there is an association between the categorical variables, viz. Specialist Doctor with Route of Administration and Drug-drug interaction test results and their values are statistically significant.

CONSULTANT INFORMATION

Out of 300 prescription sheets collected, n=7 (2%) Super Specialist Doctors were involved in writing prescription, n=204 (68%) prescription was written by Specialist Doctor and n=284 (95%) Senior and Junior Residents were involved in writing prescription.

Table 3: Errors Involved in Consultant Information.

Parameters	No. Without Error	No. of Errors	Percentage of Errors
Name	228	72	24%
Signature	169	131	44%
Seal	226	74	25%
Date	0	300	100%
Time	0	300	100%
Designation	218	82	27%

Out of 300 prescriptions audited in n=72 (24%) of the prescription sheets, the consultants' names were not available, however in n=131 (44%) and 74 (25%) of the prescription sheets, the consultants' signature and seal were not available. In n=82 (27%) of the prescriptions, the consultants' designation was not specified. However, while writing the prescriptions, the consultants never mentioned the date or time.

DRUG-DRUG INTERACTION

A total of 300 inpatients were prescribed 956 medications from 43 different drug class, which were then analysed using The Medscape Drug Interaction Checker software to identify potential drug-drug interaction. These medications were then classified into three levels based on their severity i.e., 'Closely Monitor', 'Minor', and 'Serious'.

LEVEL OF INTERACTION

A total of 42 (28%) medications were identified within the category of 'Closely Monitor', n=87 (59%) was found to be 'Minor' potential DDIs, and n=19 (13%) was potentially 'Serious' DDIs. The occurrence of various forms of DDIs was substantially associated with the number of drugs prescribed, but does not correlate with the patient's age. However, there was no interaction among 74% (n=221) of the prescribed drugs.

DRUG CLASSIFICATION

Out of 300 prescriptions that were analysed, 956 drug prescriptions belonging to 43 different drug class had errors in them. With n = 256 (27%) drugs, the most errors were detected in Proton Pump Inhibitor (Pantoprazole). The drug class Antibiotics have been involved in n = 169 (18%) errors. There is n = 143 (15%) errors in antiemetics (Ondansetron). The results of this study revealed that the most common errors were found in Analgesics (9%), NSAIDs (5%), Diuretics (3%), and Opioids (3%). Out of 300 prescription sheet analysed a total of 61 (20%) patients were prescribed two types of narcotic drugs, both in tablet and injectable dosage forms.

DISCUSSION

This was an observation prospective study conducted in a 1000 bedded teaching hospital. 300 prescriptions were audited, there were 22% IP number omissions. When two patients with the same name need to be identified, IP numbers are helpful as they are used for secondary identification. In 89% of the prescriptions, there was no indication of the bed number. It is possible to identify who the drug belongs to simply by reviewing the bed number. In 4% of the prescriptions, the patients' ages were not specified. As age is a significant factor while prescribing medication, it is always important to mention the patient age. In 5% of the prescriptions, the patient's sex was not mentioned. Considering that the patient's weight is a crucial consideration when writing a prescription, the patient weight was not recorded in majority of the prescriptions. The patient's weight must be mentioned in the prescription. However, the patient diagnosis was not available in few of the prescriptions that were audited. Since doctors cannot write a prescription without knowing the patient's diagnosis, the diagnosis must always be mentioned in the prescription.

This suggests that the demographic information on the patients was left out in the majority of cases, which may have been the result of work overload for the staff members or, in certain instances, due to the carelessness of the staff.

The Medical Council of India (MCI) amended Article 1.51 of the Indian Medical Council Regulations (Professional Conduct, Etiquette, and Ethics) in September 2016 to prohibit doctors from using generic names while writing prescriptions. According to the directive, "every physician should, to the extent practicable, prescribe drugs with generic names that are legible and, preferably, in capital letters, and he/she shall ensure that there is a rational prescription and use of drugs"[8].

Within an individual patient's prescription, one or more medication prescribed are not written with the generic name, bringing the non-compliance rate to 100% out of 300 prescriptions analysed. The majority of the time, medications prescribed are written in their brand name. The majority of the time, drug prescriptions were written in capital letters; however, only a few errors were found to be associated with the use of capital letters.

The errors identified related to drug strength and frequency of dose written on the prescription sheet were lower than 10%, while there were 20% errors with route of administration, and 4% errors with frequency of dose. These are factors that can contribute to medication errors as they can cause confusion for medical personnel who are dispensing the prescribed medications and administering the drugs.

There were 64% errors related to information on patient allergy detail. An allergy may go unnoticed or its severity may be underestimated if there aren't enough data available, particularly in the case of severe reactions. A patient's prescription therapy may unnecessarily change or become less tolerable if inaccurate or insufficient information about their drug allergies is provided. If information about a drug allergy is not recorded, there is an increased risk of prescription errors. Health care professionals may need to spend more time clarifying an order if they have incomplete or incorrect allergy histories.

There was no error found regarding the use of trailing zero while writing the drug dosage. Regarding the use of any non-standard abbreviations, there was 100% compliance. Out of 300 prescriptions, 2% had overwriting errors.

Despite the fact that a study by Lyons et al. found that doctors' handwriting is poorer than that of other professions even when they are instructed to be as tidy as possible, only 3% prescription have legibility errors. A startling result of the study conducted was that only letter of the alphabet, not numerals, had poor legibility[9]. This may be an indication of the value doctor's place on the legibility of medication dosages.

Every drug dispensed from the pharmacy had its name readily apparent; however, those whose names were not clearly visible had their names labelled on them; and no expired drugs were found.

Prior to administration, medication prescribe were verified and physically inspected from the prescription sheet. Strength of drug, route of administration and timing of drug were verified from the prescription sheet before they were administered. Out of 300 prescriptions analysed, drugs administration was not documented in 42% prescription. Drug verification is required before administration to make sure that the patient is receiving the right medicine for the correct cause and to prevent medication errors and the associated risks to patients.

Although the patient's diet plan was specified on 205 prescriptions, 32% of the prescriptions failed to mention it. The Chi-Square tests between the Specialist doctor and the diet plan indicate that there was a correlation between the two variables and that they were statistically significant.

The 300 prescriptions evaluated were written by a total of 7 (2%) Super Specialist Doctors, 204 (68%) Specialist Doctors, and 284 (95%) Senior & Junior Residents, with the majority of the doctors being Senior & Junior Residents.

The name of the consultant writing the prescription was not available in 24% of the prescriptions, while it was mentioned in 228 prescriptions. The consultant's signature was not available in 131 prescriptions. The seal and consultant designation were not provided in 25% and 27% prescriptions, respectively. However, the date and time were never specified on any of the prescription sheets that were audited. When the detailed consultant information is provided, it is much easier for other medical personnel to get in touch with them in case of emergency or anytime a concern arises.

Using the Medscape Drug Interaction Checker Software, 148 possible drug-drug interactions were identified among the drugs prescribed[10]. The 148 potential DDIs were then categorised as 'Closely Monitor', 'Minor', and 'Serious' based on the level of interaction between the drugs.

A total of 42 (28%) medicines were categorised as Closely monitor, 87 (59%) as Minor, and 19 (13%) as Serious interaction. The results of this study revealed that the most common Drug-Drug Interaction (DDI) was between Metronidazole and Diclofenac, while other interactions among Aspirin, Dexamethasone, Pantoprazole, Amikacin, Rifampin, Ondansetron, and Acetaminophen were frequent.

After analysing the collected data, errors were identified in 956 drugs prescriptions from 43 different drug classes. Proton Pump Inhibitor (Pantoprazole) with 27% prescription had the most errors. A drug class Antibiotics was involved in 18% errors. Antiemetics (Ondansetron) involve in 15% errors. The study's findings showed that analgesics (9%), NSAIDs (5%), diuretics (3%), and opioids (3%), were among the drugs that has the most errors. The most errors were due to the use of brand name instead of the generic name and omission of route of administration of the drugs.

Two narcotic drug types, Tramadol and Tapentadol, were identified among the medications prescribed. Narcotic drugs are always stored in a place with a double lock system, and the keys are maintained by the head nurse or ward in-charge of the respective ward.

CONCLUSION

The purpose of the study was to evaluate the prescribing pattern of the medical professionals at a tertiary care teaching hospital. A total of 300 prescription sheets were audited for the study from inpatient wards, including the Male and Female Surgical Wards, Male and Female Medical Wards, and the General Surgery Ward and General Medicine Wards.

A checklist was prepared for data collection as per NABH 5th edition, standards and objective elements of MOM 4,5,6 and 7. Data was collected using the checklist. Graphs and tables were prepared after the data was prepared in Microsoft Excel. SPSS software was used to perform cross tabulation and Chi-Square testing between different variables to determine their correlation.

In relation to the doctors prescribing pattern, a number of errors were identified after the data were analysed. It was observed that Junior residents were making more errors as compared to consultants. In the majority of cases, patient detailed demographic information on the prescription were not available. Some of the most important variables for writing the patient prescription, such as the patient's age, weight, and allergy information, were not included on the prescription sheet. This could be due to the lack of knowledge regarding prescription writing, which could be avoided by providing training or workshop to the health professionals involved in writing those details.

Majority of the prescribed medication were written by their brand name which should be avoided as this may cause confusion for other medical personal administering the medication and could also leads to dispensing of wrong drugs. Drugs should always be written in their generic names to prevent any confusion with specific medications having different brand names. Since the prescribed medications may be difficult to understand for some people who are unfamiliar with the drug name or who are non-medical professionals, doctors should write the prescription clearly and legibly.

While using the Medscape Drug Interaction checker for identifying any drug-drug interaction among the prescribe medication a lot of potential interactions were found. Patients may experience serious medication errors if these interactions are not closely monitored. Despite the rarity of deaths as a result, they can affect patient safety and the standard of treatment provided in both general practises and hospitals. Errors made while writing prescriptions (prescription errors) and prescribing errors made due to a lack of prescription knowledge could cause harm to the patients.

These research findings highlight the necessity of educating the prescribing doctors to write rational prescriptions and adhering the NABH standards for writing prescriptions in order to improve patient care and hospital quality.

This study covered only 6 wards; however, critical patients are at high risk for medication errors, future research might include every inpatient ward of the hospital, including the critical wards. For more accurate results, further studies can be carried out with larger sample size and longer period of study durations. For the hospital to continuously improve its quality, a prescription audit should be conducted on a regular basis.

The following are the implications of the research-

1. Improvement in Prescription Documentation:

- Emphasizing the importance of complete and accurate documentation in prescriptions, including patient demographic information, to ensure proper identification and safe medication administration.

- Implementing standardized guidelines and protocols for prescription documentation to reduce errors and improve patient care.

2. Enhancing Medication Safety:

- Highlighting the need for healthcare professionals to be vigilant in identifying and addressing drug allergies, including improving the documentation of allergy details in prescriptions.

- Implementing systems and tools to check for potential drug-drug interactions and providing alerts to healthcare professionals to prevent adverse events.

- Promoting clear and consistent documentation of drug dosage, route of administration, and frequency of dose to minimize medication errors.

3. Prescription Legibility and Clarity:

- Promoting the use of clear and legible handwriting or electronic prescribing systems to enhance prescription clarity and reduce the risk of errors.

- Providing training and awareness programs to healthcare professionals on the importance of clear and consistent prescription writing practices.

4. Healthcare Provider Responsibility:

- Reinforcing the responsibility of healthcare providers to clearly identify themselves in prescriptions, including their name, signature, and designation.

- Ensuring that healthcare providers understand the significance of their role in prescription documentation and the potential consequences of incomplete or missing information.

5. Education and Training:

- Developing educational initiatives to enhance healthcare professionals' awareness of best practices in prescription writing, including the use of generic names, appropriate abbreviations, and comprehensive documentation.

- Incorporating prescription documentation and medication safety topics into the curriculum of healthcare education programs to foster safe prescribing practices among future healthcare professionals.

In conclusion, this study's implications underscore the importance of accurate and complete prescription documentation, medication safety practices, and healthcare provider responsibility. Implementing interventions based on these implications can contribute to enhanced patient safety, reduced medication errors, and improved overall healthcare quality.

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