



## PRESCRIPTION AUDIT AT A TERTIARY CARE HOSPITAL: A CROSS-SECTIONAL STUDY

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### ABSTRACT

**Background:** A prescription audit is quality improvement tool for ensuring rational use of drugs and is based on documented evidences of diagnosis, treatment and instructions to achieve the same. The purpose was to evaluate patterns of various prescription errors.

**Method:** A prospective observational study was carried out. Prescriptions were collected randomly and analyzed for number of errors. The prescriptions were analysed in accordance to NABH and MCI guidelines for prescription writing. Special attention was paid to generic drugs names being mentioned in the prescriptions, capitals letters used and drug interactions being assessed.

**Result:** Total 370 prescriptions were analyzed. A total of 220 prescription errors were detected. Of them the most common error was not writing the generic names of drugs. In 163 followed by errors on regards to not writing the prescription in capital letters in 43 of them. Few errors also seen were wrong dosage prescription in 9 of them, drug interactions (3) and missed dosage with in 2.

**Conclusion:** Our study showed that there is scope for improvement in prescribing patterns especially with writing of prescriptions in capital letters and writing the generic name of drugs.

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### INTRODUCTION

Medical Audit is a process undertaken with the aim of making proper use of resources and improving patient care and is a continuous quality improvement tool. A prescription is a written communication from a registered medical practitioner to a pharmacist regarding instructions on dispensing of right medication to the right person in the right dosage and frequency. Prescription auditing is one tool to improving rational use of drugs, making it indispensable to quality improvement. It is a continuous cycle implementing changes to develop a new practice. The performance of the health care providers related to the appropriate use of drugs can be assessed by analysing the different prescribing parameters such as patient demographics, clinical diagnosis, department, prescribing standards, doctor's name and signature. Studies have shown that a majority of practitioners are not following the guidelines while writing the prescriptions and dosage of drugs. There is a need to standardize the prescribing

patterns in India so that all essential information is included and is made use of for improving patient care. The irrational prescribing, improper dispensing and use of medicines thus, leads to unnecessary expenditure for the patients.

Worldwide, it is estimated that over half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take their medicine correctly (Hogerzeil 1995). This fact was previously highlighted in "The rational use of drugs. Report of the Conference of Experts" Geneva, World Health Organization, 1985. Some reports placing deaths due to medical errors as the 3<sup>rd</sup> leading cause of death all over the world have brought a renewed focus onto the art of prescription writing (Makary et al 2016). Medical errors also contribute to considerable amount of morbidity and irreversible injury (Ernst et al 2001). Various studies have put prescription errors as the most common medical error in hospital settings (Patel et al 2018). In the United States of America, studies have shown a drastic increase in the number of documented mortalities due to prescription errors even exceeding the increase in the number of prescriptions (Phillips et al 2002). The number of injury and death due to prescription related errors has also been rising proportionately. Taking an overview of the

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importance of prescription writing various agencies have issued guidelines in regards to prescription writing. World Health Organisation (WHO) has laid down guidelines to be followed universally (WHO *Guide to Good Prescribing: A Practical Manual*). Medical council of India has also issued guidelines to physicians in India (Indian Medical Council Professional Conduct, Etiquette and Ethics Regulations). But by and large these guidelines are not being followed universally with incorrect and irrational prescription being at the forefront of medical errors in most setups (Acharya *et al* 2017). This may be due to lack of proper education of the treating doctors in relation to prescription writing or due to inertia preventing them from breaking out of their long incorrectly followed practices.

Due to the above stated, a number of hospitals have started the practice of prescription audit to look for the adequacy and rationality of prescriptions being written by their doctors thanks also to NABH.

**Aim of the study:** To reiterate the lacunae between education and practice and to investigate and reinforce improvement in prescribing patterns to the extent of reorientation/retraining if required.

**MATERIAL AND METHODS**

The present prospective observational cross sectional study was started after due Institutional approval and permission for consent waiver was taken. It was carried out on in-patient (IPD) prescriptions of Balco Medical Centre (BMC), a tertiary care cancer hospital, Naya Raipur over a period of 2 months from January, 2019 to February, 2019. The study excluded out-patients. All the data collected as a part of this study were kept strictly confidential and used for the purpose of this study only. Prescriptions were numbered and all the necessary information was filled in to the case record form. Demographic data, details of doctor, diagnosis, drug’s name, it’s dose, dosage form, route and frequency of administration, total number of drugs in prescription, drug by generic or brand name, number of fixed dose drug combination and use of abbreviation in the prescription were collected and analysed by using simple descriptive statistics and the parameters were expressed in percentages.

**Statistical Analysis:** The data obtained were analysed by using simple descriptive statistics and the parameters were expressed in percentages.

The suitability of the prescription was judged based on the NABH guidelines (as per NABH handbook 4<sup>th</sup> edition December 2015):

Each prescription or continuation prescriptions should be signed with date / time by the doctor.

**The Following Details Shall be Contained in all Prescriptions, Minimum**

- Patient’s ID number;
- Patient’s name & date of prescription;
- Age and weight of paediatric patients;
- Generic name of medicine;
- Dosage regimen;
- Strength or concentration of drug;
- Quantity or total number of doses required;

- Directions for use;
- Prescriber’s signature, name (clinical stamp if provided), time and date shall be mentioned.
- Each medicine order must be individually signed;

The OP visiting patients shall be prescribed medicines in the particular OP prescription form by the doctor with Name, Sign, time and date.

Repeat prescriptions shall be written on the same prescription form with date, sign or they may be given similarly signed fresh prescriptions.

The patients OP number should be entered on each prescription form and the details of the prescription is also entered on the patient OP card which will be retained by the hospital.

In the case of inpatients the doctor who visits the patients during rounds in the patient’s hospital room may advise medications which should write down in the drug order sheet in the patients file. This order/prescription should also be legibly written with details regarding dose, duration, mode and frequency of administration etc. and duly signed with date, time. The ward staff will procure these medicines from the pharmacy and keep it separately for each patient. These medicines should be administered according to the doctor’s orders by the nursing staff to the inpatients.

**The Different types of Errors were Recorded under the Following Headings**

1. Prescription not written in capital letters
2. Dosage missed
3. Wrong dosage
4. Wrong frequency
5. Duplication error
6. Drug interactions
7. Admission with adverse drug reaction
8. Error prone abbreviations
9. Patient receiving high risk medications developing adverse reactions.
10. Wrong drugs
11. Generic drug not written

**RESULTS**

A total of 370 prescriptions from the IPD of BMC were audited. A total of 220 prescriptions errors were reported. That accounts for 0.59 errors per prescription. The audited prescriptions were 34.6% of female patients and 65.4% of male patients.

The Number of prescription errors reported under the above mentioned headings were as such:

**Table 1**

Detailed Audit of Prescriptions	
Type of errors reported	Numbers Recorded
Prescription not written in capital letters	43
Dosage missed	2
Wrong dosage prescription error	9
Wrong frequency	0
Duplication error	0
Drug interaction	3
Admission with adverse drug reaction	0
Error prone abbreviations (medication chart)	0
Patient receiving high risk	0

medications developing adverse reactions	
Wrong drug	0
Generic not written	163
Total no.: of prescription errors reported	220
No. of prescriptions audited	370

The data shows that the maximum number of errors were in relation to not writing generic names of the prescribed drugs. This is a major breach of the NABH guidelines. This error was present in 44% of the prescriptions.

The second most common error was not using capital letters in writing down the prescriptions. This error was present in 11% of all prescriptions audited.

Apart from these, 9 errors were related to wrong dosage constituting 2.4% of all prescriptions audited, 3 were related to drug interactions (0.8%) and 2 were related to missing dosage from the prescription (0.54%).

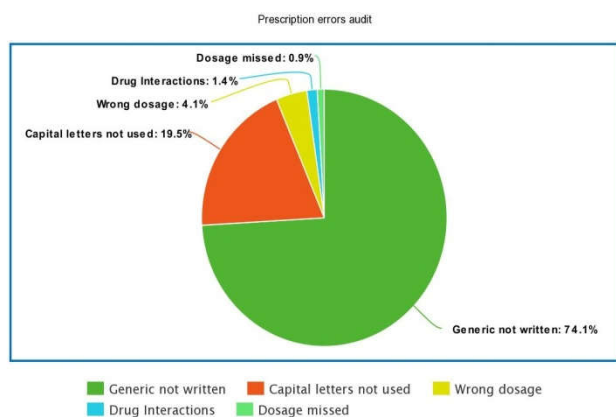


Fig.1

Of the total errors reported in the audit (220) 74.1% (163) were due to not writing the generic name of the drug in prescription, 19.5% (43) were related to not writing the prescription in capital letters, 4.1% (9) of the errors related to wrong dosage being prescribed, 1.4% (3) was in regards to drug interactions and 0.9% (2) in regards to dosage not being written in the prescription.

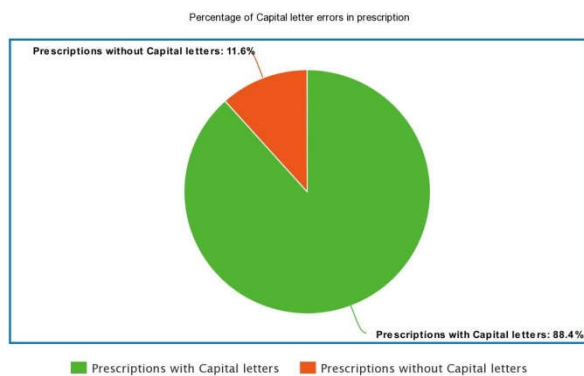


Fig. 2

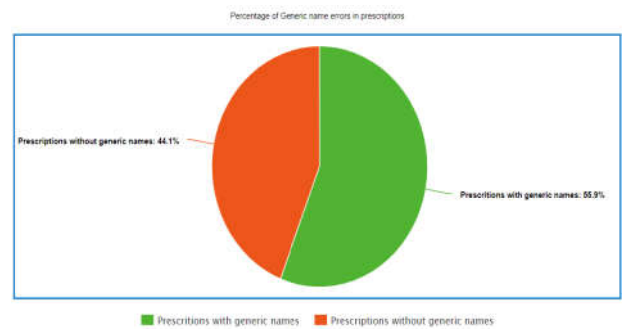


Fig. 3

## DISCUSSION

Our study found an error rate of 594 per 1000 prescription. This rate of error is much lower than those recorded at other tertiary care hospitals (Mohan *et al* 2014). This maybe an indication towards a better compliance regime at the BMC in regards to NABH standards but this may also be a product of inadequate audit efficiency. The importance of a robust audit mechanism can never be over emphasised in the field of patient care.

The most common error found in our study was in regards to usage of brand names of drugs rather than their generic names. This is in line with findings in other studies conducted at tertiary care hospitals in India (Mohan *et al* 2014, Shivamurthy S *et al*). This is due to a long held practise that has taken deep roots in our medical profession. The danger of this practise cannot be over emphasised. There are number of drugs in the market with similar trade names. A 2013 study published in the Indian journal of clinical practise detailed a number of drugs with divergent functions that had a difference in just one letter in their spelling (Keny *et al* 2013). For example- Wypar (nimisulide 100mg/ paracetamol 500mg) and Wypan (Pantoprazole 40mg) both manufactured by YACCA if used interchangeably in a gastric ulcer patient. This situation may further be complicated in cases of patients trying to get their prescription filled in a country or region other than where it was issued. To make matters worse there are number of non medication products being sold under the same trade name as medications for example “Lona” is the trade name of low sodium salt manufactured by Tata and also the trade name of Clonazepam manufactured by Triton healthcare. The Govt. of India has taken note of the problem and has decided to regulate trade names of drugs which were till date were not being regulated by the Central drug regulatory authority or the trademarks office.

The second most common error in our study was the failure of doctors to write prescriptions in capital letters. The handwriting of doctors has been much ridiculed since ages but being in denial on this front has serious consequences. When written in running letters there is huge scope for misinterpretation of drug names. Benzol (Danazol 100mg) manufactured by Solitaire pharma can be easily mistaken for Benzole (Albendazole 400mg/ivermectin 6mg) manufactured by Flamingo pharma simply due to misinterpretation of the upturned tail of ‘l’ in cursive letters (Keny *et al* 2013, Aschenbrenner *et al* 2015). Similarly confusion between ‘n’ and ‘r’ may change the drug trade name Wypan to Wypar. Even if trade names are avoided there are enough generic names that sound alike to

make to the list of 'Look Alike Sound Alike' (LASA) drugs such as Dexamethasone and Dexomethorphan, Valacyclovir and Valganciclovir. Fatal errors have occurred, often due to name similarity, when patients were given vincristine (Oncovin) at a vinblastine (Velban) dose. The various agencies put out advisories, time to time, to inform physicians with regards to such LASA drugs (PA-PSRS Patient Safety Advisory 2004). Abbreviations of drug names, bad running or cursive hand writing increases the likelihood of a wrong drug being taken by the patient (Sokol *et al* 2006). Hence a prescription should be written as clearly as possible in capital letters or use of TALL MAN lettering to emphasize the spelling of drug names such as traMADOL, traZODONE is recommended. NABH has stipulated that the organisation shall document a list of approved abbreviations for medication charts like the ISMP (Institute for Safe Medication Practices) List of Error-Prone Abbreviations, Symbols, and Dose Designations. This problem can also be largely eliminated by usage of printed/electronic prescriptions rather than handwritten ones (Samadbeik *et al* 2013).

Drug-Drug Interactions (DDIs) is the interaction of two or more drugs in such a manner that the effectiveness or toxicity of one or more drugs is altered. DDI is a major concern in patients receiving multidrug therapy. DDI make up only a small portion of adverse drug reactions but they are often predictable and therefore avoidable and hence a compulsory parameter of prescription audit. In all studies related to medical errors drug interactions make up a significant percentage of medical errors (Abubakar *et al* 2015). These are also few of the most devastating side effects causing long term complications and ending in significant morbidity and mortality.

Other common mistakes are not mentioning the exact dosage or strength. Omitting the strength of the preparation does not have much effect on dispensing medicines which are available in single strength but a large number of the medicines are available in multiple strengths such as glimepiride which is available as 1, 2 and 4 mg tablets; warfarin as 1, 2 and 5 mg tablets; atorvastatin as 10, 20 and 40 mg tablets. Mentioning strength of a medicine becomes inescapable especially for medicines with narrow margin of safety (e.g. glimepiride, warfarin) which if taken in overdose, may cause more harm than good. While indicating the strength of the formulation, only the internationally accepted abbreviations should be used: 'g' for gram, 'ml' for milliliter. Use of decimal should also be avoided. Incomplete dosing schedule/frequency error weren't found in any of the prescriptions. The problem is more important in cases where medicines needs to be prescribed as loading and maintenance dose (e.g. Chloroquine), in sliding scale (e.g. corticosteroids), or when a medicine needs to be taken on as and when required basis (e.g. analgesics like paracetamol). While indicating dosage schedules, it is better to avoid Latin words such as BD, TDS. Clear instructions such as two times a day for BD, three times a day for TDS should be used preferably along with the time of administration. the frequency of medication is of extreme importance especially in cases of paediatric age group patients (Wilson *et al* 1998).

This study should be a considered a primer for further auditing and continuous quality improvement in

healthcare. The problem can be further minimized by sensitizing the prescribers to follow prescription writing practices as per 'WHO Guide to Good Prescribing: A Practical Manual'

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## Bibliography

1. Abubakar A.R., ChediB.A.Z., et. al. 2015, Drug interaction and its implication in clinical practice and personalized medicine, *National Journal of Physiology, Pharmacy and Pharmacology*, 5 (5):343-349
2. Acharya H.R., Barvaliya M.J., Paliwal N.P., Tripathi C.B., 2017, Prescription audit in outpatient departments of a tertiary care teaching hospital: A cross-sectional study, *ejpmr*, 4 (3):372-379.
3. Aschenbrenner, Diane S., 2015, Similar Brand Names Lead To Medication Errors, *American Journal of Nursing*: December, 115 (12):24
4. Ernst F.R., Grizzle A.J., 2001, Drug-Related Morbidity and Mortality: Updating the Cost-of-Illness *Journal of the American Pharmaceutical Association*, 41(2):192-199
5. Hogerzeil HV. 1995, Promoting rational prescribing: an international perspective. *British Journal of Clinical Pharmacy*; 39:1-6.
6. Indian Medical Council (Professional Conduct, Etiquette and Ethics) Regulations, 2002 Amended upto 8th Oct 2016.
7. Keny M.S., Rataboli P.V., 2013, Look-alike and Sound-alike Drug Brand Names: A Potential Risk in Clinical Practice, *Indian Journal of Clinical Practice*, 23 (9): 508-513.
8. Makary M.A., Daniel M., 2016, Medical error—the third leading cause of death in the US, *BMJ*; 353:i2139
9. Mohan P., Sharma A.K., Panwar S.S., 2014, Identification and quantification of prescription errors *Medical journal armed forces India*, 70: 149-153
10. PA-PSRS Patient Safety Advisory (December 2004)—Vol. 1, No. 4
11. Patel S., Patel A. et al., 2018, Study of Medication Error in Hospitalised Patients in Tertiary Care Hospital *Indian Journal of Pharmacy Practice*, 11 (1):32-36
12. Phillips D.P., Bredder C.C., 2002, Morbidity and mortality from medical errors: An Increasingly Serious Public Health Problem, *Annu. Rev. Public Health*. 23:135-150
13. Samadbeik M., Ahmadi M., et. al., 2013, A Theoretical Approach to Electronic Prescription System: Lesson Learned from Literature Review, *Iranian Red Crescent Medical Journal*, 15(10): e8436 :1-11
14. Shivamurthy S *et al*, 2015, Audit of prescription notes from a tertiary health centre, AIMS, BG Nagar, India: A cross-sectional study. *Int J Res Med Sci*; 3 (12):3651-3654
15. Sokol D.K., Hettige S., 2006, Poor handwriting remains a significant problem in medicine *J R Soc Med.*, 99(12):645-646.
16. WHO *Guide to Good Prescribing: A Practical Manual*. Available at: <http://apps.who.int/medicinedocs/en/d/Jwhozip23e>. Accessed 18.02.13.
17. Wilson D., McArtney R., Newcombe R. *et al*, 1998, Medication errors in paediatric practice: insights from a continuous quality improvement approach *Eur J Pediatr* 157: 769-774.