

**A PROSPECTIVE OBSERVATIONAL STUDY ON EVALUATION OF ERROR PRONE ABBREVIATION USED IN MEDICAL CARDS/PRESCRIPTIONS OF A TERTIARY CARE HOSPITAL, EAST INDIA**Swagata Smaran Jana*¹, Laboni Maity², Ratna Baidya, Swikriti Samadder³, S. K. Todi and Arpan Dutta Roy⁴^{1,2,3}Student Pharmacovigilance in Clinical Research, Jadavpur University, Kolkata.

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ABSTRACT AND KEYWORDS

Background- Equivocal medical notations are one of the most common causes of medication errors. Clinicians often use many abbreviations as a time-saving convenience but frequently use of this abbreviations in prescription, misinterpreted and may cause adverse events. **Aim-** To evaluate the pattern of use of Error Prone Abbreviations in medical cards/ Prescriptions of a Tertiary Care Hospital, East India. **Method and materials-** The prospective observational study was carried out in different ICU and Wards of a 220 bedded tertiary care teaching hospital in west Bengal to assess the use of error prone abbreviation used in prescriptions. The study was conducted by reviewing prescription of 398 in-patients during March 2018 to June 2018. **Result-** A total of 398 patients were studied over a 4 month period. During entire study 1832 'error prone abbreviations' were used in 4520 medication ordered (40%). The most common abbreviations used were "OD" instead (20%), SC (1%), "U" instead of "Unit" (0.70%), "IU" instead of "International Unit" (0.60%) and 'Decimal point' error(0.40%). **Conclusion-** The study showed that a total of numbers of 1832 error-prone abbreviations were detected. These error-prone abbreviations can lead to disastrous medication errors and patient can suffer a lot as a consequence.

KEYWORDS: Error-prone abbreviations, Medication error, Misinterpretation.**INTRODUCTION**

Ambiguous medical notations are one of the most common causes of medication errors. Clinicians often use many abbreviations as a time-saving convenience. They are used to indicate dosages, time, frequency, routes, other information etc. Unfortunately, they can be prone to misinterpretations. Physicians commonly use abbreviations as a means to save time and space. However, some of them are prone to misinterpretation, a problem that is compounded by poor handwriting and the effect of being close proximity to other words and numerals.

Medication errors account for a good percentage of medical malpractices and the fact is that they are very common. Whether a doctor fails to identify potentially harmful drug indications or a patient is given a wrong drug or dosages. Thus error prone terms can lead to medication errors and people can suffer enormously as a result of it. Sadly, some of these mistakes are made simply because someone may misinterpret it, which misleads the receiver i.e. the patient.

Numerous national and international authorities have advised against the use of certain prescribing abbreviations due the risk of misinterpretations. The use of inappropriate abbreviations in prescriptions may alter intended therapeutic outcomes and even cause unnecessary harms to the patients. Many safety organizations have been continuing the malpractices and even have highlighted some abbreviations that are frequently associated with medical errors. Despite this warning, error-prone abbreviations continued to be used. In Modern health-care system the use of electronic prescriptions have reduced this trouble to some extent. But, handwritten prescriptions are still used, especially in developing countries. Therefore, eliminating error-prone abbreviations and standardizing acceptable abbreviations is an urgent need of the hour.

In order to achieve this goal, it is very important to identify the types and frequencies of inappropriate abbreviations used in the prescriptions. Misinterpretation may lead to patient's harm. It, even, makes delay of starting medications due to time taken for classification. According to the Institute of Medicine (IOM), there are 7000 deaths in a single year due to medication errors. An

abbreviation can be interpreted in a variety of ways. For example, 'MS' can be interpreted as an abbreviation either for Magnesium Sulfate or for Morphine Sulfate (Cohen, 2007).^[2]

Sometimes the smallest mistake can cause serious consequences when it comes to medication. One miss-typed or misread number or letter could prove to be detrimental to a person's health. The Institute for Safe Medication Practices (ISMP) recommended that error-prone abbreviations should be avoided to down confusions. According to ISMP, the use of 'u' is responsible for various medication errors. The letter 'u', may either stand for units or for high-alert drugs such as Heparin and Insulin. Again a prescriber sometimes writes '4u' in the prescription but the 'u' looks like a 4 to the nurse or pharmacist. The patient might be administered 44 units of Insulin instead of 4 units (Paparella, 2004).^[5]

ISMP has an extensive list of the most error-prone abbreviations, dosages, designations and symbols that contribute to medical errors. Those that appear on the list are no longer used in the field of medicines. Some examples of common errors include – 1) 'HS' and 'hs': They mean 'half-strength' and 'at bedtime' respectively and can easily be mixed up. 2) 'q1d' and 'q.i.d.': They mean 'daily' and 'four times daily' respectively. If misread, a patient could suffer heavily. 3) 'Decimals' and 'zeros': In dosing, 1.0 mg can be misread as 10 mg or 5 mg as 5 mg. 4) Drug abbreviations: Shortening something like hydrochloric acid to 'HCL' could be misinterpreted as potassium chloride if the 'H' is mistaken for a 'K'. However, the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) recommended not to use abbreviations because of the high amount of errors that had occurred related to the use of abbreviations. In an effort to reduce errors, the Therapeutic Advisory Group of New South Wales (NSW TAG) devised a guideline on acceptable abbreviations. Since then, Australian Healthcare Commission (AHC) maintains this guideline. In the 2005-2006 report from the Incident Information Management System (IIMS), these are 17,367 incidents in New South Wales public hospitals in which medication error was the primary cause of harm (NSW TAG, 2004).^[4]

Medication errors related to the use of error-prone abbreviation is dangerous, but it is preventable. For that, an initiative must be taken educating hospital staff on this matter is necessary to ensure that these errors can be checked. The Joint Commission and the Institute for Safe Medication Practices (ISMP) publish a "do not use" list of unsafe abbreviations, symbols, acronyms, and dosages (Lucci, 2004). (3) In the USA, several studies have implemented interventions designed to reduce the use of unsafe abbreviations (Brunetti, 2007).^[1] To ensure patients' safety, med orders must be clear and free from ambiguity. The clinicians must minimize the use of

error-prone abbreviations. These errors can be eliminated to a large extent through the adaptation of electronic prescriptions.

Now-a-day, many state governments are making big investment in technology to improve patients' safety installing electronic health report and e-prescriptions. Patients can do a few things as well to avoid medication errors. They can ask the doctor about the dosages and duration of the medicines before leaving the doctor's chamber. When they pick up the prescriptions, they should check to make sure the drug's names and instructions the doctor told them. Finally, if there is any doubt, the patients could ask the pharmacist to make sure they are receiving the right medication prescribed by the doctor. This initiative will help save many patients from the imminent danger issued from the error-prone abbreviations caused by the medical practitioners in the prescriptions. The abbreviations, symbols, dose designations are frequently misinterpreted and are involved in harmful medical errors. So, it is expected from the medical practitioners NOT to use these types of jargons to avoid severe medical errors. It is also expected that various medical centers that they should introduced technology. For example, these institutions may introduce electronic-prescriptions in place of hand-written ones. In the age of Science and advanced technology, there shall be a healthy competition among the medical centers in lieu of introducing advanced modern technology. This will definitely reduce a huge numbers of errors caused due to hand-written prescriptions coupled with frequent use of error-prone abbreviations by the medical practitioners. To get rid of this trouble mass-education can be another good initiative; the patient-party may be provided with some basic concepts regarding common abbreviations used in prescriptions. To avoid this confusion, ISMP has been reported a long list of very commonly error-prone abbreviations, symbols, and dose designations through ISMP's National Medical Errors Reporting Program. ISMP has clearly instructed never to use the listed abbreviations, symbols, and dose designations. The use of inappropriate abbreviations in prescriptions may alter the desired outcomes and even cause unnecessary harm to the patients. In order to achieve this goal, it is very important to identify the types and frequencies of inappropriate abbreviations used in the prescriptions. In this case, the list of error-prone abbreviations made by ISMP and MERP is the best one.

MATERIALS AND METHODS

The study was a prospective observational Study, which was carried out in 200 bedded tertiary care teaching hospital located in Kolkata. Data collection was performed according to the hospital regulations after getting approval by hospital research ethics committee. Total 398 (4520 drug order reviewed) in patients prescription were reviewed and analyzed to find out any kind of abbreviations used in prescriptions which may come up as an Error. Only regular orders on all current

medication charts were included in review process. Then this data were documented in "Error prone abbreviation" reporting form. Hard copy data were transformed to electro database (M.S. Excel) for further evaluation and analysis. IMPS guideline (list of EPA), various websites, review and research articles were used as standard reference for data collection.

RESULT

A total of 398 patients were studied over a 4 month period. Out of which it was found that, 176 were female (44%) and 222 were male (56%). The populations of male patients (56%) were higher than that of female (44%) in this study. According to the result of the study it was found that the populations of patients in the age group above 60 years were significantly higher (60%) followed compare to other age groups of study population.

During entire study 1832 'error prone abbreviations' were used in 4520 medication ordered (40%). The most common abbreviations used were "OD" instead (20%), SC (1%), "U" instead of "Unit" (0.70%), "IU" instead of "International Unit" (0.60%) and 'Decimal point' error(0.40%). (Table.1) (Fig.1). The study also shows that the maximum number of error prone abbreviation were found in the month of April-May' 2018, that was 831 EPA (45%). Followed by May-June, 740 EPA (41%) and March to April 261 (14%) Table.2. (Fig.2)

Table 1. Distribution of different types of Error Prone Abbreviations.

Error pron abbreviation	Total no	% found
TOTAL 'OD'	1418	77%
TOTAL 'SC'	26	1%
TOTAL 'HS and hs'	359	20%
TOTAL 'Decimal point'	7	0.4%
TOTAL 'U'	12	0.7%
TOTAL 'IU'	10	0.6%
TOTAL EPA	1832	100%

Table 2: Month wise distribution of Error Prone Abbreviations.

Months	No of epa	Percentage %
MARCH-APRIL	261	14%
APRIL-MAY	831	45%
MAY-JUNE	740	41%

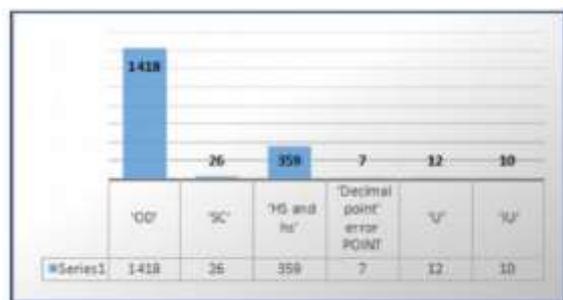


Figure 1: Different types of error prone abbreviation found.

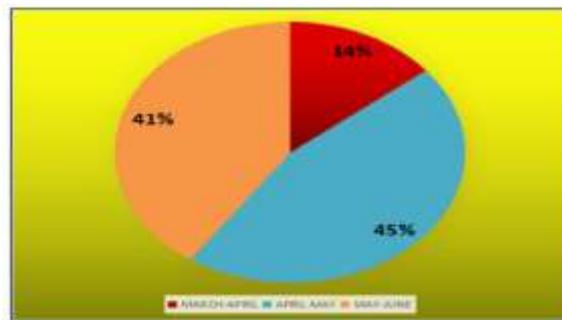


Figure 2. Graphical representation of month wise distribution of error prone abbreviations

DISCUSSION

Ambiguous abbreviations are one of the most common & preventable causes of medication errors. Clinicians use many abbreviations as a timesaving convenience. However, they can be prone to misinterpretations. The aim of this research was to identify the most vulnerable error-prone abbreviations. To meet this purpose, data were collected from the different wards and intensive care units of a tertiary care hospital of Kolkata. The data were collected from this hospital from the month of March to June of 2018. A total of numbers of 1832 error-prone abbreviations were detected. The most common error-prone abbreviations were 'OD'(77%), 'HS' and 'hs'(20%), 'SC'(1%), 'Decimal Point Error' (0.4%), 'U' (0.7%), 'IU' (0.6%) etc. From the research, the maximum number of error is found on 'OD' with (77%), because most of the Indian doctors use it very often. 'U' and 'IU' are another set of abbreviation which can read like '0' and '10' respectively. However, our matter of concern is with 'Decimal Point'. For example, if a doctor write '.2' which can be misunderstood as '2'. So to avoid this puzzle the doctor should put a zero (0) before point (.) which reads like the way the doctors intend to. In case of misinterpretation of 'Decimal Point' a patient can suffer enormously, which may cause his or her death. So, our kind suggestion is that the clinicians should write it with utmost care.

CONCLUSION

Medication errors account for a good percentage of medical malpractice and the fact of the matter is that they are very much common. These error-prone abbreviations can lead to disastrous medication errors and patient can suffer a lot as a consequence. From the research, the possible reasons for the increase in the use of unapproved abbreviations may include-

- Both the junior and senior doctors were not instructed properly to abide by the guidelines suggested by ISMP & MERM.
- Some medical staffs were in habit of using various abbreviations due to their previous work experiences and low practice standards.

To get rid of these sorts of health hazards, our benign plea to the doctors, nurses, and other medical staff is that they should cut down the use of these types of vulnerable

abbreviations and opt for full forms instead of their shorter ones. In case they need to write them at all, they must pay great attention to them.

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