International Journal of Pharmacy
Journal Homepage: http://www.pharmascholars.com

Research Article **CODEN: IJPNL6**

EVALUATION OF LOOK-ALIKE AND SOUND-ALIKE MEDICINES AND DISPENSING ERRORS IN A TERTIARY CARE HOSPITAL PHARMACY OF EASTERN NEPAL

Mukhtar Ansari [*1] and Abhishek Sen [2]

[1]Department of Pharmacology, National Medical College Teaching Hospital and Research Centre, Birgunj, Nepal
[2]Department of Pharmacology, Nobel Medical College Teaching Hospital and Research Centre, Biratnagar, Nepal

***Corresponding author e-mail:** mukhtaransari@hotmail.com

ABSTRACT

Medication errors are common in hospitals which may occur at prescribing, dispensing and administration level. The objective of this study was to evaluate the dispensing errors that occur mainly due to similar sounding and looking medicines. A cross-sectional and observational study was conducted at Nobel Medical College Pharmacy, Biratnagar, Nepal during the months of August and September 2010. Three dispensing staffs were observed every day from 9 am to 5 pm for errors made while dispensing. Besides, a survey of look-alike and sound-alike medicines available at the pharmacy and their placement in the shelves was also done. Various reported cases of dispensing errors due to similar sounding and looking medicines were found. There were about twelve similar sounding brand names with different constituents in the pharmacy. Additionally, prescriptions or medication slips containing inappropriate information also led to dispensing errors. There is an urgent need of considering the medication errors with special emphasis to the similar sounding and looking medicines.

Keywords: Dispensing Errors, Look-alike Medicines, Nepal, Sound-alike Medicines

INTRODUCTION

Medication errors are common in hospitals and errors may take place at any stage from prescribing (doctors) through dispensing (pharmacists or dispensing staffs) to their administration (nursing staffs or patients themselves).[1,2] Errors due to similar sounding and appearance of medicines are common even in America which account for numerous deaths.[3] Medication errors occur mostly during prescribing phase as a result of deficit in knowledge, poor communication and lack of considering patients' critical information.[4, 5]

At dispensing level, errors may arise due to similar sounding names of medicines, similar appearance of packaging materials, disorganized dispensing systems, over workload and interruption.[6,7] Dispensing incorrect medication, strength and dosage form may cause life threatening conditions.[8, 9]

Apart from prescribing or dispensing, errors may also occur at the time of administration.[10, 11] Performance deficit, lack of communication of nurses with other health professionals, excess work pressure and frequent interruptions are the most predominant factors associated with administration errors.[12] 'Medication errors customarily represent more the faulty system than a faulty human being'.[13] Medication errors are unavoidable but they can be minimized significantly if regulatory authority, hospital management, pharmaceutical manufacturers, prescribers, pharmacists or dispensing staffs and nurses work together to identify the medication errors and to adopt strategies to reduce them.[14]

The present study was carried out with the objective of evaluating the dispensing errors that occur mainly due to similar sounding and looking medicines.

MATERIALS AND METHODS

A cross-sectional and observational study was conducted at Nobel Medical College (NMC) Pharmacy, Biratnagar, Nepal. Nobel Medical College Hospital is a 721 bedded teaching hospital with various clinical departments such as Medicine, Surgery, Paediatrics, Orthopaedics, Obstetrics and Gynaecology, ENT, Ophthalmology and Dental. Besides these, there are Intensive Care Unit, dialysis, inpatient and emergency services. On average about 750 patients visit the hospital for treatment every day. There is only one pharmacy located in the hospital building.

Three dispensing staffs at three outlets of the pharmacy were observed every day from 9 am to 5 pm for the errors made while dispensing sound-alike and look-alike medicines and the prescriptions or medication slips containing errors in mentioning the name of medicines, dosing or instructions. The study was carried out by the hospital pharmacy in-charge during the months of August and September 2010. A zerox copy of the prescriptions or medication slips was made immediately after observing any such written error. Apart from these, a survey of similar sounding and similar looking medicines available at the pharmacy and their placement in the shelves was also executed and analyzed.

RESULTS

Prescribing and placement of the medicines at Nobel Medical College Pharmacy was based on brand names. There were confusions among the dispensing staffs about dispensing certain common brands of sound-alike and look-alike medicines (Table 1). Twelve similar sounding brand names containing different constituent were found in the pharmacy (Table 2). Almost all of the explored brands were most commonly prescribed or dispensed every day. Similarly, four similar sounding brand names of the medicine with same constituent were found available in the pharmacy (Table 3).

Figure 1 shows two look-alike but different liquid preparations (cough syrups) manufactured by the same manufacturer. Preparation I is SEDOSOLVIN which is a mixture of Dextromethorphan, Chlorpheniramine and Bromhexine. On the contrary, preparation II (BRONCHOSOLVIN) constitutes Guaphenecin, Terbutaline and Bromhexine.

Figure 2 depicts two sets of look-alike injectable preparations containing the same constituents but of different strengths. Example 1 is a penicillin preparation in which Preparation I is MEGAPEN 500 mg (Ampicillin 250 mg+Cloxacillin 250 mg), whereas preparation II is MEGAPEN 1000 mg (Ampicillin 500 mg+Cloxacillin 500 mg) injection. Similarly, example 2 is a Cephalosporin preparation containing preparation I as CEFAST 250 mg (Ceftriaxone 250 mg) and preparation II as CEFAST 500 mg (Ceftriaxone 500 mg) injection.

Figure 3 illustrates the examples of prescriptions or medication slips containing wrong strengths. Tablet ESNOV (Esomeprazole) 4 mg was prescribed instead of 40mg (example 1). Example 2 is concerned with a paediatric case in which tablet ANAFLAM 100mg was prescribed despite the availability of ANAFLAM (ibuprofen 100mg+paracetamol 125mg) in suspension form. Furthermore, tablet ANAFLAM contains not a single active agent but a mixture of ibuprofen 400mg+paracetamol 325mg. Example 3 is tablet NIMS (Nimesulide) 500mg in place of 100mg. Similarly, example 4 is tablet AMZIT 2.5mg instead of AMGIT (Metronidazole) 400mg.

Figure 4 depicts the prescription in which syrup Azithromycin was prescribed for a paediatric patient but the preparation is available in two different strengths (100 mg and 200mg). JEEVAN JAL (ORS solution) was prescribed for a 49 years old patient but the instruction about its preparation was wrong (Figure 5).

DISCUSSION

Medication errors mainly of look-alike and sound-alike medicines are common in hospitals, nursing homes and other healthcare institutions. Avoiding these errors is not only under the jurisdiction of a single healthcare provider but requires a collective coordination of prescribers, dispensers, administrators and even the manufacturers. Medication errors can occur at any stage of medication process and the ultimate victims are patients or patient party.

Various types of errors were found with regard to prescribing and dispensing. Dispensing errors were mostly due to availability of confusing brand names of the medicines, appearance of packaging materials and due to inappropriate information in the prescriptions or medication slips. These findings comply with the results of other studies. [3, 4, 9] Considering the examples of sound-alike medicines, tablet A**M**ZIT 2.5mg was prescribed instead of tablet

ANXIT (Alprazolam) 0.25 mg however tablet AMGIT (Metronidazole) was mistakenly dispensed. Similarly, tablet ALASPAN (Loratadine) was dispensed instead of ALSPAN (Hyoscine butyl bromide). In other interesting observations, injection MEGAPEN (Ampicillin+Cloxacillin) 500 mg was wrongly dispensed in place of prescribed MEGAPEN (Ampicillin+Cloxacillin) 1000 mg. This error occurred due to similar appearance of the packaging material (Figure 2, example 1). Thus, it can be imagined how detrimental will be the consequences of such errors.

In another prescription, JEEVAN JAL (ORS solution) was prescribed for a 49 years old patient with the purpose of rehydration but instruction regarding its preparation was wrongly mentioned. The patient was advised to reconstitute the content of ORS sachet in half litre rather than one litre of water. Preparing the ORS in this way would be hypertonic and this may further aggravate dehydration and the patient may die due to excessive dehydration. [15] The error might have been prevented if pharmacy/ dispensing staffs were qualified and properly trained. [16]

Reducing medication errors is not an overnight task but a continuous process of quality improvement. Crucial consideration of issues related to medication errors and continuous reinforcement contribute significantly toward minimizing these errors which ultimately lead to better clinical and pharmacy practices. Prescribing medications by generic names rather than brand names may be an alternative approach to minimize such errors. Medication ordering/prescribing errors can substantially be reduced through the application of computerized physician order entry (CPOE) systems in the hospital. [17, 18] CPOE is a recent advancement in hospital pharmacy sector in which the medications prescribed by physicians will directly appear in the computer system of the hospital pharmacy. But at present, implementation of CPOE system may not be feasible in Nepal due to cost factor.

Pharmaceutical manufacturers should critically think and consider the issues related to look-alike and sound-alike medicines before selecting the brand names of medicines and the packaging materials. The Department of Drug Administration (DDA), a government regulatory authority should also consider these factors at the time of registering the brand names of such medicines.

There is an urgent need of identifying such medication errors in the hospital which can be curtailed through sustained education and monitoring. Errors occurring at the time of dispensing can be minimized if medicines are prescribed and arranged in pharmacy shelves on the basis of generic names and/or therapeutic category. Minimization of errors and promotion of rational use of medicines in hospitals can be attained through regular monitoring of medicine utilization through a fully functional Medicine and Therapeutic Committee (MTC), dealing with only one prescription at a time while dispensing medicines, regular interaction and co-ordination among the health professionals such as doctors, pharmacists or dispensing staffs and nursing staffs without arrogance.

CONCLUSION

The present study reveals that medication errors concerned with look-alike and sound-alike medicines are important issue in the hospitals. Minimizing these errors can significantly contribute toward promoting rational use of medicines with better therapeutic outcome. Hence, there is an urgent need of minimizing these medication errors.

ACKNOWLEDGEMENT

The authors would like to gratitude Professor T. C. Saikia, Principal, Nobel Medical College, Biratnagar, Nepal for providing facility and moral support to carry out this research.

Table 1: Reported cases of sound-alike and look-alike (SALA) medicines

Errors	Number of cases
AMGIT (Metronidazole) for ANXIT (Alprazolam),	03
ALASPAN (Loratadine) for ALSPAN (Hyoscine butyl Br)	07
LEVOZIN (Levocetirizine) for LIVOGEN (Iron)	04
MEGAPEN 500 mg for 1000 mg injections	07
CEFAST 500 mg for 250 mg injections	09

Table 2: Similar sounding medicines with different constituent available at NMC Pharmacy

Examples	
AMGIT (Metronidazole)	ANXIT (Alprazolam)
ALASPAN (Loratadine)	ALSPAN (Hyoscine butyl Br.)
LEVOZIN (Levocetrizine)	LIVOGEN (Iron)
ENTEXIN (Ofloxacin)	INFEXIM (Cefixime)
TOZAAR (Losartan)	TAZAR (Piperacillin+Tazobactam)
CETIL (Cefuroxime)	CETIN (Cetirizine)
AMTAS-10 (Amlodipine)	ASTAT-10 (Atorvastatin)
FLUNAZ (Fluconazole)	FLUNAR (Flunarizine)
PIOZ (Pioglitasone)	PAAZ (Alprazolam)
PYRIMOL (Paracetamol)	PYRIMON (Dexamethasone+Chloramphenicol)
DAMOXY (Amoxycillin)	DIAMOX (Acetazolamide)
UMERAN (Diclofenac sodium)	UMINORM (Metoclopramide)

Table 3: Similar sounding medicines with same constituent available at NMC pharmacy

Generic name	Brand name 1	Brand name 2
Amitryptiline	TRIPLIN (LAPEN)	TRIPTIN (MARK)
Fluoxetine	FLUDAC (CADILA)	FLUDEP (SOLAR)
Cetirizine	CETZINE (GSK)	CETRINE (Dr. REDDY)
Levocetrizine	LEVOZIN (ASTRAL)	LERGIN (GALPHA)

Figure 1: Look-alike medicines with different constituents

Example 1 **Example 2**

Figure 2: Look-alike medicines with same constituent but different strengths

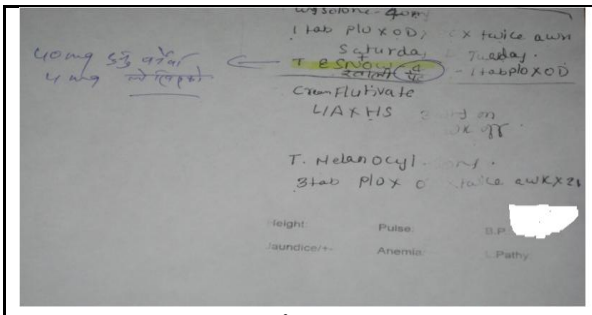

Figure 1

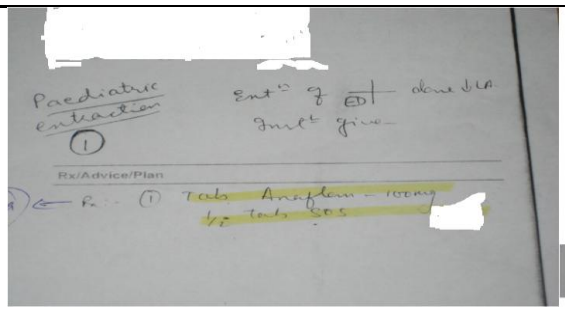

Figure 2

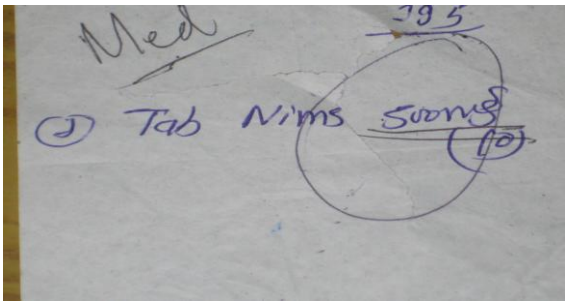

Figure 3

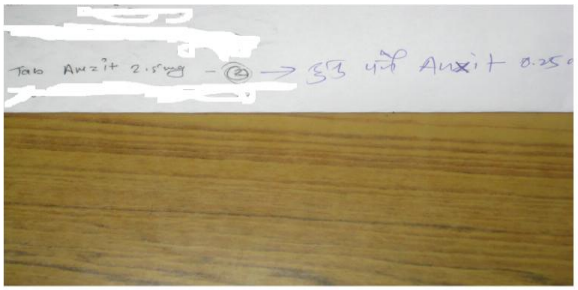

Figure 4

Figure 3: Prescriptions/medication slips with wrong strengths

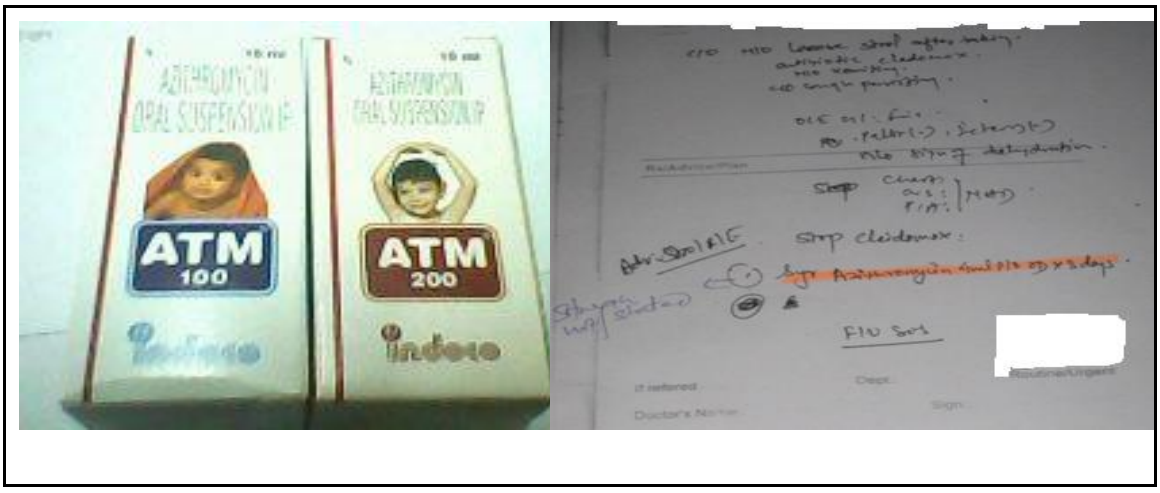

Figure 4: Prescription with missing strength but available in different strengths

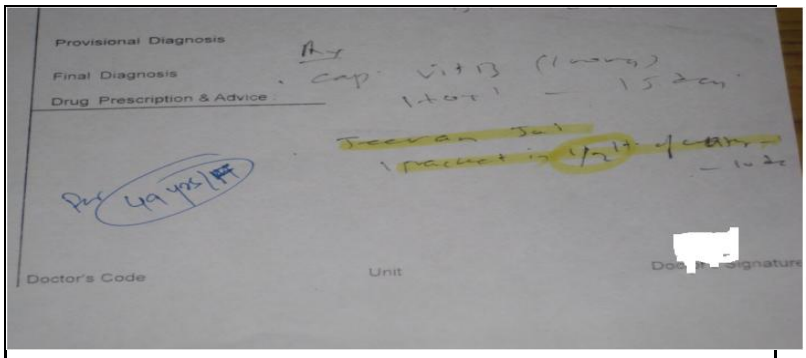

Figure 5: Prescription with wrong instruction

REFERENCES

1. Lisby M, Nielsen LP, Mainz J. International Journal for Quality in Health Care, 2005; 17(1): 15-22.
2. Barker KN, Flynn EA, Pepper GA, Bates DW, Mikeal RL. Arch Intern Med, 2002; 162(16): 1897-03.
3. Berman A. Journal of Medical Systems, 2004; 28(1): 9-29.
4. Winterstein AG, Johns TE, Rosenberg EI, Hatton RC, Gonzalez-Rothi R, Kanjanarat P. Am J Health-Syst Pharm, 2004; 61(18): 1908-16.
5. Phillips J, Beam S, Brinker A, Holquist C, Honig P, Lee LY, Pamer C. Am J Health-Syst Pharm, 2001; 58(19): 1835-41.
6. Filik R, Purdy K, Gale A, Gerrett D. Social Science & Medicine, 2004; 59(12): 2597-01.
7. Anacleto TA, Perini E, Rosa MB, Cesar CC. Clinics, 2005; 60(4): 325-32.
8. Cina JL, Gandhi TK, Churchill W, Fanikos J, McCrea M, Mitton P, et al. Joint Commission Journal on Quality and Patient Safety, 2006; 32(2): 73-80.
9. Ansari M, Neupane D. Kathmandu University Medical Journal, 2009; 7(27): 238-41.
10. Fahimi F, Ariapanah P, Faizi M, Shafaghi B, Namdar R, Ardakani MT. Australian Critical Care, 2008; 21(2): 110-16.
11. Valentin A, Capuzzo M, Guidet B, Moreno R, Metnitz B, Bauer P, Metnitz P. Br Med J, 2009; 338: b814.
12. Kumar KS, Venkateswarlu K, Ramesh A. Indian Journal of Pharmacy Practice, 2011; 4(2): 37-42.
13. Dubey AK, Palaian S, Shankar PR, Mishra P, Prabhu M, Bhandari RB, et al. Pak J Pharm Sci, 2006; 19(3): 244-51.
14. Lambert BL, Chang KY, Gupta P. Social Science & Medicine, 2003; 57(10): 1939-55.
15. Quereshi UA, Bhat JI, Ali SW, Mir AA, Kambay AH, Bhat IN. Indian J Pediatr, 2010; 77(6): 679-80.
16. Boonstra E, Lindbaek M, Ngome E, Tshukudu K, Fugell P. Quality & Safety in Health Care, 2003; 12(3): 168-75.
17. Koppel R, Metlay JP, Cohen A, Abaluck B, Localio AR, Kimmel SE, et al. J Am Med Assoc, 2005; 293(10): 1197-03.
18. Doolan DF, Bates DW. Health Affairs, 2002; 21(4): 180-88.