Look-alike and sound-alike medicines: Let us all be aware

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Abstract

Background: ALMEX and ALMOX; ASOM and AZOM; TRIAD, TRIAD P and TRIAD PF; folic acid and folinic acid; Vincristine and Vinblastine. Such look-alike and sound-alike medicines because of the similarity in their names create confusion while dispensing and administration/consumption of medicine. This may eventually cause varied degree of harm to the patient resulting from inadvertent consumption of an unintended drug.
Objective: This study was conducted to analyze and list out common confusing drug pairs in the Nepalese market aiming to increase awareness of such drug pairs among health care professionals.
Methods: Department of Drug Administration list of registered drugs, Nepal Drug Review, Monthly Index of Medical Specialties and findings from drug survey in the market were used as sources of the drugs analyzed in this study. Error prone medication pairs that cause confusion while prescribing, dispensing and administration/consumption were sorted out manually.
Results: Such drug-pairs were regrouped into different categories in a manner that they depict the clinical significance of the type of error. Also real life experiences of medication errors and near misses due to error prone drug pairs were collected from the doctors and the dispensers.
Conclusion: Several brand names are nearly identical; look alike sound alike drug pairs pose as an imminent danger to medical practice. This problem can only be minimized by increasing awareness of the presence of such confusing drug pairs among the healthcare professionals and increasing the feeling of shared responsibility by all the core members of the health care team.

Key words: Identical, Look-alike, Medication error, Patient safety, Sound-alike

INTRODUCTION

Look alike sound alike drugs have even claimed lives due to error of administration of a different drug other than the one prescribed. Few such cases have surfaced at different times in different places. An 8-year-old patient was prescribed Methylphenidate (METADATE) for attention deficit disorder; instead, he received Methadone a similar looking drug and died later. A 50-year-old woman with complaints of bronchospasm was hospitalized after taking FLOMAX, a drug for enlarged prostate, instead of VOLMAX which relieves bronchospasm[1]. In Nepal, a case is recorded where a pregnant women who was prescribed the drug FOLVIN (Folic Acid) was instead dispensed FLONTIN (Ciprofloxacin, a Fluroquinolone), later on due to some reasons there was termination of pregnancy and the hospital was blamed for the inadvertent abortion. These are only a few instances of medication errors due to look alike sound alike drugs. Some of us may have faced similar problem and may be looking for solution while others may not be aware of the danger similarities in the trade names pose to the medical practice.

Our country Nepal, no matter how small, has a plethora of medicines at our disposal to put off the illnesses at bay and this is especially true in big cities like Kathmandu. Department of Drug Administration, the government body for registering drugs in Nepal states that as of today the total number of registered drugs in Nepal is well above over 10,000. Having different medicines to use certainly gives us numerous choices, the more the choice the higher is the chance that the right drug is chosen for every patient.

However, with increasing number of medicines, slowly creeps in different problems, among them is a problem

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of confusing drug names. They may either look-alike (orthographic) or sound-alike (phonological) and hence easily lead to medication errors at the time of dispensing or administration/consumption. This results in consumption of a medicine different than the one prescribed for the patient, end result being unmet medical needs of the patient and rather unwanted effects from consumption of a different medicine.

Confusing drug name pairs that look-alike or sound-alike are generally known as LASA medicines or sound-alike--look-alike drugs "SALAD"[2]. It is as one of the most common causes of medication error worldwide[3]. There are many look-alike, sound alike medication pairs in different countries that can lead to medication errors. Such drug pairs are now increasingly being studied in much more detail at national level and at International level so as to reduce the medication error and hence contribute to patient safety.

The Institute for Safe Medication Practices "ISMP", USA is working on it since many years. It is compiling an ever growing list of LASA medicine name pairs, with the latest one published in the year 2011[4]. In our country in absence of any authorized agencies working for Medication Safety, there is no proper listing of such drugs. This is hereby, an attempt to compile a list in context of Nepal and make the health care professionals aware of possible danger during use of such medicines.

METHODS

Department of Drug Administration "DDA" list of registered drugs[5], Nepal Drug Review "NDR[6]", Monthly Index of Medical Specialties "MIMS[7]" and findings from drug survey in the market were used as sources of the drugs analyzed in this study.

The drug names were scanned for following characters in search for similar drug pairs:

1. LASA names which differ in one vowel only, e.g. ALMEX and ALMOX
2. LASA names which differ in one consonant only, e.g. ASOM and AZOM
3. LASA names differing in more than one letters, e.g. Folic acid and Folinic acid
4. Similar names with additional letters, e.g. TRIAD, TRIAD-P and TRIAD-PF

Such pairs were then regrouped into different categories as per their clinical significance. The drug-pairs which are more common in use are selected as examples for representing their groups. Clinical impact is the largest when the drug pairs differ in generic constitution while it is much lesser if such drug pairs belong to the same generic molecule.

RESULTS

Error prone medication pairs that can easily cause confusion while prescribing, dispensing and administration/consumption were sorted out. Also real life experiences of medication errors and near misses due to error prone drug pairs were collected from the doctors and the dispensers. Such pairs were then regrouped into different groups so as to make them appear in a manner with clinical significations- looking into the type of impact they can make when events of such errors occur.

1. LASA drugs-Similar brand names, different generic composition (Category I)
2. LASA drugs- Similar brand names, same generic composition (Category II)
3. LASA drugs- Similar brand names with additional letter (Category III)
4. LASA drugs- Similar brand names of the Antibiotics group (Category IV)
5. LASA drugs- Same drug, different Dosage forms (Category V)
6. LASA drugs- Same drug, different release characteristics (Category VI)
7. LASA drugs- Same brand name, different composition, different country (Category VII)
8. LASA drugs- Generic Drug pairs (Category VIII)

The drug pairs listed below only give a brief idea of the various types of LASA drug-pairs in the Nepalese market and represents only a tip of iceberg with many more submerged beneath. In fact the manual scanning of the drug-pairs without aid of specialized computer software led to the finding of over 200 drug pairs of similar looking brand names with same or different generic composition, and if we include drug-pairs with additional letter, different dosage forms and release characteristics it mounts well over 400. However, mentioning all those is beyond the scope of this paper. Therefore, below only the drug-pairs which are more common in use are selected as examples for representing their groups.

The drugs with similar brand names despite different generic composition pose a high risk to patient safety. A prescription for ALMEX can at times look like ALMOX, hence the patient may consume Amoxicillin instead of Albendazole which certainly will not solve his/her problem of helminths. Similarly, a verbal or telephonic

order for ACENIL may be noted as ACEPRIL, hence the patient in pain will still be in pain and rather may have unwanted effects of taking Enalapril.

Category II drugs having the same generic composition do not cause much problem when one is dispensed in place of other, except if the efficacy of drugs from different companies vary. The products with different proprietary names for the same active ingredient may cause safety concerns when:

1. Two or more drugs of the same generic composition are prescribed simultaneously; chances of cases as such is higher here in Nepal since the patients here tend to visit different doctors till they are assured their problem will be solved, hence they may be getting different brand drugs with same generic composition and may be over dosing themselves.
2. A patient may be allergic to an active ingredient but unknowingly takes it because the product has a different proprietary name.

It has been seen that in cases of similar brand names with additional letter, the additional letter may denote the presence of additional substance along with the parent molecule, but at the same time may also refer to a different molecule itself as in case of TAXIM and TAXIM-O. The illegible handwriting of some prescribers may create confusion in dispensers and a different drug may be administered.

LASA drugs of the antibiotic groups are among the highly confused ones. An assumption may be made that the drugs whose names end in suffix "FLOX" may refer to Ofloxacin (ARFLOX, MEGAFLOX); however, it may not always be true and may also at times denote different chemical moieties like Flucloxacillin (PERIFLOX) and Ciprofloxacin (MICROFLOX), so wrong assumption while prescribing or dispensing leads to a medication error.

We all are aware that drugs are available in different dosage forms. Never-the-less, it is possible that few prescribers only deal with a particular form of medicine on a routine basis and hence do not figure out the importance of mentioning the dosage form while prescribing. However, for some drugs that exist in different dosage forms, there arises a problem at the time of dispensing. Failure to mention the dosage form, leads to guess work during dispensing/administration and this may often lead to error.

Few drugs are prepared to have different release characteristics as compared to conventional dosage forms. Sometimes immediate action may be wanted from a drug and hence a dispersible tablet may be prescribed. However, in country like ours where people at pharmacies may not have proper pharmacy education, may instead give a conventional tablet. Also if a sustained release drug is prescribed and instead conventional tablet is administered, it exposes a patient to a high dose of instant release tablet, which may cause toxicity rather than the intended prolonged effect of the drug. Therefore, prescriber explaining the patient about the type of medicine prescribed, one that works over a long time (SR) or the one that releases quickly when placed in water (DT), would make patient more vigilant to take the correct form of medicine reducing the errors.

There are chances that some medicines marketed under same or similar-sounding brand names may contain different active moieties in different countries (Category VII). The drug marketed by the name MELOL contains Metoprolol in Nepal and is known to contain Atenolol and Amlodipine in India. This can be problematic if one practices medicine in India and prescribes the same while here in Nepal; the actual drug taken by the patient is something different from the intended drug. Also this type of drug pairs may cause problem in the modern world, because the new generation often resort to search the internet for things one is unsure of. So, having a drug registered by the same name with different generic constituent somewhere else also increases the likelihood of error.

When it comes to generic names, the degree of confusion is decreased but none-the-less is known to exist. Problematic generic drug name pairs that have surfaced in one country often pose similar problem elsewhere too. The drug pair Acetazolamide and Acetohexamide are problematic worldwide and they having posed a problem in mountaineering groups in Nepal have also been recorded[8]. Due to the fact that generic prescribing is limited only to a handful of hospitals in Nepal, errors arising from similar generic names are not seen much here.

Table 1: LASA drugs-Similar brand names, different generic composition (Category I)

Trade Names	Strength(mg)	Dosage form	Generic Composition
ACENIL	100	Tablet	Aceclofenac
ACEPRIL	2.5/5/10	Tablet	Enalapril
ALMEX	400	Tablet	Albendazole
ALMOX	250/500	Capsule	Amoxicillin
AZOM	250/500	Tablet	Azithromycin
ASOM	20/40	Tablet	Esomeprazole

The strengths of the preparations are in milligrams (mg) until and unless stated to be otherwise.
The slash "/" mark in strength section denotes the different strengths available in the market.

Table 2: LASA drugs- Similar brand names, same generic composition (Category II)

Trade Names	Strength (mg)	Dosage form	Generic Composition
ACIV	200/800	Tablet	Acyclovir
ACLOV	200/400/800	Tablet	Acyclovir
ALERT	10	Tablet	Cetirizine
ALLERTIN	10	Tablet	Cetirizine
AMDEEP	2.5/5/10	Tablet	Amlodipine
AMDIPIN	2.5/5/10	Tablet	Amlodipine

Table 3: LASA drugs- Similar brand names with additional letter (Category III)

Trade Names	Strength (mg)	Dosage form	Generic Composition
ALMOX	500	Capsule	Amoxicillin
ALMOX -C	250+250	Capsule	Amoxicillin + Cloxacillin
TAXIM	250/500/1000	Injection	Cefotaxime
TAXIM-O	100/200	Tablet	Cefexime
TRIAD	25-Oct	Tablet	Amitriptyline
TRIAD P	10 + 5	Tablet	Amitriptyline + Chlordiazepoxide
TRIAD PF	25 + 10	Tablet	Amitriptyline + Chlordiazepoxide

Table 4: LASA drugs- Similar brand names of the Antibiotics group (Category IV)

Trade Name	Strength (mg)	Dosage form	Generic Composition
ARDOX	100	Capsule	Doxycycline
ARFLOX	200/400	Tablet	Ofloxacin

Table 4 continue ...

MEGACLOX	500	Capsule	Cloxacillin
MEGADOX	100	Capsule	Doxycycline
MEGAFLOX	400	Tablet	Ofloxacin
MICRODOX	100	Tablet	Doxycycline
MICROFLOX	250/500	Tablet	Ciprofloxacin
PERICLOX	250+250	Capsule	Ampicillin+ Cloxacillin
PERIFLOX	250/500	Capsule	Flucloxacillin

Table 5: LASA drugs- Same drug, different Dosage forms (Category V)

Trade Name	Strength (mg)	Dosage form	Generic Constituents
CEDROX DRY SYRUP	(125mg/5ml)30ml	Oral Suspension	Cefadroxil
CEDROX-500	500	Capsule	Cefadroxil
CEDROX- TAB	250/500	Tablet	Cefadroxil
CEDROX- P- TAB	125	Tablet	Cefadroxil
CEDROX DT	125/250	Dispersible Tablet	Cefadroxil

Table 6: LASA drugs- Same drug, different release characteristics (Category VI)

Trade Names	Strength (mg)	Dosage form	Generic Composition
ARFLOX	200/400	Tablet	Ofloxacin
ARFLOX -DT	200	Dispersible Tablet	Ofloxacin
VOVERAN	50	Tablet	Diclofenac
VOVERAN SR	100	Sustained Release Tablet	Diclofenac

Table 7: LASA drugs- Same brand name, different composition, different country (Category VII)

Trade Name	Strength (mg)	Dosage form	Generic Constituents	Manufacturer
MELOL	50+5	Tablet	Atenolol+Amlodipine	Globus Remedies (India)
MELOL	25/50	Tablet	Metoprolol	National Healthcare (Nepal)
MEGADOX	100	Capsule	Doxycyline	Q-med (Nepal)
MEGADOX	100	Tablet	Aceclofenac	Pharmacon Gignos(India)

Table 8: LASA drugs- Generic Drug pairs (Category VIII)

Acetohexamide - Acetazolamide	Folic acid - Folinic acid
Amantadine-Loratidine	Glyburide-Glipizide
Alprazolam-Lorazepam-Clonazepam	Lantus - Lente
Cetirizine-Sertraline	Nifedipine-Nimodipine
Ephedrine - Epinephrine	Prednisolone-Prednisone
Fentanyl - Sufentanil	Vincristine-Vinblastine

DISCUSSION

The look-alike sound-alike drugs covered under different categories depict the potential of the problem we might be facing on a regular basis. Just a small glitch in the process of prescribing, dispensing or administering medicine can lead to medication error, which in turn may compromise patient safety.

The first seven categories discussed here are all related to the trade names while the eight category is for the generic drug pairs. LASA drugs problem is more common with trade names since they are specifically chosen so that they sound pleasant, are easy to remember, catchy, and positive. This limits the combination of sounds that can be used significantly, which is why so many trade names are easily confused. The reason for lesser problem of LASA drugs in generic naming is because the generic naming is a process regulated by multiple agencies which all try and make sure to provide a distinct name for the newly discovered molecule.

Among the different categories of drugs mentioned above, categories I, IV, VII and VIII which all have different generic constituents present much of a problem in events of occurrence of such errors. However, the categories III and VI which have additional molecule or different release characteristics can also have consequences which when occur can bring about some degree of negative impact in the patient. The problem associated with similar brand names despite the same generic constitution (Category II) is relatively low, provided that the medicine has equal potency. Nevertheless one should not disregard the fact that this might lead to co-prescribing or co-administration of two different drugs with the same generic constituent at the same time leading to over dosing problem.

The error arising from the failure to mention the dosage form (Category V) is known to occur to a much more extent, arising from the regular prescribing of the same medication and feeling of decreased need of mentioning the dosage form over and over again. Though it is not such big a problem, however patients who were intended one dosage form may get another and effects might not be as intended.

LASA medicine related errors may not necessarily at all times harm the patient; such is the case when the active ingredient and indication are similar and the difference only exists in the manufacturer, as in case of DECOLD (Lomus Pharmaceuticals- Nepal) and D'COLD (Paras Pharma-India). However, not all patients may be equally lucky and some might have to pay a high price for it. The example of LASA pair DAMOXY (Amoxicillin) and DIAMOX (Acetazolamide); giving the wrong drug certainly will not fulfill the intent with which one was given and may cause harm from unabated illness to unwanted effect of the unintended drug.

There is also a trend of using a fanciful proprietary name for a drug to imply that the drug has some unique effectiveness or doing so helps memorize the name of the drug. Similar cases can be traced here in Nepal; the drug Mebendazole comes by the name KITKAT. At times, patient parties have rather come up with the chocolate Kit Kat instead when handed over a small chit transcribed by the nurses for the drug KITKAT (Mebendazole).

Avoiding the LASA drug related medication errors does not only fall under the jurisdiction of a single healthcare provider but requires a collaborative efforts of prescribers, dispensers, administrators and even the manufacturers[9].

A few universal factors like illegible prescription writing, incompetent people at the pharmacies, incomplete knowledge of drug names, no knowledge of newly registered products, similarity in labeling and packaging, similar clinical use, similar strengths, dosage forms, frequency of administration, and the failure of manufacturers and administrative bodies to recognize potential for error are established cause for LASA drug related medication errors.

In Nepal most of the hospitals and clinics use the system of prescribing in trade names and there are only a handful of hospitals which have started prescribing in generics, trade names being more prone to LASA names. Complicating the things in Nepal is the scenario of medical transcription done at the end of the nursing staff in many hospitals, who may not be adequately versed with the disease condition and the drug being prescribed, thereby, leaving enough space for medication error. To make the matters much worse, the absence of prescription checking at the time of dispensing by the pharmacists certainly is another broken link in the health care system in Nepal, which also adds to increase the likelihood of error going unnoticed.

POSSIBLE SOLUTIONS

1. Identification of LASA medications

Create the awareness of look-alike and sound-alike medicines in the prescribers; if possible provide a detailed list of drug names pairs in the local market and those accepted internationally as published by various agencies working for medication safety[10]. Feeling

of shared responsibility by all the health care team members and the institution is a key factor to avoiding the confusion with LASA drugs.

2. Prescriber's role

Minimize the use of verbal and telephonic prescription order[11], until and unless it cannot be completely avoided. Try to use legible handwriting while prescribing, keeping in mind as if one was writing bank cheques[12]. It should be born in mind that the medicine best suited for the patient may not give good results if confusion arises with drug name or instruction for taking it and hence may instead cause more harm than good. While writing prescriptions for drugs known to be problematic, try and reduce the confusion by writing trade names (UPPER CASE) accompanied by generic names, dosage form, strength, directions and indication for use when possible[13]. Mostly the confusing drugs are used for different purposes, knowing the indication can help minimize the error[2].

3. Pharmacist's/dispenser's role

They should not leave any doubt while dispensing medicines, guess work is strictly prohibited. Provided that there is dose and other details in the prescription s/he should make use of his/her knowledge to identify the drug prescribed. In case of uncertainty in medicine names, they should not hesitate to consult the prescribing doctor before dispensing [12]. In case of Nepal, pharmacies are known to work in haste, giving less time to dispensing, which itself increases chances for error, so slowly better systems should be incorporated to ensure proper use of medications.

4. Patient's role

Literate patients can themselves check if the dispensed product is the same as prescribed. Here, again the need for legibility of the prescription is highlighted. If in doubt, he/she should ask the pharmacist/dispenser for verification. Patients who cannot read and write should better consult other sources for verification before taking the medicines.

5. Hospital's or institution's role

a. Provide education on potential LASA medicines

Incorporating education on potential LASA medications into the educational curricula**,** orientation, and continuing professional development for health-care professionals and annually review the list of LASA medicines used in the institution[10].

b. Formulate policies on verbal or telephonic orders

Formulating policies to accept verbal or telephonic orders only when truly necessary. Encouraging staff to read back all orders, spell the product name, and state its indication[12]. Try and reduce the medical transcription by the nursing staff and rather initiate dispensing only against a proper prescription by a licensed doctor[14]. Initiate measures to check the medicine for indication, dose prior to dispensing and administering the medicine. For any institution to formulate and work on such policy, it should get full support from its medical fraternity, so again here the doctors might need to come forward help the institution in such measures.

c. Focus on prescription legibility

Doctor making the wisest decision and prescribing the best medicine will do no good if mistake creeps in at the other end in dispensing or administration of medicines. Therefore, in the long run hospitals should ensure prescription legibility through improved handwriting and printing, or use of printed order or electronic prescribing.

d. Cautious approach towards generic prescribing and hospital formulary development

Taking a step towards generic prescribing coupled with hospital formulary development to make recommendations of different brands to be used within the hospital. It is a well-accepted fact that research is carried out at a much greater depth while naming generics of new medicines; hence confusion with similar names is lesser. However, in a country like ours moving on to generic prescribing should be done with caution, since the presence of less efficacious drugs in the market is also high. Also there is tendency of patient buying medicines not just from pharmacy at the hospital but from outside pharmacies which may be engaged in less ethical business.

e. Continuous upgrading of Hospital formulary

When adding new products into hospital formulary, considering the possibility of adding drug to form a confusing drug pair. If a potential LASA drug is already present in the formulary, the less important drug in the LASA pair can be

removed. If the addition is a must the institution must notify the prescribers of the confusing drug pair present[15].

f. Use of Name-alert stickers

Making it mandatory for the "Name alert" stickers to be affixed in areas where look-alike or sound-alike products are stored in pharmacies[3]. Keeping look alike drugs in adjoining shelves is known to have caused more error in dispensing.

g. Setting up a system of reporting errors

Setting up a system of reporting of errors and potentially hazardous conditions arising from look-alike and sound-alike drug pairs and using the information to establish priorities for error reduction.

6. Manufacturer's and regulatory agency's role

The manufacturers and regulatory agencies both should work together hand in hand to avoid confusion right at the time of naming their products. The regulatory agencies must develop strict mechanisms whereby no drug-pairs looking or sounding similar come to the market. Any reports of confusing brand names should be taken seriously and proper steps should be taken towards renaming the drug. It is a common trend for manufacturers to use part of their company names as suffix or prefix in the trade names of drugs they market, for different marketing reasons, but they should make sure that in doing so they are not contributing to the problem of confusing drugs.

In the past Royal Drugs had a panel of "naming consultants", who came up with unique names like AMGIT (Amoebiasis, Metronidazole, Glardiasis, Trichomoniasis); NECYCLINE (Nepal-Tetracycline); CUFNAS (Against-"NAS" Cough) which easily grabbed the required attention from both prescribers and patients. May be its time that every other drug companies turn to panels of "naming consultants" for creating a unique name that will appeal to both doctors and patients. They coming up with names like ADVAIR, "advantage air for asthma"; SPASMINDON "Spasm relief from INDON" may possibly help solve the problem, being both unique and catchy.

CONCLUSION

The look-alike and sound-alike drugs are available in the market today and will continue to bother us in future. The problem may even escalate by many folds owing to the ever growing number of medicines being discovered and introduced.

We therefore, should be able to recognize the prevalence of LASA medications and try our level best in decreasing the medication error by being committed to decreasing errors arising as a result of such confusing drug pairs.

Minimization of verbal and telephonic errors is something that can be commenced soon, so taking such steps and slowly moving towards prescription legibility should be given a head start. Formulating policies on strictly prohibiting guess work in case of medical transcription and dispensing is another milestone that can be covered. If we could raise the awareness in the public, the educated patients would certainly be able to make sure that they take the correct drug. Institutions forming a "Medication safety committee" for monitoring new confusing drug pairs, and recommending new insights to bar such errors and formulating the policies at institutional level will be required to deal with errors as such in the long run. The manufacturers and regulatory bodies should acknowledge the gravity of the problem such drug pairs can cause and follow stricter measures to ensure that such confusing names are not registered in the first place.

The concept being that an error is something that can be prevented, understanding the cause better, certainly helps decreasing its occurrence and helps us move towards implementing safer practices. Provided that we could work to decrease in such medication errors it would serve as a milestone in increasing patient safety.

This paper should serve as a cautionary approach for the prescribers to be self-aware of the potential hazards and also for our institution to try and form a "Medication safety committee" to deal with matters as such and many more which cause various kinds of medication errors. Awareness is the first step towards minimizing the occurrence of such errors; let us all be aware.

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