ORIGINAL RESEARCH

STUDY OF MEDICATION ERROR IN OUTPATIENT PHARMACIES OF GANDHINAGAR, GUJARAT

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ABSTRACT:

Presented work dictates major prevailed concerns of medication error in Indian healthcare setup. Using Neville et al. system attempt has been made to quantify and justify the concerns respectively in outpatient pharmacies of Gandhinagar, Gujarat. A prospective observational study was commenced and 501 prescriptions were enrolled in 6 months of study periods from 3 outpatient pharmacies. As per Neville et al. system total medication errors were 26.94% in which of category A, B, C, D were found 0.59%, 5.58%, 7.58%, and 13.17% respectively. Great matter of concern towards poor prescribing and high trend of medication error requires in depth assessment with consideration of influencing factors and pattern in such area of interest.

KEY WORDS: WHO, Drug use indicators, prescribing indicators, Physician's Practice Patterns

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INTRODUCTION:

As arising pharmacoepidemiological & pharma coeconomical concerns provoked evolution of healthcare in numbers & monetary units, prime concern of providing safe and quality health care has been found in circle of doubts. Sensing such issue incorporation of modern tools and methods were considered necessary to evaluate quality of healthcare in every aspect. So many factors of modern healthcare system gave birth to alarming problems of inappropriate drug use and medication errors. Medication errors affect 1.5 million people in the United States each year, resulting in additional $3.5 billion in extra medical costs. So, let's not talk about Indian setup because it would be much higher than expected [1]. Gradually it was made clear that for providing quality in healthcare appropriate use of drug is vital [2]. It is not hard to find literature addressing problem of medication error.It was no more in doubt that irrational use of medicine is serious threat worldwide [3]. But what we lack are methods to manage problem of medication error effectively. Although there are plenty available but there is always a room for bigger and better. Being essential part of healthcare system, drugs are increasing constantly with limited financial resource [4]. Not only it is leading cause of adverse drug reactions worldwide but also puppeteer of increased morbidity and mortality rates, wasted resources, unwanted cost and cause for antibiotic resistance [5-6].Rise in such trends are also noticed with rise in expectations and standards of healthcare. Focusing on an integral part of healthcare, 'prescriptions' are not the only mean of communication between healthcare providers but also provides statement on quality of healthcare via means of details of drug prescribed. Considering prescriptions as 'crude' to extract vast variety of data can be extracted to fulfill the need of safe and effective drug use.However, assessing the quality of diagnosis and evaluating the adequacy of drug choices is a complex undertaking in practice, and beyond the scope of any evaluation method.

Since the time when Indian health care received modern touch irrational use of drug and medication error has been a leading and alarming problem [1, 3, 7,8]. Sensing the situation research has been done with the intention of identifying the triggers and preventive measures. But situation doesn't seem to have improved. Even if we consider the lack of man power, lack of resources and quality of education in olden days, which would have caused such devastating results the present status is no better. In fact it is more devastating. The rates of medication error have doubled with course of time compared to early results [9, 10]. Most work on errors has concentrated on listing types of error and quantifying error rates. Little attention has been directed towards studying the potential effects of errors or of ways in which errors can be reduced or prevented. Thus, taking in consideration the factors which prevail in Indian setup Neville et al system of medication error is used to identify the nature and degree of medication error with ease. [11]However, in the Indian set-up there are very minimum studies that follow Neville et al system for medication error. One study according to Neville et al suggests very high amount of 65% medication error,[12] and it is a matter of concern. In the present study we assessed the Neville et al. system of medication error. Answers are made clear with reasons like lack of skilled prescribers, lack of standards in prescribing, poor communication among healthcare providers, lack of education among patients and strong marketing strategies by drug manufacturers. [13, 14, 15, 16]Thus, we have made attempt to assess current setting and to justify such reasons in our study.

MATERIALS AND METHOD:

A prospective observational studywas carried out in 3 outpatient pharmacies of Gandhinagar, Gujarat for six months from October 2015 to March 2016. During this period 501 prescriptions were enrolled in study. Data was collected at random times during the study by assigned data collector. Data was collected in pre-designed data collection form during process of dispensing. Fromcollected data the prescription details were used to categorize medication error using Neville et al. Micromedex Solutions was used to assess interactions. Approval from K. B. Independent Ethics Committee (ECR/144/Indt/GJ/2014) was taken for protocol: KBIEC / 2015 / 61 to conduct the study in October 2015.

The inclusion criteria included prescriptions of patients having age above 18 years, regardless of gender. And the exclusion criteria were (1) Prescriptions, written on scraps of paper, not containing information about either prescriber or patient (3) Pregnant women were excluded. (4) Repeat and refills were not taken in to consideration.

Neville et al. Medication Error [11]

Prescription errors are common and, while many errors are harmless, a number of them are potentially dangerous. Most work on errors has concentrated on listing types of error and quantifying error rates. Little attention has been directed towards studying the potential effects of errors or of ways in which errors can be reduced or prevented.

In this study three methods were combined to get a new method for classification of medication errors, The first method of classifying errors consisted of one of the authors joining a local retail pharmacist for a 15-day period and for each error the disruption and inconvenience caused to the pharmacist and patient was observed as the pharmacist tried to establish the prescriber's intentions. The second method involved one general practice recording all instances over a three-month period when retail pharmacists throughout the locality had cause to telephone the practice to query prescriptions or return incomplete prescriptions. The third method of investigating errors was from a study of all prescriptions written by eight principals at three general practices at the Westgate health center, Dundee, over a three month period (December 1985 to February 1986). Prescriptions which contained errors were then reviewed and the project staff assessed the potential effects of each error on patients, pharmacists and doctors. The three independent methods of studying errors in prescription within retail pharmacy led to the following class of errors:

Type A: 'potentially serious to patient': The prescription would be dangerous to the patient if dispensed. For example, dose of doctors who make drug wrong by a factor of 10 or of handwriting between chlorpromazine and chlorpropamide.

Type B: 'major nuisance': The pharmacist has to contact the prescriber in order to dispense the prescription. For example, phenytoin prescriptions which omit to mention whether capsules or tablets; completely illegible script.

Type C: 'minor nuisance': The pharmacist has to make a professional decision before dispensing, although is able to do so without contacting the prescriber. For example wrong pack size of dermatological preparation.

Type D: 'trivial': The prescription does not strictly conform to the guidelines in the British national formulary although the prescriber's intentions are not in doubt. For example, liquid instead of gel with antacid preparations; spelling errors.

TABLE-1: Classification of prescription errors according to the potential seriousness to the patient or the inconvinience to doctors, pharmacist and patients (given in neville et al. Classification of medication error)

	Type – A	Type – B	Type – C	Type - D	Total
Dose					
Strength of preparation not stated					
Dose wrong by multiple of 10					
Quantity					
Wrong pack size					
Naming of Drug					
Incomplete description					
Confusion of similar name					
Wrong Drug					
Controlled drug regulations not followed					
Formulation					
Tablets Instead Of capsule or liquid					
Limited list					
Preparation not available on Formulary list					
Total					

RESULTS:

At the end of 6 months study and from 3 outpatient pharmacies 501 prescriptions were enrolled among which 257 (51.29 %) were of male and 244 (48.70 %) were of female. (Table 2)

TABLE-2: GENDER WISE DISTRIBUTION OF PRESCRIPTIONS

Gender	Numbers	%
Male	257	51.29
Female	244	48.70
Total	**Total**	**100**

While, As per Neville et al. system total medication errors were 28.94% in which of category A, B, C, D were found 0.59%, 5.58%, 7.58%, 13.17% respectively.

TABLE-3: RESULTS ACCORDING TO NEVILLE ET AL. CLASSIFICATION OF MEDICATION ERROR

Medication Error Type	Type description	Numbers Encountered So Far N (%)
A	'potentially serious to patient'	**3 (0.59%)**
B	'major nuisance'	**28 (5.58%)**
C	'minor nuisance'	**38 (7.58%)**
D	'trivial'	**66 (13.17%)**

As per Neville et al system description and intensity of medication error was analyzed (Table 3). It is noticeable that results described here (Table 4) are bit different than promised earlier. That is because of several changes were made to type descriptions and classification according to modern Indian setup. Incorrect dosing and interaction have been added to make up with current setup. Amount of medication error go high noticeably after that. Which indicate high trend of interaction and wrong dosing in practice setting. We have managed to plot similar results as descried in system itself. Description of Medication error involving intera-ction and wrong dosing has been given (Table 5).

TABLE-4: CLASSIFICATION OF PRESCRIPTION ERRORS (GIVEN IN CONVENTIONAL NEVILLE ET AL. CLASSIFICATION OF MEDICATION ERROR)

	Type – A	Type – B	Type – C	Type - D	Total
Dose					
Strength of preparation not stated	0	2	15	3	**20**
Dose wrong by multiple of 10	0	0	0	0	**0**
Quantity					
Wrong pack size	0	0	0	0	**0**
Naming of Drug					
Incomplete description	0	0	5	18	**23**
Confusion of similar name	0	0	0	0	**0**
Wrong Drug					
Controlled drug regulations not followed	0	0	0	0	**0**
Formulation					
Tablets Instead Of capsule or liquid	0	0	0	42	**42**
Limited list					
Preparation not available on Formulary list	0	0	0	0	**0**
Total	**0 (0%)**	**2 (0.39%)**	**20 (3.99%)**	**63 (12.57%)**	**85 (16.96%)**

TABLE-5: CLASSIFICATION OF PRESCRIPTION ERRORS (MODIFIEDNEVILLE ET AL. CLASSIFICATION OF MEDICATION ERROR)

	Type – A	Type – B	Type – C	Type – D	Total
Dose					
Strength of preparation not stated	0	2	15	3	**20**
Dose wrong by multiple of 10	0	0	0	0	**0**
Incorrect Dosing	2	12	4	0	**18**
Interaction	1	14	14	3	**32**
Quantity					
Wrong pack size	0	0	0	0	**0**
Naming of Drug					
Incomplete description	0	0	5	18	
Confusion of similar name	0	0	0	0	**23** **0**
Wrong Drug					
Controlled drug regulations not followed	0	0	0	0	**0**
Formulation					
Tablets Instead Of capsule or liquid	0	0	0	42	**42**
Limited list					
Preparation not available on Formulary list	0	0	0	0	**0**
Total	**3** **(0.59%**	**28** **(5.58%)**	**38** **(7.58%)**	**66** **(13.17%)**	**135** **(26.94%)**

TABLE-6: DESCRIPTION OF AMENDED CLASSES OF MEDICATION ERROR

	Type-A	Type-B	Type-C	Type-D	Total
Interaction					
Contraindicated	1	0	0	0	**1**
Major	0	14	0	0	**14**
Moderate	0	0	14	0	**14**
Minor	0	0	0	3	**3**
Incorrect dosing					
Overdose	2	12	0	0	**14**
Underdose	0	0	4	0	**4**
Total	**3** **(0.59%)**	**16** **(3.19%)**	**18** **(3.59%)**	**3** **(0.59%)**	**50** **(9.98%)**

DISCUSSION:

Conventional Neville et al. system of medication error gives result of 0%, 0.39%, 3.99% and 12.57% for category A, B, C and D respectively while same scenario is explained in form of 0.59%, 5.58%, 7.58% and 13.17% for category A, B, C and D in modified Neville et al. classification of medication error. As explained prior the change is due to amendments in to conventional classification system of medication error. Interaction and incorrect dosing alone holds the amount of 0.59%, 3.19%, 3.59% and 0.59% for category A, B, C and D respectively in medication error (TABLE 6). Although it is unfair to give any justification on the

basis of these results because with no doubts this concern is too much complex and requires in depth assessment. This study has several limitations which makes difficult to justify anything precisely. In spite of such concerns at least it is clear that the problem is bigger. Even well developed countries are dealing with the problem at a similar extent and how can we deny it here in India? In fact low literacy rates and high population makes India an epicenter for such issues. It should be considered that Neville et al system of classification was designed in Europe and that too a fair amount of time ago. Thus it may not be appropriate to suit in current 'modern' Indian setup. Clear lack of follow up with the study is major obstacle to get a precise information and also the classification is strictly based upon inconvenience experienced by patient , pharmacist and prescribers, this system becomes too weak. With no surprise the amount of medication error is seen noticeably higher. This shows fair amount of prevalence of such type of medication error in the society. Being in one of the major cause of death medication error poses as serious problem apart from just increasing the cost burden.Thus it requires strict management and prevention.

CME \ CPD to improve skill and knowledge of health care providers along withstrict regulatory influence and standard guidelines to practice pharmacist oriented collaborative approach can be a key in management of medication error [17]. Medication error is high in current practice setting and more modern and handy techniques are required to continuously monitor practice precisely to suit the Indian setup.

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AUTHOR CONTRIBUTION:

All authors have made equal substantial contributions to conception and design, acquisition of data, analysis and interpretation of data with intention to fulfill academic requirement. All authors have been involved in drafting the manuscript content and have read and approved the final manuscript.

CONFLICT OF INTREST:

All authors of this research paper have directly participated in the planning, execution, or analysis of this study and approved the final version submitted;The contents of this manuscript have not been copyrighted or published previously and are not under consideration for publication elsewhere. There are no directly related manuscripts or abstracts, published or unpublished, by any authors of this paper; Our Institute's (K.B.INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH) representative is fully aware of this submission. Neither our project was sponsored nor we have conflicts of interest to declare.

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