

Assessment of Risk Factors for Drug Related Problems in Hospitalized Patients

Mohd. Haseebur Rahman Khan^{1*}, Dr. Roshan S²

^{1*}Research Scholar, Mewar University, Chittorgarh, Rajasthan, India.

²Research Supervisor, Mewar University, Chittorgarh, Rajasthan, India.

***Corresponding Author:** Mohd. Haseebur Rahman Khan

*Research Scholar, Mewar University, Chittorgarh, Rajasthan, India.

E-mail: haseeburrahmankhan2016@gmail.com, Mobile No: +91 6301671072

Abstract

Introduction: Drug related problems (DRP) may debase the healthy life, leading to hospitalization. They will raise overall health expenditure and even increase the risk of morbidity and mortality. DRPs, constituting health related safety issues with respect to pharmacological treatment, result in deterioration of patient's condition. Various researches evidencing 50% of the drug related hospital admissions to be avoidable, facilitates considerable interest in identification and assessment of risk factors involved. The objective of the present study is to identify the risk factors resulting in drug related hospitalizations and assess them with respect to the type of drug related problem.

Methodology: A prospective observational study was conducted in a tertiary care hospital for a period of one year. Inclusion criterion of this study was an association between current complaints and DRP, patient or patient care taker being adequately communicable. Exclusion criteria of this study were ambulatory patient consultation attributed to herbal medicine use, poisoning and substance abuse.

Results and Discussion: Evaluation of various parameters involved resulted in identification of 280 drug related problems amongst the 240 identified cases. Non-adherence to prescribed therapy (51.07%) and Adverse Drug Reaction (ADR) (38.21%) were predominant among the identified drug related problems. From our study it was observed that risk factors such as lack of knowledge, inappropriate medication use, hypersensitivity towards drugs and pharmacology of certain drugs showed more predominance among the drug related problems documented.

Conclusion: In our study non-adherence and ADR are the major contributors among the identified drug related problems. Lack of knowledge about disease, its complications and need of pharmacological management is found to be the main risk factor for development of Non-adherence, whereas hypersensitivity to drug and pharmacology of drug are found to be main risk factors for developing ADR which are unavoidable.

Key words: Drug related problems, Adverse drug reaction, Non-adherence, Risk factors.

INTRODUCTION

Drug related problems (DRPs) refer to the problems associated with the drug use, comprising a wide range of clinical situations/emergencies like significant drug related morbidity/mortality [1]. Drug related problem is "an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes" [2]. Dealing with drug related problems is the

primary thing that can be considered in the healthcare system to achieve better health during the treatment which imposes the prescription making it very difficult [3]. There exist different DRP categorization systems but most of these systems target the issues which can be identified from the patient case sheets. Therefore most commonly observed drug related problems are adverse drug reaction, drug–drug interactions, sub–therapeutic dose, non– adherence to the prescribed therapy, over use of the medications, over dosage of the drug, wrong administration of the medication, drug use without an indication and therapeutic duplication [4] which lead to subverted health, hospitalization and health expenditures and increased risk to the life [5]. DRPs, constituting health related safety issues with respect to pharmacological treatment, result in deterioration of patient’s condition and increased healthcare costs. Various researches evidencing 50% of the drug related hospital admissions to be avoidable, facilitates considerable interest in identification and assessment of risk factors involved [6]. Previously conducted studies have identified a certain number of risk factors to drug related problems which include poly-pharmacy, female sex, age above 65 yrs., narrow therapeutic index of the drug, anticoagulants, diuretics, failure to take prescribed regimen in prescribed manner [7]. Assessment of risk factors of drug related problems specific to an area in evaluation is essential in order to prevent avoidable drug related problems and consequent economic burden attributed to additional health care through strategizing ways to sort out drug related problems attributed to identified risk factors [8]. Need of the study is to explain the importance of patient education about disease, drug and highly possible drug related problems that may result in severe complications and deterioration of patient’s quality of life. To explain the importance of care needed in prescribing drugs in high risk patients like elderly with multiple chronic conditions, low immune individuals etc. to highlight the importance of resolving the risk factors causing DRPs. The objective of the present study is to identify the risk factors for DRPs resulting in hospitalization and assess them with respect to the type of drug related problem. This study serves to minimize the number of hospitalizations attributed to drug related problems, develop methods to resolve the risk factors and enables to prevent avoidable drug related problems, thereby ultimately enabling to improve health related quality of life through optimizing the therapeutic outcomes.

METHODOLOGY

A prospective observational study was conducted in a tertiary care hospital for a period of one year. Prior to the initiation of the study, ethical clearance was obtained from the Institutional Human Ethical Committee (IHEC). Inclusion criterion of this study was an association between current complaints and DRP, patient or patient care taker being adequately communicable. Exclusion criteria of this study were ambulatory patient consultation attributed to herbal medicine use, poisoning and substance abuse. Case sheets of patients with past medical history are considered and assessed for the impact of the medication used in the past on the current complaints and if the DRP is observed, the case is considered for further study by documenting necessary information (age, gender, medications used in the past, laboratory investigations, social history etc.) in data collection form and DRP assessment form. Based on the information available from the case sheets regarding the past medical history and the past medication history, the type of DRP involved was identified. After categorizing the DRPs, by questioning the patient or the patient care taker (in case of pediatrics, patients unable to communicate) about medication taking behavior, risk factors like age, polypharmacy, infectious and parasitic diseases, self- medication with non- prescribed medications, lack of knowledge, inappropriate medication use, social habits of the patient, economic status of the patient etc. were assessed. The categorical variables were represented in number and percentage and the data was analysed using SAS version 9.1. Relative risk and confidence interval was calculated using MedCalc’s relative risk calculator.

RESULTS

Among the identified 240 cases, 146(60.83%) were male and 94(39.17%) were female, showing 1.55 times higher risk for males to develop drug related problems. Among age groups, adults 129(53.75%) were predominant over children 69(28.75%) and geriatric 42 (17.50%) in terms of prevalence, while males have higher risk to develop drug related problems among children and adults and in geriatrics both the genders have high risk in developing drug related problems details from the given table 1 and figure 1.

Table 1: Distribution according to Age group

Sl. No.	Age group	Frequency N (%)	Gender		Ratio (M:F)
			Female	Male	
1.	Children	69 (28.75%)	28	41	1.46
2.	Adults	129(53.75%)	45	84	1.86
3.	Geriatrics	42 (17.50%)	21	21	1
	Total	240	94	146	1.55

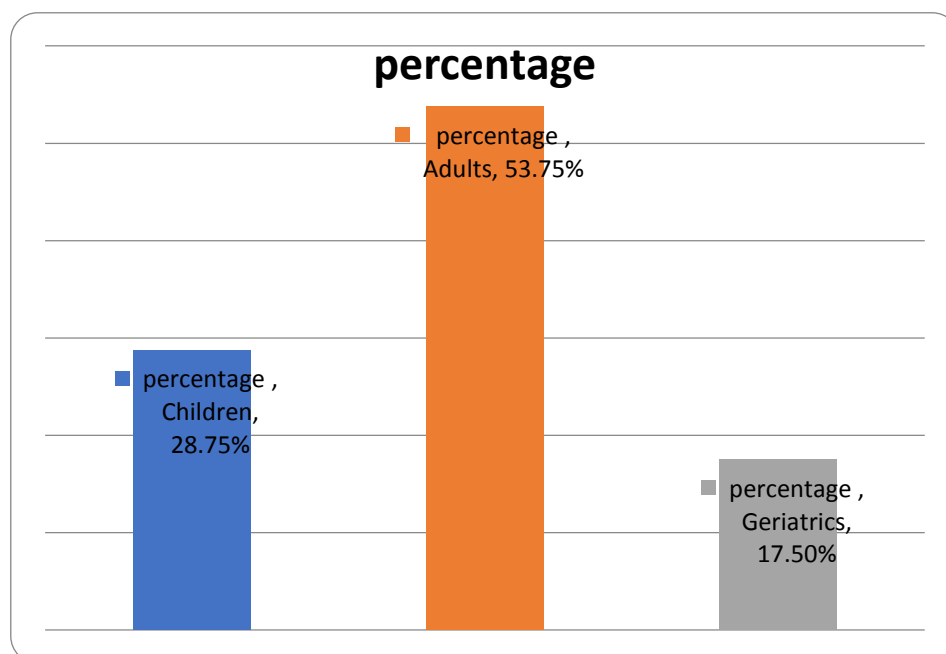


Figure 1: Pictorial diagram showing percentage distribution according to age group

A total of 280 drug related problems were identified in 240 patients presented with past medical history, which shows the probability of multiple drug related problems in a single patient. Among the enrolled cases, a total of 396 risk factors were found responsible for the assessed 280 drug related problems. In the present study, the most commonly observed DRP's are non-adherence to the prescribed therapy 143(51.07%) followed by adverse drug reaction 107 (38.21%) and others are represented in Table 2 and Figure 2.

Table 2: Types of drug related problems

Sl. No.	Drug related problem	Frequency	Percentage (%)
1	Non-adherence to prescribed therapy	143	51.07
2	Adverse drug reaction	107	38.21
3	Overuse of the drug	21	7.50
4	Therapeutic duplication	05	1.79
5	Wrong administration	04	1.43
Total		280	100

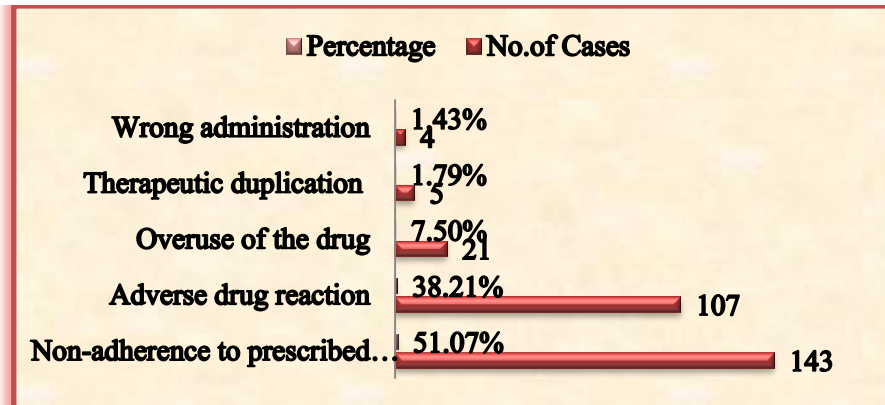


Figure 2: Different types of drug related problems

According to the present study, risk factors which are highly responsible for the DRP's are lack of knowledge about the medications and disease 157 (39.65%) followed by inappropriate medication use 67 (16.92%) and others were represented in the Table 3 and Figure 3.

Table 3: Risk factors involved in Drug related problems

Sl. No.	Risk factors	Frequency	Percentage (%)
1	Lack of knowledge	157	39.65
2	Inappropriate medication use	67	16.92
3	Hypersensitivity & Pharmacology of drugs	58	14.65
4	Self-medication with non-prescribed medications	40	10.10
5	Age	24	6.06
6	Drug with narrow therapeutic index	21	5.30
7	Infectious and parasitic diseases	14	3.53
8	Social habits of the patient	11	2.78
9	Economic status of the patient	04	1.01
Total		396	100

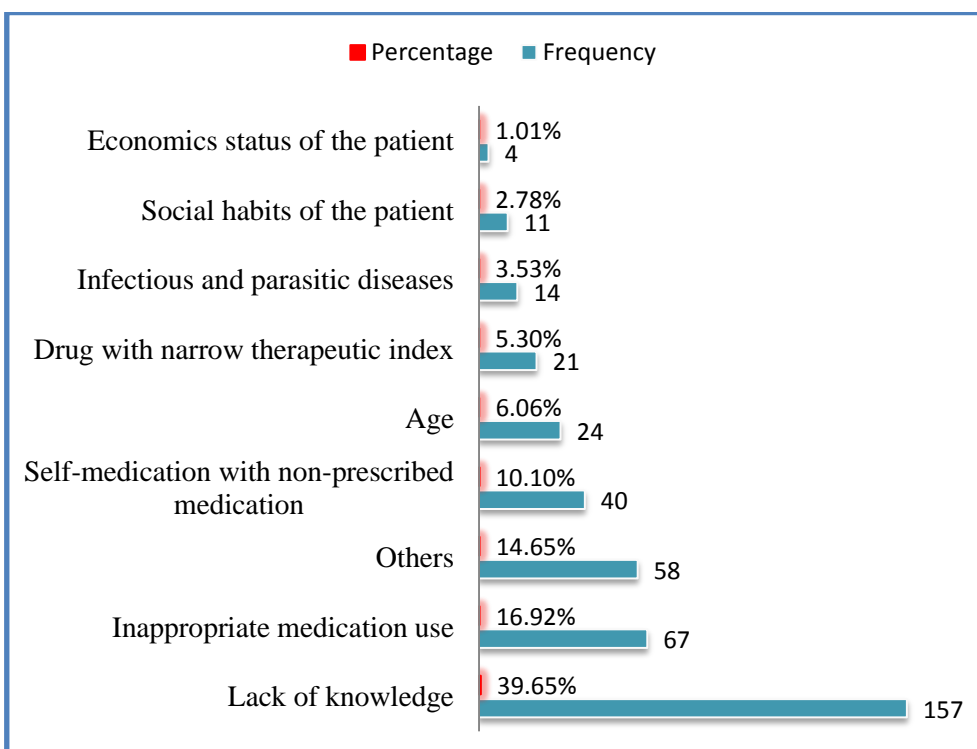


Figure 3: Risk factors involved in DRPs

Significant risk factors responsible for the non-adherence were assessed using the relative risk and confidence interval, in which lack of knowledge about the medications and disease were found to have 3.74 times higher risk for non-adherence when compared to other risk factors which showed insignificant relative risk and other details were represented in the Table 4.

Table 4: Assessment of significant risk factors in Non-adherence

Non-Adherence					
		Yes	No	RR	CI
		143	137		
Lack Of Knowledge	Yes	125	32	3.74	2.74 to 5.10
	No	18	105		
Inappropriate Medication Use	Yes	32	35	0.87	0.57 to 1.33
	No	111	102		
Age	Yes	12	12	0.95	0.44 to 2.05
	No	131	125		
Infectious Diseases	Yes	3	11	0.26	0.07 to 0.91
	No	140	126		

Significant risk factors responsible for the adverse drug reaction were assessed using the relative risk and confidence interval, in which hypersensitivity to the medications were found to have 11.57 times higher risk for adverse drug reaction when compared to other risk factors which showed insignificant relative risk and other details were represented in the Table 5.

Table 5: Assessment of significant risk factors in adverse drug reaction

Adverse Drug Reaction					
		Yes	No	RR	CI
		61	87		
Hypersensitivity	Yes	29	4	11.57	4.29 to 3.19
	No	28	87		
Self-Medication	Yes	17	5	4.84	1.89 to 12.43
	No	44	82		
Narrow Therapeutic Index	Yes	10	2	7.13	1.61 to 31.40
	No	51	5		
Inappropriate Medication Use	Yes	10	25	0.57	0.29 to 1.09
	No	51	62		
Age	Yes	11	6	2.61	1.02 to 6.68
	No	50	81		
Infectious Diseases	Yes	6	2	1.27	0.89 to 20.49
	No	55	85		
Lack Of Knowledge	Yes	6	83	0.10	0.04 to 0.22
	No	55	4		

DISCUSSION

Among the 240 enrolled cases, 280 drug related problems were identified. We have evaluated various parameters in relation to the drug related problems. In our study Non-adherence and ADR are predominant among the identified drug related problems. To prevent the avoidable ADRs, patients should be informed about the suspected and highly frequent ADRs, so that they can easily report and obtain immediate management. From our study it was observed that risk factors such as lack of knowledge, inappropriate medication use, hypersensitivity towards drugs and pharmacology of certain drugs showed more predominance among the drug related problems documented. Lack of knowledge about disease its complications and need of pharmacological management is assessed to be the significant risk factor, for development of Non-adherence, with relative risk 3.72 times

higher than other risk factors whereas hypersensitivity to drug and pharmacology of drug are found to be main risk factors for developing ADR which are unavoidable, with a relative risk of 11.57. The assessment of significant risk factors attributing the DRPs encountered in less significant numbers during the study, i.e., Overuse of the drug, Therapeutic duplication, Wrong administration, could not be done as a result of sample size being minimal.

CONCLUSION

In our study Non-adherence and ADR are predominant among the identified drug related problems. Lack of knowledge about disease, its complications and need of pharmacological management is found to be the main risk factor for development of Non-adherence, whereas hypersensitivity to drug and pharmacology of drugs are found to be main risk factors for developing ADR which are unavoidable. The other DRPs like overuse of the drug, therapeutic duplication and wrong administration can be assessed for their significance with appropriate sample size as attributing risk factors causing DRPs.

REFERENCES

1. Easton KL, Parsons BJ, Starr M and Brien JE. The incidence of drug related problems as a cause of hospital admissions in children. *Med J Aust* 2016; 169(7):3569.
2. Appalasamy JR, Sariff A, A survey of drug-related-problems among patients treated for allergy symptoms in community pharmacies at Negeri Sembilan, Malaysia, *Int J Phar Phar Sci*, 2014; 6 (10): 313-316.
3. Rashed NA, Wilton L, Charles CHL, Kwong BYS, Leung S, Wong LCK. Epidemiology and potential risk factors of drug related problems in Hong Kong paediatric wards. *Br J Clin Pharmacol* 2013; 28;77(5):873-9
4. Adusumilli PK, Adepu R. Drug related problems: An overview of various classification systems. *Asian J Pharm Clin Res* 2014; 16; 7(4):8-10.
5. Alghamdy MS, Randhawa MA, Al-Wahhas MH and Al-Jumaan MA. Admissions for drug related problems at the emergency department of university hospital in the kingdom of Saudi Arabia. *J Family Community Med* 2015; 22(1):44-8.
6. Singh H, Kumar BN, Sinha T and Dulhani N. The incidence and nature of drug-related hospital admission: A 6-month observational study in a tertiary health care hospital. *Journal of Pharmacology and Pharmacotherapeutics* 2011; 2(1): 17-20.
7. Kaufmann CP, Stampfli B, Hersberger KE, Lampert ML. Determination of risk factors for drug related problems: a multidisciplinary triangulation process. *BMJ* 2015; 5(3): e006376.
8. Leendertse AJ, Egberts AC, Stoker LJ, Van den Bemt PM, Frequency of and risk factors for preventable medication-related hospital admissions in the Netherlands. *Arch Intern Med* 2008 Sep 22; 168(17):1890-6.