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Original Article

Study of adverse drug reactions in pulmonary medicine department of a Tertiary care hospital, Srinagar, Jammu & Kashmir, India

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ABSTRACT

Background: ADRs (adverse drug reactions) are becoming a vital aspect of patient care and assessment. ADRs account for about 2% of all hospitalizations, according to the incidence rate. Medications with a narrow therapeutic index need ADR control rather than others. ADR research is required to determine the prevalence of ADRs in medical inpatients, estimate the impact of ADRs to hospital admissions, classify the types of ADRs found, identify possibly contributing risk factors, as well as estimate the costs of ADRs in terms of ADR-related excess stay in the hospital. For several years, theophylline has been used to treat asthma and chronic obstructive pulmonary disease (COPD). Theophylline-related adverse events (ADRs) were found to be 4.71 percent of the time, with nausea, anorexia (loss of appetite), and palpitation being the most common.

Objective: The main objective of the study was to study adverse drug reactions in pulmonary medicine department of a Tertiary care hospital, Srinagar, Jammu & Kashmir, India.

Methodology: For an eight-month period, a prospective, descriptive, cross-sectional study was conducted in the pulmonary medicine department of a Tertiary care hospital in Srinagar, Jammu & Kashmir, India. ADRs that occurred in the ward were closely tracked, and the collected reports were analyzed for demographic profile, type of ADRs, ADR occurrence and drug causing ADR, severity assessment, and ADR management.

Results: During the study period, 420 patients' records were obtained from the pulmonary medicine department of a Tertiary care hospital. ADRs were registered in 60 of the patients. The demographics of ADR patients were analyzed, and it was discovered that the prevalence of ADR was highest in the age group of 50-59 years (21 out of 60) and lowest in the age group of <=19 years. The therapeutic drug groups most often involved in ADRs were investigated. The most common culprits among the medications are first-line TB drugs, which account for 21(35%) ADRs, corticosteroids, which account for 9 (15%) ADRs and other drugs used for different indications, such as ipratropium, furosemide, tramadol, and so on, which account for 30 (50%) ADRs. Hepatitis, loss of appetite, nausea, and vertigo were the most widely recorded ADRs in this study.

Conclusion: ADRs are more prevalent in the elderly, and first-line TB drugs are more often implicated. The majority of the reactions were moderate. As a result, early identification, assessment, and control of ADRs are critical for reducing patient harm and improving public health.

Keywords Adverse drug reactions, respiratory disorders, Pharmacovigilance

INTRODUCTION

Adverse drug reactions (ADRs) and other drug-related conditions lead to serious health and quality-of-life concerns. According to research conducted in various settings, adverse drug reactions account for 5 to 35 percent of hospitalizations (ADR). The World Health Organization (WHO) describes an adverse drug reaction (ADR) as any noxious, unexpected, or unwanted consequence of a drug which appears in humans at doses used for prophylaxis, diagnosis, or therapy. Among hospitalized patients, ADRs are the fourth to sixth leading cause of death (Gallelli, Ferreri *et al.,* 2003; Galli, Pandya *et al.,* 2017; Petrova, Stoimenova *et al,.* 2017; Maqbool, Ikram *et al.,* 2018). Adverse related incidents (ADRs) account for 2.9-5.6 percent of all admissions, with ADRs affecting about 35 percent of hospitalized patients. ADRs not only raise mortality and morbidity, but they also increase the cost of health care. Drugs with a narrow therapeutic index need ADR control rather than others. For several years, theophylline has been used to treat

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asthma and COPD (Gallelli, Ferreri *et al.,* 2003; Petrova, Stoimenova *et al.,* 2017; Hanlon, Nicholl *et al.,* 2018; Maqbool, Shabbir *et al.,* 2018). Theophylline-related ADRs were found to be 4.71 percent of the time, with nausea, anorexia (loss of appetite), and palpitation being the most common symptoms. ADRs must be studied in order to assess the prevalence of ADRs in medical inpatients, estimate the contribution of ADRs to hospital admissions, classify the types of ADRs found, identify possibly contributing risk factors, as well as estimate the costs of ADRs in terms of ADR-related excess stay in the hospital (Hire, Kale *et al.,* 2014; Singh, Prasad *et al.,* 2015; Petrova, Stoimenova *et al.,* 2017; Maqbool, Dar *et al.,* 2019). Adverse drug reactions (ADRs) associated with medications used to treat pulmonary disorders pose a significant health risk to patients. ADRs that are serious or potentially lethal are often detected with commonly used medications. Premarketing clinical trials are used to determine the advantages and adverse effects of new products before they are approved for sale. However, the scale of these trials is usually limited to 3,000 patients, making it difficult to identify unusual ADRs prior to approval. When previously unknown but serious ADRs are identified after a medication has been approved by the US Food and Drug Administration (FDA), information is disseminated through updated product inserts (PIS), so-called Dear Doctor letters, and/or journal publications. Despite the fact that medical professionals and patients rely on this information to ensure safe medication use, ADR documentation is often delayed and formatted inconsistently (Brettner, Robert Heitzman *et al.,* 1970; Sossai, Cappellato *et al.,* 2001; Bhananker, O'Donnell *et al.,* 2005; Baniasadi and Fahimi 2011; Fens, Zhou *et al.,* 2021). This study was performed in the pulmonary medicine department of a Tertiary care hospital in Srinagar, Jammu & Kashmir, India, to investigate adverse drug reactions.

METHODOLOGY

This 8-month research took place in the Pulmonary Medicine department of a Tertiary care hospital in Srinagar, Jammu & Kashmir, India. The treatment chart of patients in the ward of the pulmonary medicine department was included in this prospective, descriptive, cross-sectional analysis. The Institutional Ethics Committee gave its approval to the study. Adverse drug reactions were tracked by interviewing the caretaker and ward staff on a regular basis for instances of adverse reactions. Inclusion and exclusion criteria were used to recruit patients. Patients with an adverse reaction to medications used for a variety of indications, patients of both genders, and patients of all ages were included in the study, while prescriptions with insufficient patient information were omitted. The data was analyzed using descriptive statistics. The results were presented as mean ± SEM and percentages, as necessary. MS Excel and the SPSS statistical package were used to measure drug and patient characteristic results. For determining the relationship between variables, appropriate statistical tests were used. The Student's t-test was used to compare the means. If the P value was less than 0.05, the difference was considered important. The causality, severity, and demographic profile of the reports were all reported and examined. Causality of ADRs was done by Naranjo's scale (Naranjo, Busto *et al.,* 1981) which is a questionnaire based classification of the suspected ADRs as definite, probable, possible or unlikely by a scoring method. The severity of ADRs was analyzed using Hartwig's scale (Hartwig, Siegel *et al.* 1992) and accordingly they were grouped as "mild", "moderate" or "severe". Most of the patients were classified as "mild" or "moderate". The study procedure involves use of data collection forms for documentation, causality assessment, severity assessment and analysis of the data.

RESULTS

During the study period, 420 patients' records were screened from the pulmonary medicine department of a Tertiary care hospital. ADRs were reported in 60 of the patients.

Table 1.1. Total Number Of Patients Included In The Study With Respective To Age And Gender.

Age group	Total no. of patients	No. of males	No. of females	% distribution
≤19	27	25	2	6.42
20-29	50	21	29	11.90
30-39	53	20	33	12.61
40-49	54	30	24	12.85
50-59	112	72	40	26.66
60-69	67	39	28	15.95
≥70	57	30	27	13.57
TOTAL	420	237	183	100

Incidence of ADRs:
Out of the 420 patients treated for various indications, 60 (14.28%) patients were reported with an incidence of ADRs. Out of them 24 were male and 20 were female patients.

Table 1.2. List of ADRs Reported During Study Period

S. No	Type of ADR	No. of Pts.	No. of Males	No. of Females	% distribution
1	Hepatitis	7	4	3	11.66
2	Nausea	9	4	5	15
3	Vomiting	7	3	4	11.66
4	Chest pain	6	4	2	10
5	Loss of appetite	12	7	5	20
6	Vertigo	7	3	4	11.66
7	Dry mouth	5	3	2	8.33
8	Sore throat	7	4	3	11.66
	Total	44	32	28	100

Incidence of ADRs:
a) Based on gender of patients:
A total of 60 patients with ADRs were detected out of which 32 were males and 28 were females.

Table 1.3. Incidence of ADRs in the Patients With Respect To Gender

Gender	No. of Patients With ADRs	No. of Patients Without ADRs	Total	Incidence Rate
Male	32	205	237	0.135
Female	28	155	183	0.153
Total	60	360	420	0.142

b) Based on the age of the patients
Table shows the incidence of ADRs with respect to age

Table 1.4. Incidence of ADRs In The Patients With Respect To Age

Age (Yrs.)	No. of ADR patients	Total No. of Patients	Incidence Rate
≤19	0	27	0
20-29	5	50	0.10
30-39	6	53	0.113
40-49	7	54	0.129
50-59	21	112	0.187
60-69	12	67	0.179
≥70	9	57	0.157

Drugs Causing Adverse Drug Reactions:
The most commonly occurring ADRs are due to the first line Anti-TB drugs, ipratropium corticosteroids, furosemide, tramadol etc.

The following table shows the detailed information.

Table 1.5. Drugs Most Frequently Implicated For ADRs

Suspected Drug	No. Of ADRs	Percentage Of ADRs
First Line Tb Drugs	21	35
Corticosteroids	9	15
Others	30	50

Management Of The Adverse Drug Reactions (ADRs):
The management of the ADRs was done by taking following measures. The details are shown in the following

Table 1.6. Management of Adverse Drug Reactions (ADRs)

Measures	No. Of Patients
Drug changed	8
No change	34
No change other drug added	18

Causality Assessment Of ADRs
Causality assessment was done using Naranjo's scale (Naranjo, Busto *et al.,* 1981) and according to the score the ADRs were classified as "definite/highly probable", "probable", "possible" or "unlikely". Out of the 60 ADRs, most ADRs were found to be "definite" followed by "possible" while the rest were classified as "probable". Out of 60 ADRs, 30(50%) ADRs were detected as "Definite" and it is followed by 18 (30%) were "Possible" and 12(20%) ADRs were "Probable".

Table 1.7. Causality Assessment

Outcome	No. Of Patients	% Of Outcome
Definite/highly probable	30	50
Possible	18	30
Probable	12	20
Unlikely	0	0

Severity Assessment
The severity of ADRs were analyzed using Hartwig's scale (Hartwig, Siegel *et al.,* 1992) and accordingly they were grouped as "mild", "moderate" or "severe". Most of the patients were classified as "mild" or "moderate". No patients were found to be "severe".

Table 1.8. Severity Assessment

Severity	No. of ADRs	Percentage (%)
Mild	42	70
Moderate	10	16.6
Severe	8	13.3

DISCUSSION

The physicians prompted spontaneous reporting method was used in this research. Adverse drug reaction reports were obtained from 60 patients (14.28 percent) of the 420 patients treated for different indications during the 8-month study period. The Naranjo scale revealed that out of 60 ADRs, 30 (50%) was listed as "Definite", followed by 18 (30%) Likely, and 12 (20%) "Probable" adverse drug reactions (Table 1.7). Hepatitis, loss of appetite, nausea, and vertigo were the most widely recorded ADRs in this study (Table 1.2). When the severity of ADRs was measured using Hartwig's severity scale, it was clear that the majority of the ADRs were mild (42 patients) to moderate (10 patients), with one serious (8 patients) reaction (Table 1.8). ADRs were often controlled by withdrawing the causative drug depending on the severity of the reaction. In the current research, 7 patients with drug-induced hepatitis were treated by switching medications, 18 patients were treated by adding other drugs to reduce the severity of ADRs, and 34 patients' prescriptions were not changed. There were no ADRs that caused permanent damage or resulted in the patient's death. The demographics of ADR patients were analyzed, and it was discovered that the prevalence of ADR was highest in the age group of 50-59 years (21 out of 60) and lowest in the age group of <=19 years (Table 1.4). The higher prevalence of ADRs in our study's extreme age groups (50-59 years) may be attributed to other co-morbidities or age-related disorders such as metabolic changes. The lower number of ADRs identified among those aged <=19 years could be due to a lower prevalence and occurrence of pulmonary disorders in this age group, as well as a lower number of patients attending the hospital. ADRs were found to be more common in males (32 patients) than females in this sample (28 patients).

This may be due to the fact that there are more male patients in the ward than female patients. The therapeutic drug groups most often involved in ADRs were investigated. The most common culprits among the medications were found to be first-line TB drugs, which account for 21(35%) ADRs, corticosteroids, which account for 9(15%) ADRs, and other drugs used for different indications, such as ipratropium, furosemide, tramadol, and so on, which account for 30 (50%) ADRs (Table 1.5). This study's findings were close to those of several other studies that found these to be the most offending substances in their studies. ADR research is also necessary to assess their prevalence in medical practice, estimate their contribution to hospital admissions, classify the types of ADRs seen, identify predisposing risk factors, and estimate the costs of ADRs in terms of ADR-related excess hospital stays. One of the study's drawbacks is that we did not observe hospitalizations due to ADRs or collect information on their expense.

One pathway for more actively monitoring Adverse Drug Reactions (ADRs) and, as a result, improving patient care safety is a structured Adverse Drug Reaction Surveillance network. Multiple methods for testing and recording the efficacy of drugs in clinical use are important for avoiding or reducing patient injury and strengthening public health. This entails establishing a well-structured Pharmacovigilance programme in clinical practice. Once a prescription has been published into the "true world," pharmacovigilance is an important method of monitoring medication-related issues. Pharmacovigilance and other drug-related problems should be familiar to those whose life is impacted by prescription procedures in some way. In recent years, pharmacovigilance has gained prominence as a technology critical to sound clinical practice and public health science. Since ADRs have such a detrimental influence on patients' wellbeing and inflict too much financial strain, it's critical to carefully monitor each medication for any potential adverse effects in animal models (preclinical studies) and clinical trials until releasing it. Pharmacovigilance aims to play a key role in combating the dangers faced by an ever-growing number of drugs, each of which is vulnerable to unpredictably negative side effects. When adverse effects and toxicity occur, they must be recorded, analysed, and the importance of the results correctly communicated to those who may understand the evidence. By ensuring that prescription drugs of high consistency, purity, and effectiveness are used rationally, the risk of injury will be minimised (Salem, Manouchehri *et al.,* 2018; Johnson, Manouchehri *et al.,* 2019).

CONCLUSION

ADRs increase morbidity and mortality while also rising healthcare costs. ADRs must be identified, measured, and tracked early in order to minimise patient damage and thereby improve public health. As a consequence, pharmacovigilance is an important post-market method for ensuring the safety and effectiveness of pharmaceuticals and other health-related products. Many research have been conducted separately on various respiratory diseases such as COPD, tuberculosis, asthma, respiratory tract infections (upper/lower), and so on. However, this study included some of the most common diseases in this field, such as COPD, tuberculosis, and respiratory tract infections. A routine patient follow-up is needed for the early detection and prevention of ADRs in order to improve patient adherence to drug therapy and provide improved drug therapy by avoiding associated morbidity and mortality. Pharmacovigilance aims to play a critical role in addressing the risks faced by the ever-growing list of drugs, each of which carries the unavoidable risk of unpredictably harmful side effects. When adverse effects and toxicity occur, particularly when they are previously unknown, they must be registered, evaluated, and their importance effectively communicated to those with the ability to interpret the data. By ensuring that pharmaceutical products of good quality, protection, and effectiveness are used rationally, the risk of harm can be minimised.

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CONFLICT OF INTEREST

None

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