

ORIGINAL ARTICLE

Comparative Assessment of Drug Interactions among Public and Private Sector Hospitals

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ABSTRACT

Background: Drug-drug interactions (DDIs), being one of the most preventable drug related hazards having serious life threatening adverse consequences or at least results in therapeutic failure.

Aim: To confirm the drug-drug interactions among medical patients at private and public sector hospitals of Jhelum and Kharian.

Study design: Comparative study.

Methodology: The collected data was analyzed for drug interactions. Patients who were being prescribed less than two drugs along with topical drugs (ointments, creams, ear drops and eye drops) were excluded. Information on prescriptions was retrieved from the hospital prescription. SPSS for windows version 20.0 was used to analyze the data. Results were presented as frequency and percentage.

Results: The results showed that the public sector showed 1640 drug interactions, that is 75%; on the other hand, the private sector showed 260 drug interactions, that is 41%.

Conclusions: We concluded that frequency of drug interactions were more in public sector hospitals. Hence, a possible reason for such a result could be the greater patient load on public sector hospitals and less number of appointed doctors in such facilities.

Keywords: Adverse Drug Interaction, Drug-Related Problems and Drug-Drug Interaction.

INTRODUCTION

Drug-drug interactions (DDIs), being one of the most preventable drug related hazards having serious life threatening adverse consequences or at least results in therapeutic failure.^{1,2} The accompanying ADRs may cause severe morbidity or even mortality. ADRs result in 5% admissions in healthcare settings, of which 0.25 to 25% are due to DDIs.³⁻⁶ Detection and proper prevention of DDIs result in avoiding the connected undesirable situations.⁷ DDIs are very widespread in hospital admitted patients.⁷⁻⁹ According to various studies conducted in certain wards of a healthcare setting, showed the data regarding reasons for hospitalization, class of drugs and patient populations.¹⁰⁻¹⁴ Studies regarding the DDIs occurrence in OPDs of Pakistan's hospitals are very inadequate and rare. A few studies in developed countries showed 28-83% prevalence of DDIs in OPDs¹³⁻¹⁸. Factors affecting such findings include work settings, plans, DDIs screening tool, and drug prescribing pattern.

Healthcare providers in undeveloped and developed countries, including Pakistan, face various challenges i.e., overburdened patients in hospitals, with multiple diseased states, accompanied by unauthentic previous medication histories^{19,20}. In addition, there are no such methods available/adopted to determine the patients' drug adherences, therapeutic outcome levels and ADR reporting

and highlighting systems.^{19,20} Overall, due to these miserable circumstances, it is inevitable to perform studies on DDIs occur in OPDs inside Pakistan. The aim of the study was to determine the prevalence of possible DDIs that are preventable by proper analyzing the prescriptions of the patients that visit OPDs. Also to evaluate the degree and intensity of the DDIs and to discover the widespread clinically significant interactions.

As per 2016 statistics, Pakistan has got an excess of 1200 public hospitals and 700 private hospitals. Public health facilities in Pakistan provide the bulk of healthcare.²¹ Over the years our population has increased exponentially and such rise is led with a greater burden on the public health sector. Public care institutes are usually the only major healthcare facility in most of the far flung districts or cities. Public sector charges minimal fees and remains affordable to all the population.

The private sector plays a vital role in the delivery of healthcare services in Pakistan as they are well-equipped with modern gadgets. Hence, private healthcare facilities are in greater demand than government sector.²¹ A plethora of conditions haunting the public and private sector hospitals can also lead to an increase in drug-drug interactions, an easily preventable cause of patient distress.

The objective of the study was to confirm the drug-drug interactions among medical patients at private and public sector hospitals of Jhelum and Kharian.

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METHODOLOGY

The collected data was analyzed for drug interactions. Patients who were being prescribed less than two drugs along with topical drugs (ointments, creams, ear drops and eye drops) were excluded. Possible DDIs were analyzed by using drug-reax that unveils information about adverse drug reactions resulting from a DDI, the onset as well as the severity of a potential DDI. It provided information on potential clinical consequences (ADRs). Present study was conducted following approval from ethical review board.

Statistical Analysis: SPSS for windows version 20.0 was used to analyze the data. Results were presented as frequency and percentage.

RESULTS

A total of 2840 prescriptions revealed a total of 1900 interactions (67%). Public hospitals had a greater number of interactions in their prescriptions. Out of 2200, 1640 (75%) interactions were from public sector hospitals. Among the private hospitals from the two cities, a total of 260 interactions were ascertained from 640 prescriptions (41%) as shown in Figure 1.

Figure-1: Overall percentage of drug interactions in hospitals

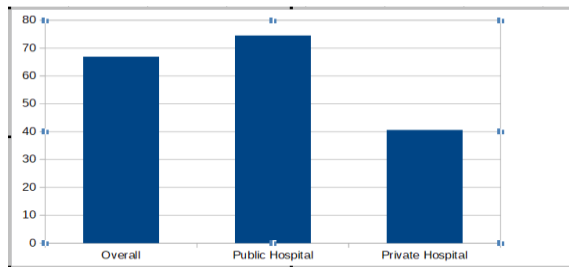


Table-1: Drug interactions at public hospitals of jhelum

Drug interaction	Effect	No of interactions%
Ibuprofen + Levofloxacin	Central nervous system toxicity	220 (16.2)
Ciprofloxacin + Diclofenac	Central nervous system toxicity	128 (9.4)
Aspirin + Atenolol	Attenuate the antihypertensive effects	96 (7.0)
Diclofenac + Levofloxacin	Central nervous system toxicity	78 (5.7)
Aspirin + Clopidogrel	Potentiate the inhibition of platelet aggregation	42 (3.0)
Ciprofloxacin + Metronidazole	Prolong the QT interval	36 (2.6)
Amlodipine + Diclofenac	Attenuate the antihypertensive effects	36 (2.6)
Levofloxacin + Prednisolone	risk of tendinitis and tendon rupture	34 (2.5)
Atorvastatin + Clopidogrel	Reduce antiplatelet effect	32 (2.3)
Aspirin + Glimepiride	Increase risk of hypoglycemia	32 (2.3)

A high percentage of interactions were found in a public sector Kharian hospital that is 93%, 780 out of 840

prescriptions. Drug interactions from public sector hospitals at Jhelum were shown in Table-1.

Table-2: Drug Interactions At Public Hospital Of Kharian

Drug interaction	Effect	Number of interactions%
Aspirin + Clopidogrel	Potentiate the inhibition of platelet aggregation	244 (29)
Aspirin + Bisoprolol	Attenuate the antihypertensive effects	112 (13.3)
Aspirin + Ramipril	Attenuate the antihypertensive effects	74 (8.8)
Aspirin + Nitroglycerin	Enhance the antihypertensive effect	54 (6.42)
Hydrochlorothiazide + Ramipril	Enhance the antihypertensive effect	42 (5.0)
Aspirin + Furosemide	Blunt the diuretic and natriuretic response	34 (4.0)
Aspirin + Lisinopril	Attenuate the antihypertensive effects	32 (3.8)
Atorvastatin + Clopidogrel	Reduce antiplatelet effect	30 (3.6)
Glimepiride + Levofloxacin	Hypoglycemia or hyperglycemia	28 (3.3)
Aspirin + Bisoprolol	Attenuate the antihypertensive effects	26 (3.1)

Table-3: Drug Interactions At Private Hospitals Of Jhelum

Drug interaction	Effect	Number of interactions%
SSRIs + TCAs	Serotonin syndrome , TCA toxicity	32 (8)
Methotrexate + Omeprazole	Increased methotrexate concentration	28 (7)
Ciprofloxacin + Theophylline	Increased theophylline toxicity	4 (1.0)
Prednisone + Levofloxacin	Tendinitis, tendon rupture	6 (1.5)
Prochlorperazine + Escitalopram	Prolongation of the QT interval	6 (1.5)
Ciprofloxacin + Duloxetine	Increased duloxetine toxicity	4 (1.0)

Table-4: Drug Interactions at private hospitals of kharian

Drug interaction	Effect	Number of interactions%
Potassium sparing diuretics + ACE inhibitor	Hyperkalaemia	80 (33)
Omeprazole + Clopidogrel	Reduced cardioprotection	30 (12.5)
Ibuprofen+ Aspirin	Loss of cardioprotective and anti platelet effect	24 (10)
Orphenadrine+ Topiramate	Hyperthermia	14 (5.8)
Tizanidine+ Escitalopram	Prolongation of the QT interval	14 (5.8)
Propoxyphene+ Duloxetine	Additive CNS and/or respiratory depressant effects	12 (5)
Lorazepam+ Olanzapine	Additive CNS and/or cardiorespiratory, depressant effects	02 (0.8)
Warfarin + Aspirin	Increased risk of bleeding	02 (0.8)
Aluminum hydroxide + Sodium citrate	Hyperalbuminemia and encephalopathy	02 (0.8)

Drug interactions at public hospital of Kharian were shown as frequency with percentage was shown in table-2.

In private sector, two major hospitals were selected, Faizan Memorial Hospital Jhelum and Elahi Hospital Jhelum from Jhelum. Prescriptions totaling 400 were checked. Drug interactions details were shown in Table-3. Najam Hospital Kharian and Allama Iqbal International Hospital Kharian.

240 prescriptions from hospitals of Kharian were checked. Drug interactions details depicted in Table-4.

DISCUSSION

Our study depicts the situation of drug interactions between government run setups and that in private hospitals. In undeveloped countries, like Pakistan, patients receiving healthcare at a hospital are at risk of drug drug interaction and other adverse/ iatrogenic effects. This phenomenon can be explained by a large burden of patients on doctors, absence of follow up visits and no facility to scan drug drug interactions²².

Prevalence of drug drug interactions is similar to that when compared with other studies from different countries (27.9–83.4%)¹³⁻¹⁸. Our results have led us to believe that public sector hospitals have a higher percentage of drug drug interactions. Public hospitals have 63% and 93% interactions in prescriptions in Jhelum and Kharian respectively. DHQ Jhelum showed better performance due to greater number of healthcare workers in its staff compared with Kharian THQ. Among private hospitals, Jhelum showed 20% drug interactions and Kharian showed 75% of drug interactions. This could be due to a greater number of staff in private hospitals in Jhelum.

It can be concluded from our study that drug drug interactions are occurring in both private and public hospitals. This problem needs serious addressing. To prevent such occurrence a full faculty of healthcare workers should be present at the hospitals and the work load should be manageable for them. Present study suggested that prescribers' knowledge regarding different significant DDIs is inadequate. Our findings were in line with other researches hence, there is need to develop systems that alert and educate prescribers about significant DDIs.

Limitation: Our study had several limitations like financial constraints, time restrictions, small sample number and fewer resources.

CONCLUSION

We concluded that frequency of drug interactions were more in public sector hospitals. Hence, a possible reason for such a result could be the greater patient load on public sector hospitals and less number of appointed doctors in such facilities.

Author's contribution: HAM & MZA: Overall supervision, write up and literature review. AS & AK: Statistics application analysis literature review, help in write up. HA, AA and TL: Literature review help in write-up.

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Financial Disclosure: None

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