

Estimation of Hepatotoxic Drug Use and Outcomes in Managed Care as a Medication Error Reduction Strategy

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INTRODUCTION

- Medication errors due to prescribing are a major cause of morbidity and mortality, and pharmacy benefit managers (PBMs) can play a vital new expanded role in their reduction.
- Hepatotoxicity as a result of prescribing error is a major risk factor in patients with severe liver disease.
- Hepatotoxicity can lead to serious liver failure, increased healthcare costs and resource utilization.

OBJECTIVE

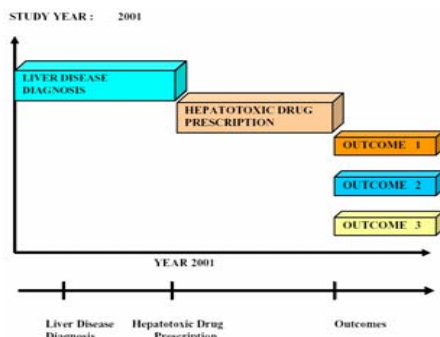
- To estimate hepatotoxic drug utilization in patients with severe liver disease, and analyze healthcare resource utilization between hepatotoxic drug users and non-users.
- Provide a model for pharmacy benefit managers to adopt medication error risk reduction strategies.

METHODS

- A retrospective one year study of liver disease patients on hepatotoxic drugs was performed using an integrated pharmacy and medical claims database at a large Midwestern PBM.
- A severe liver disease list and a severe hepatotoxic drug list were generated and validated by a literature review and medical expert opinion by hepatologists.
- The hepatotoxic drug list and the liver disease list were used to estimate liver disease patients on hepatotoxic drugs using the integrated pharmacy and medical claims database of a large corporation.
- Health care resource utilization was estimated by the following variables
 - Inpatient hospital charges
 - Total days spent in hospital
- A control group of liver disease patients with no hepatotoxic drug prescription was used for comparison.
- Co-morbidity was controlled for, by eliminating patients with HIV/AIDS, cancer, and others undergoing chemotherapy.

METHODS (cont'd)

- A T-test was performed between the hepatotoxic drug users and non-user liver disease patients.
- Regression analysis was performed to estimate whether the presence of a hepatotoxic prescription was a significant predictor of inpatient hospital charges in patients with severe liver disease.



RESULTS

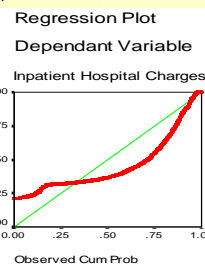
PBM Member Population	22 million
Patients using hepatotoxic drugs	1,675,520 (~1.6 million) ~ 7.3%
Employees of Corporation A	160,000
Hepatotoxic drug users in Corp. A.	51,128 ~ 32%
Liver disease patients in Corp. A.	1,937 ~ 1.2%
Liver disease patients in Corp. A. using Hepatotoxic drugs	405 ~ 21%*

(After elimination of patients with co-morbid conditions)
* As a percentage of liver disease patients

	Hepatox. User		Hepatox. Non-User	
	Average	Median	Average	Median

Inpatient Charges	\$76,624 [†]	\$19,624	\$59,096 [†]	\$1,370
Hospitalization Days	4.02 days [†]	0	9.30 days [†]	0

[†] Per Person Per Year



Regression Equation: $Y = 35421.76 + 22869.94X$

RESULTS (cont'd)

- A considerable number of liver disease patients were being prescribed hepatotoxic medications in the selected sample population; approximately 21%.
- There were significantly higher inpatient hospitalization charges among liver disease patients with hepatotoxic drug use. ($F=41.68$, $p=0.000$)
- There were significantly lower total number of hospital days in liver disease patients with hepatotoxic drug use while compared to patients without hepatotoxic drug use. ($F=3.38$, $p=0.000$)
- Presence of a hepatotoxic prescription was found to be a significant predictor of Inpatient hospital charges. ($r=0.145$, $F=27.67$, $p=0.000$)

DISCUSSION

- Results suggested that prescribing of hepatotoxic medications to patients with severe liver disease was a significant problem.
- Often patients visit multiple prescribers, thus resulting in a hepatotoxic prescription, as physicians might be unaware of the patient's underlying condition of severe liver disease.
- Hepatotoxic medications, if prescribed to patients with severe liver disease, can lead to increased costs and health care resource utilization. In this study a lesser number of hospital days was seen in hepatotoxic users in spite of higher inpatient charges. A possible reason could be that hepatotoxic drug users might have utilized more expensive services at higher cost hospitals.
- Limitations include:
 - Availability of a minimal amount of integrated pharmacy and medical claims data.
 - Laboratory test results that help to assess clinical severity of liver disease are not available in pharmacy claims databases
 - Idiosyncratic reactions also cause hepatotoxicity and liver damage, thus it is difficult to identify and isolate severely hepatotoxic drugs.
 - International Classification of Diseases (ICD 9) codes were used to evaluate the presence of liver disease in the claims databases. The use of ICD9 codes in administrative claims databases might not be reliable due to up-coding.
 - Baseline severity or risk of the patients was not assessed.
- Although corroborative research is needed, this study identified hepatotoxic prescribing to liver disease patients as a significant problem which could lead to higher costs and potentially higher resource utilization.
- Such medication error risk reduction strategies can be incorporated in current Disease State Management programs to provide better analysis of patient health outcomes.
- Errors in health care pose a significant problem and collaborative research is strongly needed among managed care organizations.

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