BACKGROUND

Hepatitis C virus (HCV) is an emerging public health problem with over 160 million people infected worldwide. In the United States (US), approximately 3.2 million people are affected.1 Human immunodeficiency virus (HIV) is also one of the biggest health concerns globally, with 33 million people infected worldwide2 and 1.2 million people infected in the US.3 Over time, chronically infected patients develop complications such as cirrhosis of the liver and hepatocellular carcinoma. The CDC estimates nearly 8,000–10,000 deaths due to chronic liver disease each year. Co-infection with HCV and HIV result in more rapid disease progression and a higher prevalence of cirrhosis leading to increased disease burden.

OBJECTIVES

To generate national estimates of per-discharge inpatient costs, length of stay (LOS), and probability of death among patients infected with chronic HCV, HIV, and those co-infected with both. Results were compared with patients without chronic HCV or HIV.

METHODS

Study Design

Descriptive analysis

Data Source

Discharge data were collected from the 2005 Healthcare Cost and Utilization Project (HCUP) National Inpatient Sample (NIS).2

• The NIS is the largest all-payer inpatient care database in the US.

• The 2005 NIS dataset contains data for approximately 8 million inpatient hospitalizations.

• The NIS is the only national hospital database with charge information on all patients, regardless of payer, including those covered by Medicare, Medicaid, private insurance, and the uninsured.

• The NIS includes numerous demographic, clinical, and resource use variables for each inpatient stay, including patient age, gender, and race, diagnosis codes, LOS, total charges, admission and discharge status, payer, and hospital-specific characteristics.

Sampling weights allow for generating nationally representative estimates.

• Steiner and colleagues (2005) provide a comprehensive review of this source and other HCUP data sources.5

Inclusion Criteria

Criteria for inclusion in the study were as follows:

• Discharges with at least one International Classification of Disease, 9th Revision, Clinical Modification (ICD-9-CM) diagnosis code for the condition of interest:

  - Chronic HCV 079.4, 079.41, 079.42, or 079.49
  - HIV 042.xx (including all fourth- and fifth-digit modifiers)

• Discharges were classified into four mutually exclusive groups:

  - Chronic HCV alone without HIV
  - HIV alone without chronic HCV
  - Chronic HCV and HIV co-infection
  - No chronic HCV or HIV (comparator group)

Outcome Measures

• Per-discharge total costs

  - NES’s charge data converted to costs using facility-specific cost-to-charge ratios

  - Costs presented in 2007 US dollars

• Per-discharge LOS

  - Cost per day

• Probability of death

Statistical Techniques

• All analyses were conducted using SUDAAN® software, version 9.2, to account for the NIS’s complex survey design.

  - T-tests were used to test for significant differences in outcomes between groups.

REFERENCES

1. The Global Burden of Hepatitis C: Estimating the Global burden of disease (GBD) for hepatitis C. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4600732/


RESULTS

Table 1. Patient Characteristics (Table 1)

<table>
<thead>
<tr>
<th>Study Cohort</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic HCV</td>
<td>600,882</td>
<td>1.57</td>
<td>895,953</td>
<td>2.37</td>
<td>205,474</td>
<td>0.55</td>
<td>6,196,040</td>
<td>1.62</td>
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<tr>
<td>HIV</td>
<td>552,082</td>
<td>1.49</td>
<td>858,646</td>
<td>2.31</td>
<td>180,402</td>
<td>0.48</td>
<td>6,096,098</td>
<td>1.60</td>
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<tr>
<td>Chronic HCV + HIV</td>
<td>528,117</td>
<td>1.45</td>
<td>851,784</td>
<td>2.28</td>
<td>162,743</td>
<td>0.44</td>
<td>5,963,660</td>
<td>1.59</td>
</tr>
<tr>
<td>No HCV or HIV</td>
<td>30,090</td>
<td>0.08</td>
<td>50,307</td>
<td>0.14</td>
<td>12,190</td>
<td>0.03</td>
<td>1,226,740</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Costs Associated With Chronic HCV-Related Complications

- Total cost per hospitalization was lowest for HCV at $11,796 and was significantly higher for HCV ($31,064) and for HCV and HIV co-infection ($81,668).
- The total hospitalization cost for the comparator group was nearly half ($8,859).
- Per-discharge total costs decreased by 2.1% for all three groups.

Length of Stay and Probability of Death

- The average LOS for chronic HCV-related hospitalizations was 4.03 days, while that for HCV-related hospitalizations and for HCV and HIV-related hospitalizations was higher at 7.87 days. In comparison, hospitalizations not related to HCV or HIV had an average LOS of only 4.62 days.
- The probability of death associated with HCV only, HIV only, and HCV and HIV co-infection is 3.9%, 5.7%, and 6.6%, respectively. The probability of death associated with non-HCV or HIV-related hospitalizations combined was only 2.1%, P < 0.01 for all three groups.

LIMITATION

- Conditions were identified based on diagnostic codes, which if recorded inaccurately, may cause some discharges to be misidentified as chronic HCV or HIV-related.

CONCLUSIONS

- This is one of few studies to quantify differences in inpatient costs and outcomes associated with HCV, HIV, and HCV and HIV co-infection in a multipayer US population.

- Hospitalizations related to HCV and HIV co-infection were longer and more expensive compared to those related to HIV only.

- Policy makers and other decision makers should be aware of this burden as strategies to allocate resources are developed.

CONTACT INFORMATION

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1. The Global Burden of Hepatitis C: Estimating the Global burden of disease (GBD) for hepatitis C. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4600732/


