Trends in Utilization and Analysis of Inpatient Outcomes for Adult Liver Transplantation Donors in the United States – A National Inpatient Sample Analysis from 2010 to 2017

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Background: There has been an increasing trend of liver transplantation in the United States albeit with a continued shortage of available liver donors. Recently, new techniques for technical variant grafts have been developed, including deceased donor partial and split liver transplantation, as well as living donor transplantation. As a result, the aim of this study is to investigate liver donor demographics, comorbid conditions and total inpatient hospitalization charges.

Methods: The National Inpatient Sample was used to identify all adult liver donors by ICD codes during hospitalizations from 2010-2017. Trend tests were conducted for categorical variables and weighted least squares regression for linear variables. Cost ratios were calculated after selection of four significant predictors including donor age, hospital region, insurance type and number of Elixhauser Comorbidities.

Results: There was an upward trend of liver donations by younger (age 18-39) patients ($p < 0.0001$) and those with relatively higher Elixhauser Comorbidity indices (ECI). Greater hospitalization costs were found to be independently associated with younger age (<60 years old, $p < 0.05$), Northeast and West hospital regions ($p < 0.0001$), private insurance ($p = 0.0439$) and having at least one ECI ($p = 0.0019$) after comparing to the reference group (Table 1). There was an overall downtrend of liver donors in patients of the 3rd ($p = 0.0012$) median household income, with a one-year exception in 2016. An uptrend of liver donations was found amongst the 4th income quartile ($p = 0.035$) over the years.

Conclusions: Of those admitted for liver donation, young patients from northeast or west regions, with private insurance and ECI greater than one had higher hospitalization costs. Utilization of donors with baseline chronic conditions, together with complicated socioeconomic factors can lead to a prolonged hospital stay, driving increased hospitalization costs.

Table 1. Statistically significant variables after comparing to the reference group (Patient age 70 or greater, Midwest Hospital Region, Medicaid, Elixhauser Comorbidity Index = 0).

Variable	**Adjusted Cost Ratio**	**P -Value**
Age 18-39 years old	1.69 (1.22, 2.32)	P = 0.0014
Age 40-49 years old	1.64 (1.18, 2.29)	P = 0.00313
Age 50-59 years old	1.53 (1.09, 2.14)	P = 0.013
Northeast Hospital Region	1.56 (1.33, 1.82)	P < 0.0001
West Hospital Region	1.75 (1.51, 2.04)	P < 0.0001
Private Insurance	1.36 (1.01, 1.83)	P = 0.0439
Elixhauser Comorbidity Index = 1	1.23 (1.08, 1.4)	P = 0.0019