

Liver Transplantation Demographics and Indications Over Two Decades: Single Center Retrospective Analysis

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Introduction

- Liver transplant is a therapeutic treatment option for patients with acute and chronic liver disease
- The number of liver transplants has increased steadily each year
 - 9,236 liver transplants were performed in 2021, making it the ninth consecutive year that number has been an all-time high
- Transplant indications vary and are based on liver disease etiology
- The aim of this study is to evaluate transplant indications and patient demographics over the past two decades
 - Determine presence of increased incidence in certain transplant indications
 - Determine associations between transplant indication and demographic background such as race, age, and gender
- Understanding transplant indications with increased incidence as well as associations between transplant indication and demographic background may assist in early determination of high-risk populations at an increased risk of liver transplant

Methods

- Demographic information and indications for liver transplant were collected from the Thomas Jefferson University transplant database during the years 2002-2020
- Demographic factors analyzed were age, race (White, Black, Asian, Hispanic, or Other), and gender (male/female)
- Indications for liver transplant included non-alcoholic fatty liver disease (NASH/NAFLD), alcoholic cirrhosis (alcohol), drug use, HBV, HCV, autoimmune, primary sclerosing cholangitis (PSC), primary biliary cholangitis (PBC), hepatocellular carcinoma (HCC), or common combinations of two indicators
- Frequencies of demographic factors overall and within transplant indications were calculated
- Comparisons between demographic factors were made using chi-square tests ($p < 0.05$)

Comparison of Age and Gender in Liver Transplant Patients from 2002-2020

Indication	Total Patients (%)	Mean Age (years)		p-value
		Male	Female	
Overall	974 (100.0)	56.54	54.59	0.0005
NASH/NAFLD	94 (9.7)	60.19	61.29	0.56
Alcohol	156 (16.0)	55.95	54.79	0.15
HCV	110 (11.3)	55.87	57.00	0.85
HBV	11 (1.1)	47.90	49.00	0.89
Autoimmune	30 (3.1)	47.33	45.47	0.68
PSC	35 (3.6)	47.90	44.04	0.52
PBC	25 (2.6)	53.32	51.19	0.84
HCC	48 (4.9)	59.00	61.22	0.35
Drug	14 (1.4)	44.92	48.44	0.82
Cirrhosis NOS / Cryptogenic	129 (13.2)	53.06	51.52	0.73
HCV + HCC	252 (25.9)	58.03	58.77	0.89
NASH + HCC	12 (1.2)	61.14	66.00	0.92
NASH + Alcohol	3 (0.3)	37.00	56.50	0.22
Alcohol + HCC	54 (5.5)	60.72	56.30	0.049
HBV + HCC	1 (0.1)	N/A	50.00	N/A

Results

- A total of 974 patients were included in our study, consisting of 685 males and 289 females
- The mean age at time of transplant was 56.0 years \pm 10.7 years
- The race breakdown for our population was 758 White, 115 Black, 59 Hispanic, 42 Asian, and 9 Other
- The most common indications for liver transplant were HCV + HCC (25.9%) and alcoholic cirrhosis (16.0%)
- There was a statistically significant relationship between age and gender ($p=0.0005$), with females being younger at the time of transplant
- There was no statistically significant relationship between race and gender ($p=0.06$) or between age and race ($p=0.051$)
- Male patients with alcoholic cirrhosis + HCC were significantly older than their female counterparts (60.7 years vs. 56.3 years, $p=0.049$)
- Among patients whose indication was alcoholic cirrhosis + HCC, Hispanics were significantly older than their White and Black counterparts (68.3 years vs. 59.9 and 55.8 years, respectively, $p=0.044$)
- Among patients whose indication was autoimmune, Hispanics were significantly younger than their White, Black, and Other counterparts (5.8 years vs. 51.5, 38.8, 58.7 years, respectively, $p=0.001$)

Patient Demographics

Race	Total Patients (%)	Gender	Total Patients (%)
White	758 (77.8)	Male	685 (70.2)
Black	115 (11.8)		
Hispanic	59 (5.1)	Female	289 (29.8)
Asian	42 (4.3)		
Other	9 (0.9)		

Discussion

- HCV + HCC and alcoholic cirrhosis were the two most common indications for liver transplant; females overall were significantly younger at the time of transplant, and there were no statistically significant relationships between race and gender or between age and race
- Understanding the changing landscape of liver transplant indications and its nuances will help physicians target and utilize available resources accordingly
- Recognizing high risk populations is important for the anticipation and proactive management of patients
- Further studies are required to elucidate the different manifestations in specific populations of aggressive patterns of liver disease, and the effect these differences have on treatment outcomes
- Determining what extent female gender and Hispanic race play a role in transplant indication through studies focusing on potential causes, as well as outcomes, is essential

References

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