Impact of NAFLD on In-Patient Outcomes in Non-Variceal Upper GI bleeding: A Nationwide Analysis

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Introduction

- Non-Alcoholic Fatty Liver Disease (NAFLD) is the leading cause of liver disease globally with an estimated prevalence of 25%, with the clinical and economic burden expected to keep increasing.

- Upper gastrointestinal bleeding (UGIB) occurs in 100 out of 100,000 people per year.

- In the US, non-variceal UGIB has an estimated incidence of 61-78 cases per 100,000 people with mortality rate of 2-15% based on co-morbidity burden.

Objective

- Aim of the study is to determine the impact of NAFLD on mortality, in-patient complications and resource utilization in patients with non-variceal UGIB.

| NAFLD and NVUGIB | ⟷ | Mortality In-Patient Complications Resource Utilization. |
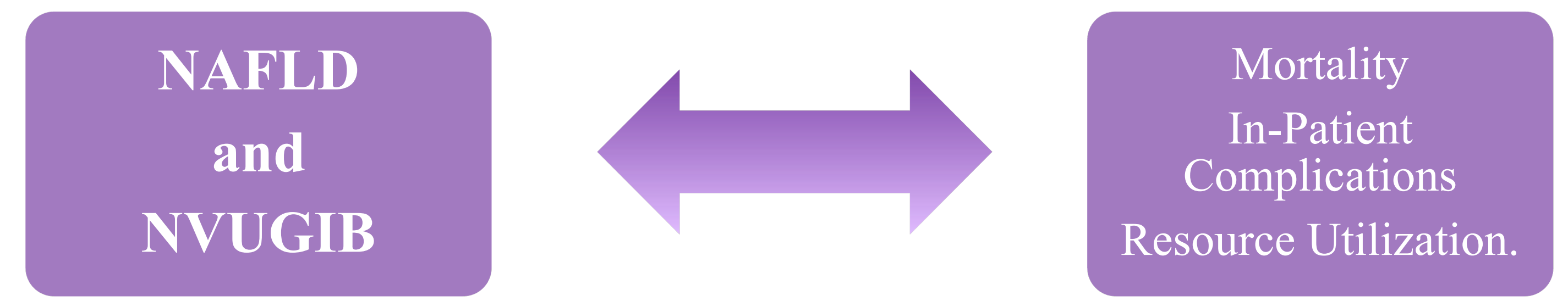
Methods

- De-identified data from the National Inpatient Sample (NIS) database 2016-2019 was used.

- Using ICD-10 CM codes, patients with non-variceal UGIB were identified and then stratified into those with and without NAFLD.

- Patient demographics, length of stay, hospital charges, comorbidities, complications and mortality outcome data were analysed.

- Mann-Whitney tests with Bonferroni corrections were used for testing differences in continuous variables, while chi-squared tests with Bonferroni corrections were used for testing homogeneity of categorical variables.

- Multivariate logistic regression was conducted to analyse the relationship between mortality and statin use, while controlling for relevant covariates.

- Bidirectional stepwise regression was utilized to build the final model. All statistical analysis and hypothesis tests were performed at significance level (p<0.05).

- Analyses were conducted with R software (version 4.0.4).

Results

Table 1: Patient Demographics and Characteristics

Variables	GIB without NAFLD (N=752,980)	GIB with NAFLD (N=46,805)	p-value
Age (years), Mean (SD)	69.3 ± 0.1	64.6 ± 0.2	**<0.001**
Sex, N (%)			**<0.001**
	374615 (49.8%)	21805 (46.6%)	
Female	378210 (50.2%)	24985 (53.4%)	
Race, N (%)			**<0.001**
White	515935 (68.5%)	31705 (67.7%)	
Black	108520 (14.4%)	3965 (8.5%)	
Hispanic	61990 (8.2%)	7030 (15%)	
Other	46220 (6.1%)	3000 (6.4%)	
Number of Elixhauser co-morbidities, N (%)			**<0.001**
0	89900 (11.9%)	5195 (11.1%)	
1	191920 (25.5%)	12280 (26.2%)	
2	233635 (31%)	14935 (31.9%)	
3 or more	237525 (31.5%)	14395 (30.8%)	
Disposition, N(%)			**<0.001**
Routine	13685 (1.8%)	825 (1.8%)	
Short-term Hospital	448085 (59.5%)	299620 (63.3%)	
Skilled Nursing Facility	21130 (2.8%)	1775 (3.8%)	
Home Health Care	148465 (19.7%)	6550 (14%)	
Other	20205 (2.7%)	1920 (4.1%)	

Table 2: Regression Analysis Showing Effect of NAFLD on Outcomes in Patients with GI Bleeding.

Outcomes	GIB with NAFLD (n=45215)	GIB without NAFLD (n=726490)	Univariate p-value	Odds Ratio or Regression Coefficient (95% CI)	Multivariate p-value
Mortality	1920 (4.2%)	20205 (2.7%)	<0.01	1.018 (1.013,1.022)	**<0.01**
Length of Stay	4.47 ± 5.03	4.26 ± 4.51	<0.01	0.27 (0.17,0.38)	**<0.01**
Total Charges	35,092 ± 21,749	32,275 ± 21,011	<0.01	2148 (1,677, 2,618)	**<0.01**
Acute Kidney Injury	10150 (22.4%)	159955 (21.2%)	1	1.012 (1.003,1.021)	1
Shock	6015 (13.3%)	87425 (11.6%)	<0.01	1.015 (1.008,1.023)	**<0.01**
Sepsis	1000 (2.2%)	12640 (1.7%)	0.14	1.005 (1.002,1.008)	1
Acute Respiratory failure	2330 (5.2%)	30540 (4.1%)	<0.01	1.01 (1.005,1.015)	**<0.01**
Acute MI	955 (2.1%)	22635 (3%)	<0.01	0.992 (0.989,0.995)	**<0.01**
Acute liver failure	915 (2%)	2560 (0.3%)	<0.01	1.016 (1.013,1.019)	**<0.01**
Endoscopy	12500 (27.6%)	169385 (22.5%)	<0.01	1.038 (1.028,1.048)	**<0.01**
Intubation	140 (0.3%)	1255 (0.2%)	0.28	1.001 (1,1.003)	1
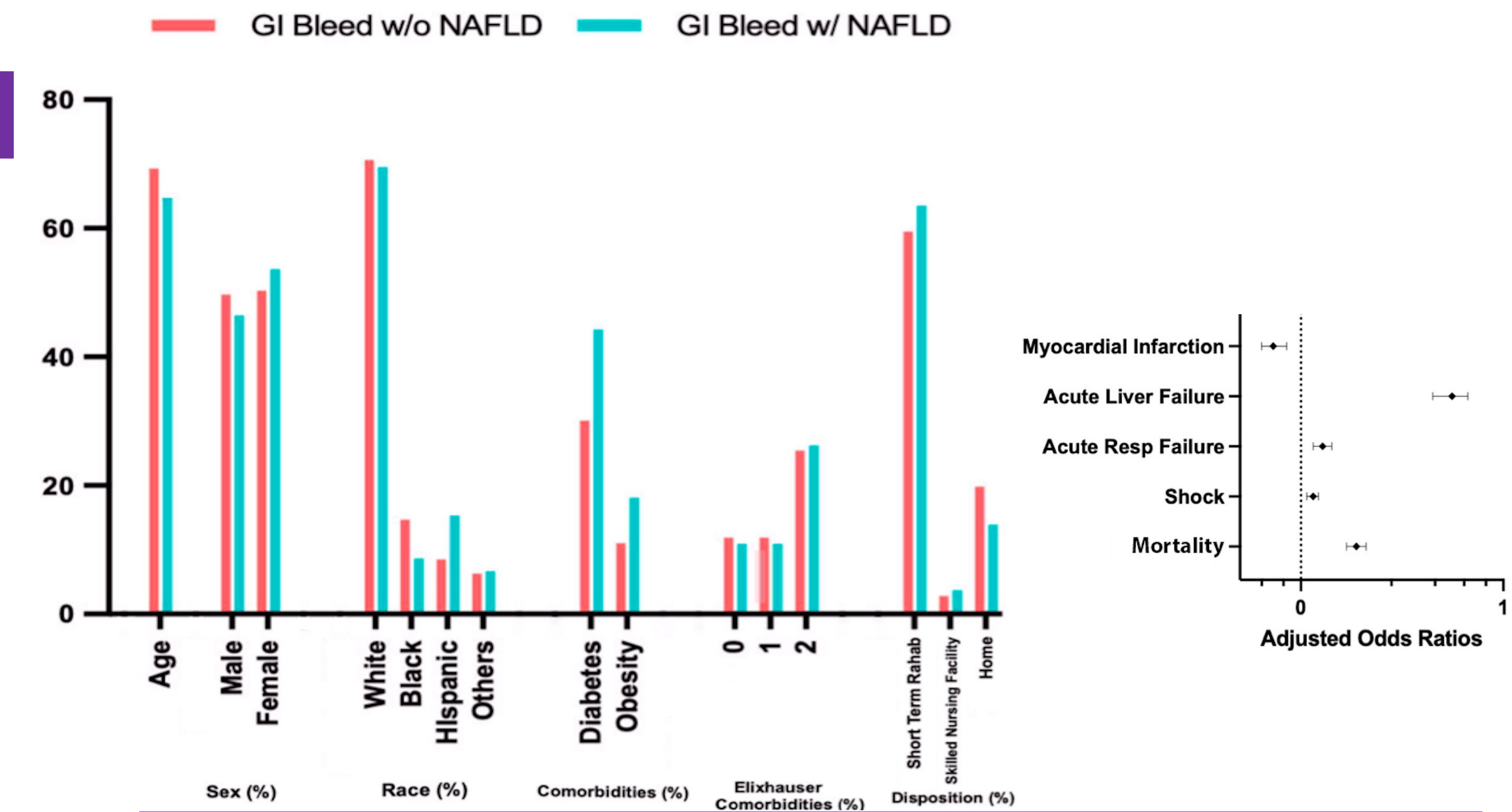
Results

- Compared to the group without NAFLD, NAFLD group was significantly younger (69.3 vs 64.6, p < 0.001).
- In both the groups, GI bleeding was more common in females.
- Compared to the group without NAFLD, we noted that the NAFLD group had a higher proportion of diabetes (44.1% vs 30%, p < 0.001) and obesity (18% vs 11%, p < 0.001).
- After adjusting for the variables in Table 1, NAFLD group had higher odds of inpatient mortality.
- Difference between the total charge of hospitalizations was also statistically significant with higher charges in the NAFLD group ($35,092 vs $32,275, p < 0.01).
- Patients with NVUGIB and NAFLD were more likely to have worse outcomes in terms of complications including acute respiratory failure, acute liver failure

Conclusion

- Our analysis showed that patients with NVUGIB have higher mortality, increased complications, longer length of stay and higher hospital charges demonstrating an increased morbidity and economic burden of NAFLD.

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