



# Impact of Ethnicity in Upper Gastrointestinal Hemorrhage

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## ABSTRACT

**Background and Aims:** Upper gastrointestinal hemorrhage (UGIH) is a serious condition, with considerable morbidity and mortality. Thus, we aimed to examine the role of ethnicity in UGIH outcomes.

**Methods:** We analyzed 2196 consecutive patients admitted with acute UGIH between January 2006 and February 2012. Data (including complete demographic and clinical data) was gathered prospectively and entered into our GI Bleed Registry, which captures multiple demographic and clinical variables. Results were analyzed using the Chi-square analyses and the analysis of variance techniques with Tukey multiple comparisons.

**Results:** Among 2196 patients, 620 (28%) were Black, 625 (29%) White, 881 (40%) Hispanic, and 70 (3%) were members of other ethnic groups. Males outnumbered females by approximately 2:1 ( $p=0.01$ ). ASA (18%;  $p<0.001$ ) and NSAID (17%  $p=0.007$ ) use was common across ethnic groups. Smoking and illicit drug use was highest in Whites (63% and 31%), and Blacks (62% and 31%). Alcohol use was highest in Hispanics (63%) and Whites (63%). The most frequently identified causes of UGIH include gastric and duodenal ulcers (25%), esophageal varices (25%), and esophagitis (12%). Among the 3 main ethnicities, Blacks frequently had UGIH due to gastroduodenal ulcers (32%), while Hispanics most commonly bled from esophageal varices (34%). Ulcer disease and esophageal varices in Whites were found equally (25%). Causative bleeding varied with age. More Black (50%) and White patients (44%) bled between 50-64 years, while 40% of Hispanics bled between 35-49. The most common cause of bleeding in patients younger than 35 or older than 65 years was gastroduodenal ulcer disease. Overall, rebleeding rates were significantly lower in Whites (5.8%) than in Hispanics (9.9%) or Blacks (8.7%) ( $p=0.02$ ). Looking at outcomes in patients with variceal or gastroduodenal ulcers, Blacks had a higher mortality rate (7% and 11%), while Whites had a lower mortality rate (5% and 5%). Hispanics with varices had higher rebleeding rates (13%) but the lowest mortality (6%).

**Conclusions:** By examining an ethnically large and diverse population, we conclude that the etiology and outcome of UGIH has specific trends across age and ethnic groups. Hispanics were more likely to have esophageal varices and higher rebleeding rates, while Blacks were more likely to have ulcers and the highest mortality overall. Whites were equally likely to have ulcers or varices, but a lower rate of rebleeding. UGIH frequently occurs between the ages of 34-49; however, patients over 65 were more likely to have ulcers.

## INTRODUCTION

- Upper gastrointestinal hemorrhage (UGIH) typically affects 100 to 150 per 100,000 adults each year and usually causes death in 6-14% of those it affects.
- Data to date suggest that all ethnic groups are affected by UGIH across most, if not all, age ranges.
- Some variations in the etiology of bleeding may be present in different ethnic groups.
- Previous reports have noted that Hispanic and Black ethnic groups typically bleed from gastroduodenal ulcers.
- Others report that Asian patients experience esophageal varices and gastric ulcers.
- Peptic ulcer disease has been reported to be the most common cause of UGIH in Whites.

## AIMS

- We have noted in our clinical practice that there appear to be different patterns associated with UGIH in ethnic groups.
- We postulated that certain causes of UGIH vary among ethnic groups, and that outcomes may differ in these populations.
- We aimed to analyze patients with UGIH in order to
  - Understand how ethnicity correlates with the etiology of UGIH
  - Evaluate whether the identified diagnoses vary in different age groups
  - Determine whether ethnicity may play a role in UGIH morbidity and mortality

## METHODS

The study evaluated patients who presented to Parkland Memorial Hospital (Dallas, TX) and UT Southwestern University Hospital (Dallas, TX) with UGIH - defined as reported or witnessed melena, hematemesis, coffee ground emesis, or hematochezia - between January 1, 2006, and February 27, 2012. Patients with all forms of gastrointestinal bleeding are identified, and demographic and historical (including gender, age, ethnicity and presentation) are entered prospectively into a Gastrointestinal HealthCare Registry database (Microsoft Access, Microsoft Corporation, Redmond, WA). Patients were divided into 4 self-reported ethnicities - Black, White, Hispanic, and other (Native American, Alaska Native, Asian, East Indian, and Pacific Islander). Other data captured included clinical and historical features, American Society of Anesthesiologists (ASA) score on physical status (1-3 = normal to severe; 4-5 = life threatening to moribund), medications, laboratory and endoscopic data (endoscopic diagnosis, stigmata of recent or active hemorrhage, and therapies). Primary hemostasis rates, treatment failures, 30 day rebleeding events, and 30 day mortalities are also collected. Rebleeding is defined as visualization of vomited red blood, a drop in hematocrit of  $\geq 9$  points (or hemoglobin 3g/dL) after endoscopy or by development of hypotension (systolic pressure  $\leq 90$ ) more than 2 hours after endoscopy.

A bleeding lesion, or one with stigmata of recent bleeding, is the primary diagnosis. When more than one lesion/diagnosis is present along with the primary lesion, it is considered a secondary lesion, but not deemed the cause of hemorrhage. Primary lesions are classified as follows: esophageal varices, erosive esophagitis, esophageal ulcers, Mallory-Weiss tear, gastric varices, portal hypertensive gastropathy, gastric ulcer, erosive gastritis, duodenal ulcer, erosive duodenitis, Dieulafoy (any location), vascular ectasias (any location), neoplasia (any location), other, or no source identified. The attending physician responsible for the procedure routinely assigns the etiology. In situations of disagreement between such assignment and the study team, a 3-panel group adjudicates the bleeding lesion (in a blinded fashion). The study was approved by the institutional IRB.

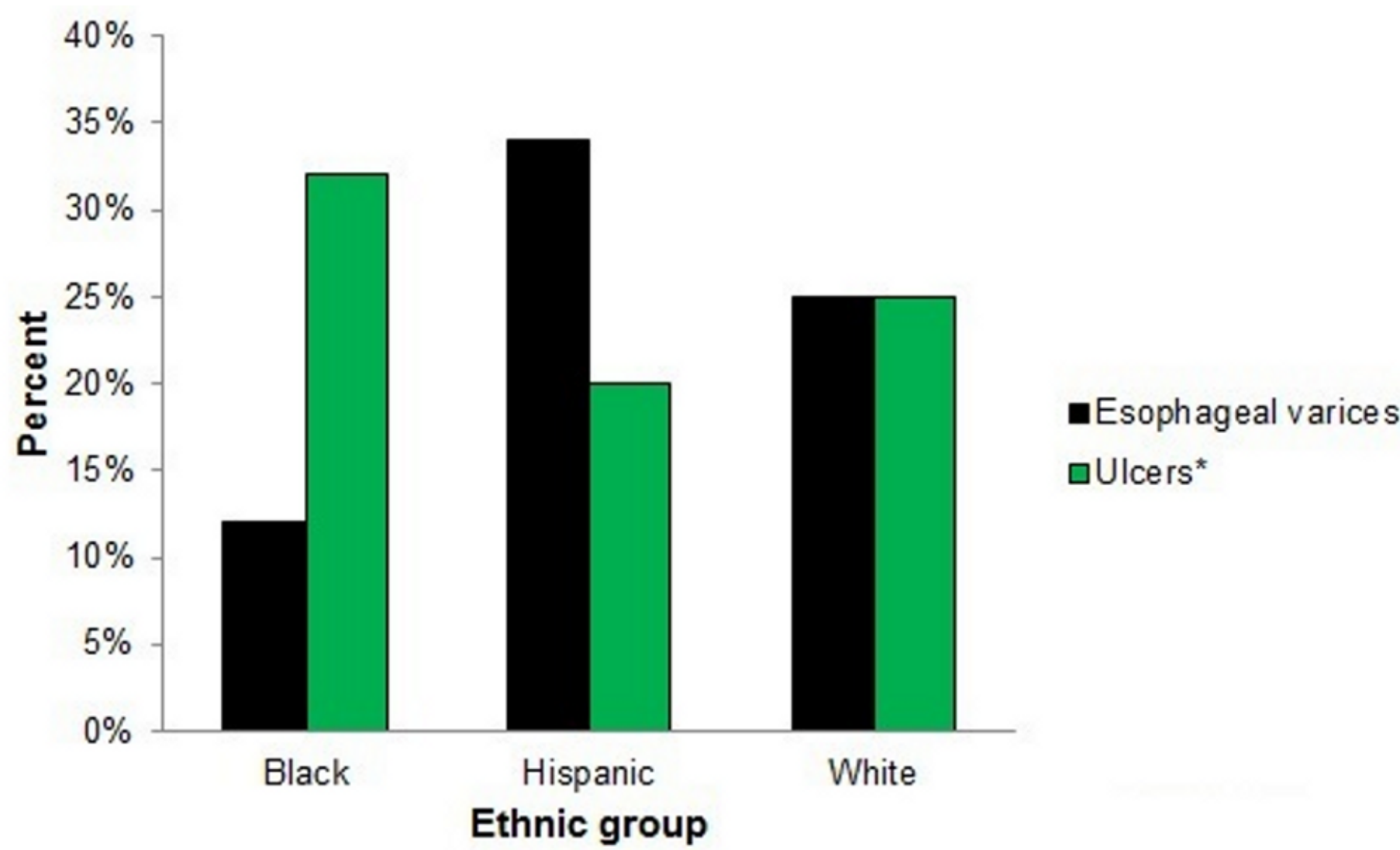
Patient-reported alcohol (greater than 2 drinks per day for men and 1 drink for women) illicit drug use, smoking, NSAID and ASA use within the previous year were recorded. We recognized urinary tract infections, pneumonia, spontaneous bacterial peritonitis, and bacteremia as infections. If a patient contracted one or more infections within 30 days of hemorrhage, we noted the patient "positive." Causes of death are classified into 8 groups: gastrointestinal bleeding, cardiorespiratory failure, renal failure, liver failure, sepsis, multiorgan system dysfunction, malignancy, or other.

**Table 1. Patient demographics and clinical features**

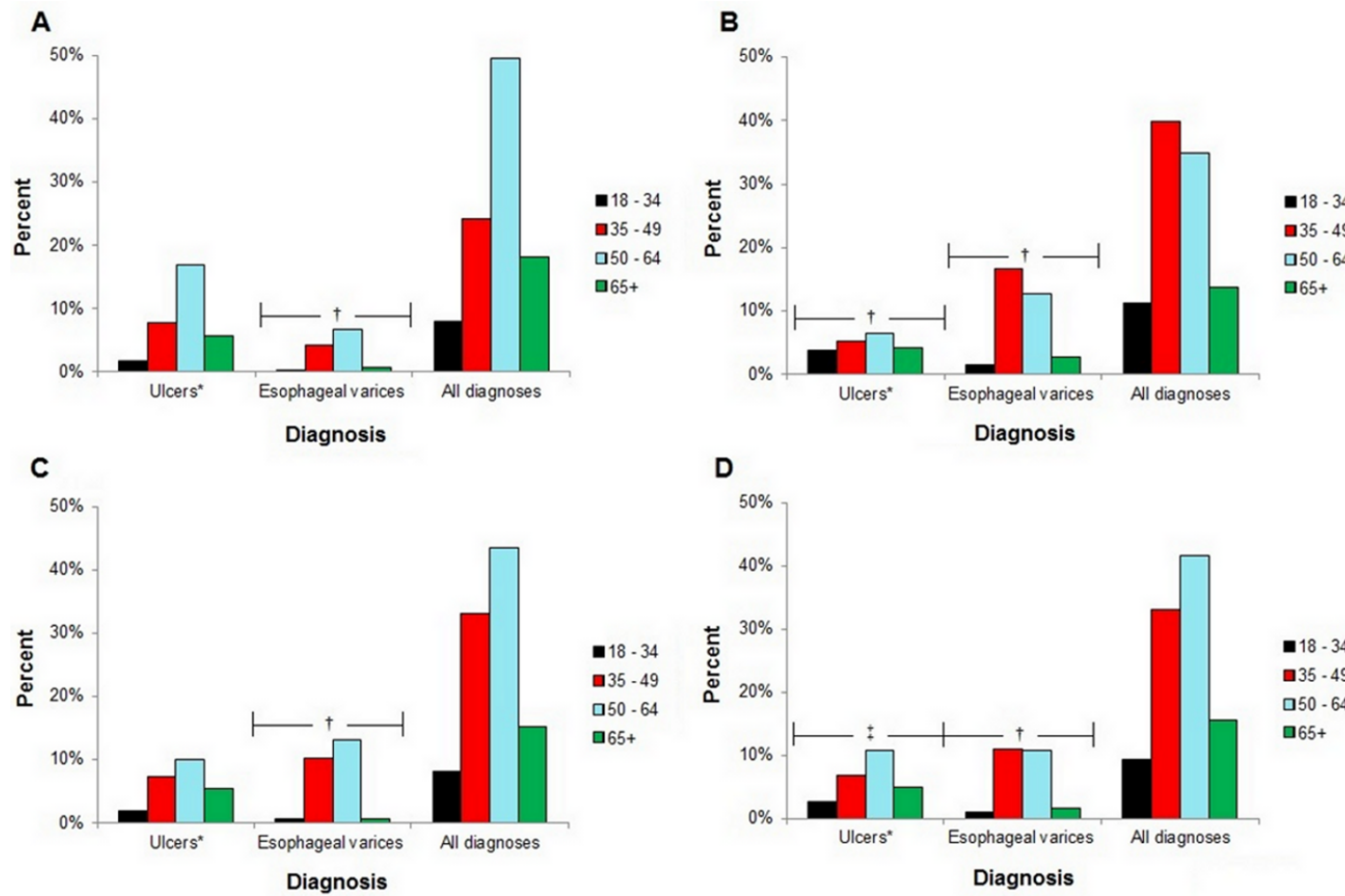
	White (N=625) n (%) / Mean $\pm$ SD	Black (N=620) n (%) / Mean $\pm$ SD	Hispanic (N=881) n (%) / Mean $\pm$ SD	Other* (N=70) n (%) / Mean $\pm$ SD	All (N=2196) n (%) / Mean $\pm$ SD	p-values
<b>Demographics</b>						
Male	414 (66.2)	397 (64.0)	632 (71.7)	47 (67.1)	1490 (67.9)	0.011
Female	211 (33.8)	223 (36.0)	249 (28.3)	23 (32.9)	706 (32.1)	
Age	52.4 $\pm$ 13.2	54.1 $\pm$ 13.0	50.5 $\pm$ 13.8	54.8 $\pm$ 13.2	52.2 $\pm$ 13.5	<0.001
<b>Lifestyle</b>						
Aspirin use	100 (16.0)	148 (23.9)	121 (13.7)	16 (22.9)	385 (17.5)	<0.001
NSAID use	126 (20.2)	119 (19.2)	125 (14.2)	9 (12.9)	379 (17.3)	0.007
Smoke	394 (63.0)	383 (61.8)	376 (42.7)	33 (47.1)	1186 (54.0)	<0.001
Alcohol use	391 (62.6)	330 (53.2)	552 (62.7)	30 (42.9)	1303 (59.3)	<0.001
Drug use	193 (30.9)	166 (26.8)	170 (19.3)	9 (12.9)	538 (24.5)	<0.001
<b>Clinical features</b>						
Pulse	94.5 $\pm$ 19.5	92.3 $\pm$ 21.0	92.5 $\pm$ 21.1	93.0 $\pm$ 20.0	93.0 $\pm$ 20.6	0.232
Systolic Blood Pressure	121.5 $\pm$ 24.1	129.1 $\pm$ 26.7	123.5 $\pm$ 24.6	123.4 $\pm$ 23.1	124.4 $\pm$ 25.3	<0.001
Diastolic Blood Pressure	69.3 $\pm$ 15.5	74.3 $\pm$ 18.3	70.42 $\pm$ 16.4	68.6 $\pm$ 16.7	71.2 $\pm$ 16.8	<0.001
Pre-Rockall Score	2.0 $\pm$ 1.4	2.1 $\pm$ 1.4	2.0 $\pm$ 1.3	2.1 $\pm$ 1.5	2.0 $\pm$ 1.4	0.287
ASA Score	2.5 $\pm$ 0.7	2.5 $\pm$ 0.7	2.5 $\pm$ 0.7	2.5 $\pm$ 0.6	2.5 $\pm$ 0.7	0.956
<b>Characteristic of bleeding</b>						
Hematemesis	384 (61.4)	339 (54.7)	549 (62.3)	35 (50.0)	1307 (59.5)	0.006
Melena	407 (65.1)	389 (62.7)	535 (60.7)	55 (78.6)	1386 (63.1)	0.011
Hematochezia	45 (7.2)	51 (8.2)	77 (8.7)	11 (15.7)	184 (8.4)	0.102
<b>Lab Values</b>						
HGB	9.53 $\pm$ 2.71	9.13 $\pm$ 3.58	9.36 $\pm$ 3.79	9.03 $\pm$ 2.17	9.33 $\pm$ 3.41	0.214
HCT	28.52 $\pm$ 7.69	27.54 $\pm$ 7.65	27.80 $\pm$ 7.42	26.75 $\pm$ 6.46	27.90 $\pm$ 7.54	0.066
PLT	191.06 $\pm$ 128.30	216.23 $\pm$ 115.95	165.72 $\pm$ 124.35	167.25 $\pm$ 95.73	187.11 $\pm$ 124.11	<0.001
MCV	90.48 $\pm$ 32.67	86.73 $\pm$ 26.81	88.66 $\pm$ 27.31	85.28 $\pm$ 7.53	88.53 $\pm$ 28.45	0.103
BUN	31.17 $\pm$ 28.91	31.50 $\pm$ 27.77	28.15 $\pm$ 27.18	32.86 $\pm$ 24.30	30.09 $\pm$ 27.79	0.066
INR	1.39 $\pm$ 0.71	1.38 $\pm$ 1.00	1.37 $\pm$ 0.84	1.39 $\pm$ 0.80	1.38 $\pm$ 0.85	0.966
PTT	29.06 $\pm$ 10.49	28.06 $\pm$ 11.23	29.10 $\pm$ 12.60	28.22 $\pm$ 8.22	28.77 $\pm$ 11.53	0.36

\*Includes American Indian/Alaska Native/ Asian/Pacific Islander/East Indian

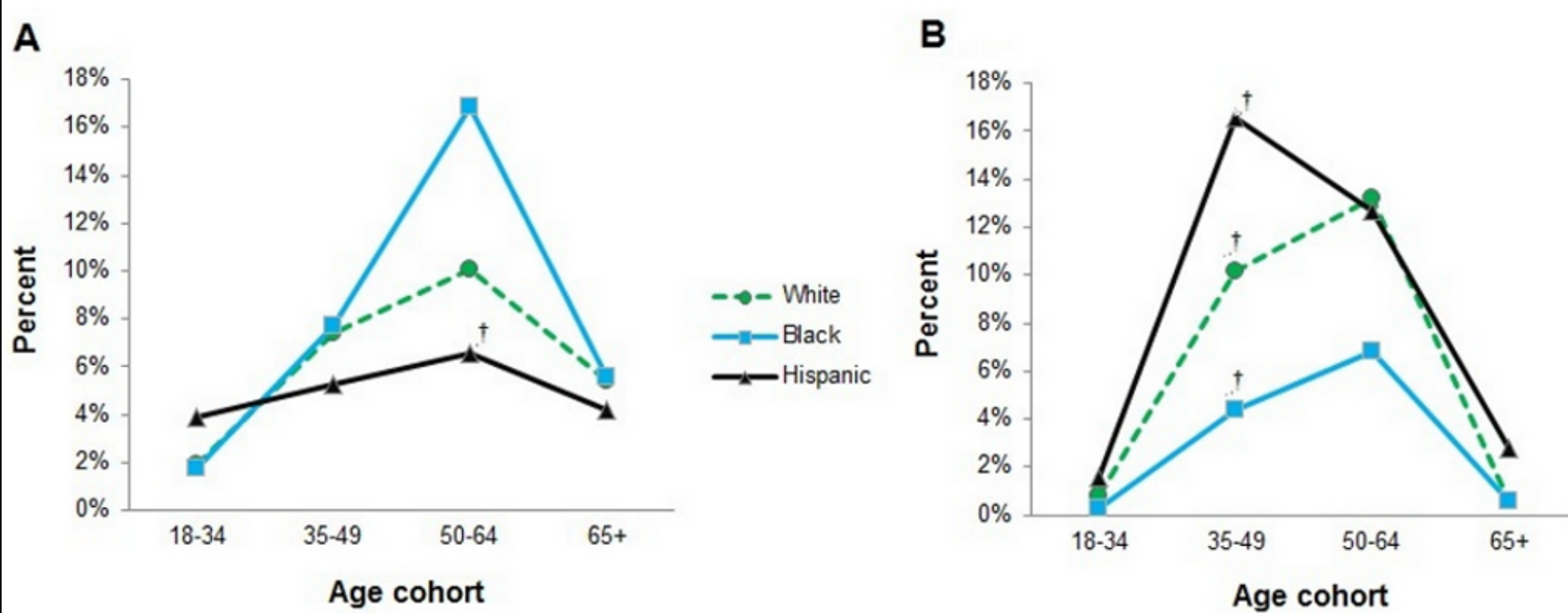
**Figure 1. Distribution of esophageal varices and ulcers per ethnic group.**



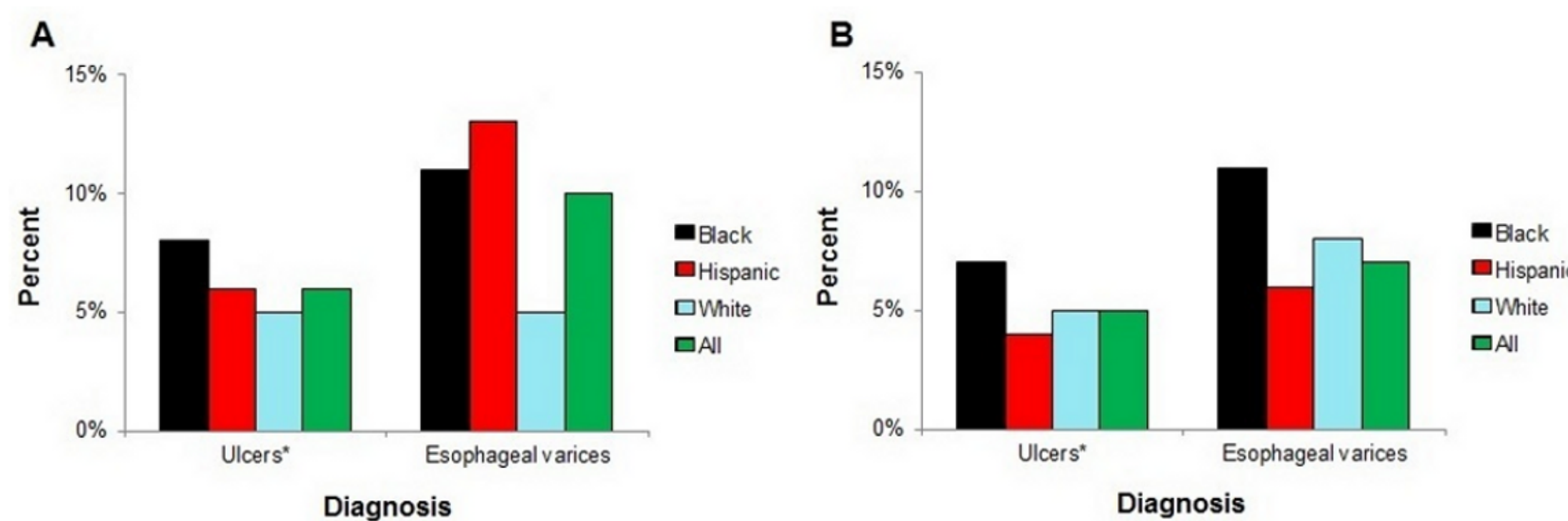
**Figure 2. Distribution of diagnoses across ethnic groups and age. Blacks (A), Hispanics (B), Whites (C), and all patients (D).** ( $\dagger p < 0.001$ ;  $\ddagger p < 0.01$  vs. other ethnic groups)



**Figure 3. Distribution of gastroduodenal ulcers (A) or varices (B) across age and ethnic groups.** ( $\dagger p < 0.001$  vs. other ethnic groups)



**Figure 4. Frequency of complications among ethnic groups with ulcer and variceal bleeding. Rebleeding (A) and mortality (B).**



## RESULTS

- Clinical features were similar in all groups (**Table 1**).
- The most common etiologies of UGIH included gastric and duodenal ulcers (26%), esophageal varices (25%), and esophagitis (12%).
- There were differences in the causative lesions of UGIH across the ethnic groups (**Figure 1**).
  - Esophageal varices were common in Hispanics (34%) ( $p < 0.001$ ).
  - Ulcers were more often in Blacks (32%) ( $p < 0.001$ ).
  - Ulcers and esophageal varices were found equally in Whites (25% each)
- Causative bleeding lesions varied with age (**Figures 2A-D, Figures 3A-B**).
  - All ethnicities experienced most of their hemorrhages between 35-49 and 50-64.
  - In those over 65, there were more gastroduodenal ulcers than variceal mediated bleeding, regardless of ethnicity
  - Black and White patients more frequently bled in the 50-64 age group (50% of all Blacks, and 44% of all Whites).
  - Hispanics bled younger, between the ages of 35-49 (40% of all Hispanics).
- Across all ethnicities, 58% of patients required blood transfusions.
- Outcomes varied for the ethnic groups.
  - Hispanics had more ICU transfers (9%) ( $p = 0.01$ )
  - Whites and Hispanics were equally likely to develop infections (2% each).
  - Whites had lower rebleeding rates (6%) than Hispanics (10%) or Blacks (9%) ( $p = 0.02$ )
- Outcomes varied when patients with variceal and ulcer mediated bleeding were analyzed (**Figures 4A-B**).
  - Hispanics with varices had the highest rebleeding rate (13%), and the lowest mortality rate (6%).
  - Mortality rates were higher for Blacks regardless of etiology.
  - Whether bleeding from ulcers or varices, Hispanics had the lowest mortality rate (4% and 6%).
  - Whether bleeding from ulcers or varices, Whites had the lowest rebleeding rate (5%).

## SUMMARY

- Here, we have identified differences and similarities in the clinical features of UGIH among individuals of different ethnicities.
- Male patients outnumbered females by a 2:1 margin.
- Regardless of gender or ethnicity, patients were typically in their middle adulthood.
- Variceal bleeding was associated with higher alcohol consumption.
- Causative lesions associated with UGIH vary among different ethnic groups.
  - Hispanics were significantly more likely to bleed from esophageal varices.
  - Gastroduodenal ulcers were the most common causative lesion in Blacks.
  - White patients bled equally from gastroduodenal ulcers and esophageal varices.
- UGIH etiology and patient age had important relationships.
  - UGIH is most common between the ages of 34-49 and 50-64.
  - Patients over 65 were more likely to bleed from ulcers
- Alcohol consumption and race imparted an impact on diagnosis
  - Hispanic patients most commonly had varices and the greatest alcohol consumption.
  - Whites experienced less varices than Hispanics, but had an equal amount of alcohol consumption.
  - Blacks hemorrhaged from varices less often than the other races, but had a similar amount of alcohol consumption.
- Race may have an impact on outcomes
  - Hispanics with varices had the highest rebleed rates, but the lowest number of deaths.
  - Regardless of the cause of hemorrhage, Blacks had higher mortality rates, while Whites had the lowest rebleeding and moderate mortality rates.