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Association Between Race/Ethnicity and Outcomes in Patients With Nonobstructive Hypertrophic Cardiomyopathy

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INTRODUCTION

- Data on differences in race/ethnicity and cardiovascular (CV) outcomes in non-obstructive hypertrophic cardiomyopathy (nHCM) are limited.
- We evaluated these associations in a large, national cohort of patients with nHCM using real-world claims and electronic medical record data.

METHODS

Study Design

- Retrospective cohort study of adult patients with HCM in Optum's Market Clarity database from January 1, 2013, through December 31, 2021 (Index date = first HCM diagnosis).
- Market Clarity includes administrative claims and electronic medical record data.

Inclusion criteria

- Evidence of nHCM: Patients with nHCM met the following selection criteria:
  - ≥2 medical claims with a diagnosis code for nHCM (ICD-9: 425.11 or 425.18; ICD-10: I42.2) in any position on different dates of service ≥30 days apart during the patient identification period.
  - ≥18 years of age as of the index date.

Enrollment

- Baseline enrollment: Continuous enrollment (CE) with medical and pharmacy benefits for 6 months prior to the index date.
- Follow-up enrollment: CE with medical and pharmacy benefits for at least 6 months after (and including) the index date.

Exclusion criteria

- No medical claim of obstructive HCM (ICD-9: 425.1; ICD-10: I42.1).
- No evidence of septal reduction therapy (alcohol septal ablation and septal myectomy) during the study period and pharmacotherapy during the baseline period.
- Patients with evidence of Fabry disease or amyloidosis during the study period.
- Patients with missing age, gender, and unknown or "other" geographic region.

Study Outcomes

- Clinical outcomes (atrial fibrillation [AF], stroke, heart failure [HF], ventricular tachycardia, stress cardiomyopathy, sudden cardiac arrest [SCA], and heart transplant) and mortality.
- Outcomes were assessed over a variable follow up period from index first HCM diagnosis to death, health plan disenrollment, or study end.

Statistical Methods

- Event rates per 100,000 person-years to estimate risk of CV outcomes.
- Kaplan–Meier analysis to evaluate risk of mortality.
- Comparison of outcomes by race/ethnicity; all tests were 2-sided α=0.05

RESULTS

- Among 9842 patients with nHCM (mean age, 60.6 ± 16.2 years; 46.2% were female; mean follow-up, 45.0 ± 28.6 months), 74.2% were non-Hispanic White, 19.5% non-Hispanic Black/African American, 4.2% Hispanic, and 2.1% non-Hispanic Asian (**Table 1**).
- Black patients had the highest Charlson Comorbidity Index (1.8 ± 1.2), followed by Hispanic (1.6 ± 1.9), White (1.3 ± 1.7), and Asian (1.1 ± 1.6) patients (**Table 2**).
- White patients had higher rates of AF and cardiovascular hospitalization (CVH) compared with Asian and Hispanic patients (**Table 3**).

Table 1: Patient demographics

Patient characteristic	All nHCM N=9842	White n=7306	Black n=1916	Asian n=204	Hispanic n=416
Age, mean (SD), y	60.6 (16.2)	61.1 (16.3)	59.2 (15.6)	59.6 (14.7)	58.7 (17)
Age group, n (%)					
18–39 y	1149 (11.7)	840 (11.5)	230 (12.0)	19 (9.3)	60 (14.4)
40–54 y	1958 (19.9)	1355 (18.6)	439 (22.9)	57 (27.9)	107 (25.7)
55–64 y	2380 (24.2)	1773 (24.3)	480 (25.1)	46 (22.6)	81 (19.5)
65–74 y	2176 (22.1)	1609 (22)	442 (23.1)	48 (23.5)	77 (18.5)
75+ y	2179 (22.1)	1729 (23.7)	325 (17)	34 (16.7)	91 (21.9)
Female, n (%)	4545 (46.2)	3271 (44.8)	998 (52.1)	80 (39.2)	196 (47.1)
Insurance type, n (%)					
Commercial	4922 (50.0)	3773 (51.6)	851 (44.4)	110 (53.9)	188 (45.2)
Medicare	2790 (28.4)	2089 (28.6)	528 (27.6)	39 (19.1)	134 (32.2)
Medicaid	754 (7.7)	351 (4.8)	318 (16.6)	27 (13.2)	58 (13.9)
Other	36 (0.4)	19 (0.3)	12 (0.6)	1 (0.5)	4 (1.0)
Unknown/missing	1340 (13.6)	1074 (14.7)	207 (10.8)	27 (13.2)	32 (7.7)
Region, n (%)					
Northeast	2763 (28.1)	2123 (29.1)	467 (24.4)	75 (36.8)	98 (23.6)
Midwest	4152 (42.2)	3068 (42)	919 (48)	56 (27.5)	109 (26.2)
South	2159 (21.9)	1479 (20.2)	478 (25)	34 (16.7)	168 (40.4)
West	768 (7.8)	636 (8.7)	52 (2.7)	39 (19.1)	41 (9.9)
Race/ethnicity, n (%)					
White, non-Hispanic	7306 (74.2)	-	-	-	-
Black/African American, non-Hispanic	1916 (19.5)	-	-	-	-
Asian, non-Hispanic	204 (2.1)	-	-	-	-
Hispanic	416 (4.2)	-	-	-	-

nHCM, non-obstructive hypertrophic cardiomyopathy.

Table 2: Baseline clinical characteristics

Patient characteristic	All nHCM N=9842	White n=7306	Black n=1916	Asian n=204	Hispanic n=416
CCI score (continuous), mean (SD)	1.36 (1.8)	1.3 (1.7)	1.8 (2.1)	1.1 (1.6)	1.6 (1.9)
Baseline comorbidities, n (%)					
Coronary artery disease	2269 (23.1)	1645 (22.5)	483 (25.2)	47 (23.0)	94 (22.6)
Pulmonary hypertension	381 (3.9)	253 (3.5)	108 (5.6)	3 (1.5)	17 (4.1)
Hyperthyroidism	73 (0.7)	48 (0.7)	19 (1.0)	3 (1.5)	3 (0.7)
Hypothyroidism	1170 (11.9)	957 (13.1)	141 (7.4)	18 (8.8)	54 (13.0)
Bradyarrhythmia	595 (6.1)	431 (5.9)	125 (6.5)	16 (7.8)	23 (5.5)
Heart failure	1680 (17.1)	1102 (15.1)	484 (25.3)	27 (13.2)	67 (16.1)
Chronic kidney disease	1181 (12.0)	705 (9.7)	390 (20.4)	18 (8.8)	68 (16.4)
Atrial fibrillation	1409 (14.3)	1171 (16.0)	180 (9.4)	20 (9.8)	38 (9.1)
Hypertension	5338 (54.2)	3674 (50.3)	1331 (69.5)	102 (50.0)	231 (55.5)
Obstructive sleep apnea	1108 (11.3)	806 (11.0)	240 (12.5)	14 (6.9)	48 (11.5)
Diabetes, type 2	2222 (22.6)	1404 (19.2)	626 (32.7)	58 (28.4)	134 (32.2)
Obesity	1658 (16.9)	1078 (14.8)	457 (23.9)	19 (9.3)	104 (25)
Myocardial fibrosis	261 (2.7)	168 (2.3)	78 (4.1)	4 (2.0)	11 (2.6)
Diagnosing Provider's specialty, n (%)					
Cardiologist	5037 (51.2)	3788 (51.9)	961 (50.2)	110 (53.9)	178 (42.8)
Cardiovascular surgery	20 (0.2)	19 (0.3)	0 (0)	0 (0)	1 (0.2)
Primary care physician	1213 (12.3)	816 (11.2)	293 (15.3)	30 (14.7)	74 (17.8)
General practice	697 (7.1)	525 (7.2)	112 (5.9)	12 (5.9)	48 (11.5)
Other	1707 (17.3)	1239 (17.0)	377 (19.7)	26 (12.8)	65 (15.6)

CCI, Charlson Comorbidity Index; nHCM, non-obstructive hypertrophic cardiomyopathy.

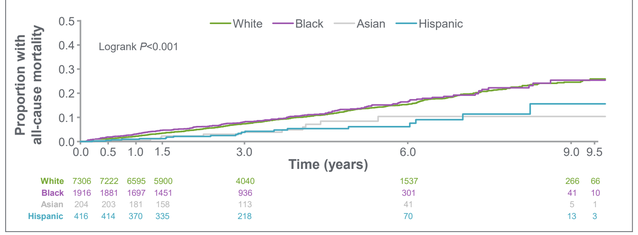
Table 3: Rates of CV outcomes in patients with nHCM

Outcomes	White N=7306	Black n=1916			Asian n=204			Hispanic n=416		
	Rate/100,000 PY	Rate/100,000 PY	RR[b]	*P* Value	Rate/100,000 PY	RR[b]	*P* Value	Rate/100,000 PY	RR[b]	*P* value
Atrial fibrillation	12,535.6	9215.0	0.74	<0.001	7096.4	0.57	<0.001	7519.4	0.60	<0.001
Stroke	4,281.5	7520.8	1.76	<0.001	3743.8	0.87	0.511	3573.9	0.83	0.212
Heart failure	14,761.3	25,506.1	1.73	<0.001	14,506.7	0.98	0.893	16,852.0	1.14	0.103
Ventricular tachycardia	29,590.5	36,617.3	1.24	<0.001	31,390.0	1.06	0.734	32,279.3	1.09	0.541
Ventricular fibrillation	2,081.5	2076.6	1.00	0.006	1611.1	0.77	0.717	1827.8	0.88	0.825
Sudden cardiac arrest	777.6	1480.8	1.90	<0.001	791.9	1.02	0.916	1017.4	1.31	0.317
CV hospitalization	8,333.3	11,845.7	1.42	<0.001	4578.5	0.55	<0.001	6673.5	0.80	0.040
CV readmission[b]	21,842.3	28,718.7	1.31	<0.001	17,326.1	0.79	0.397	21,236.7	0.97	0.873

All tests were 2-sided α=0.05.
[a] Reference group for RR = White (n=7306).
[b] Among patients with CV hospitalization.
CV, cardiovascular; PY, person-years; RR, relative risk.

- Compared with White patients, Black patients had higher rates of stroke (risk ratio [RR] 1.76), HF (RR 1.73), ventricular tachycardia (RR 1.24), SCA (RR 1.90), CVH (RR 1.42) and CV readmission (RR 1.31) and a lower rate of AF (RR 0.74) (all *P*<0.001) (**Table 3**).
- All-cause mortality was highest among Black patients (*P*<0.001) (**Figure 1**).

Figure 1: All-cause mortality by race/ethnicity in patients with nHCM



Limitations

- Real-world data in this study utilized ICD-9 and ICD-10 coding for disease identification and study outcomes, and may be subject to inconsistencies without patient-level genetic and anatomical confirmation.
- Due to the descriptive nature of this study, these results include unadjusted analyses only.

CONCLUSIONS

- Compared with White patients with nHCM, non-Hispanic Black patients had the highest rate of adverse CV outcomes and all-cause mortality, whereas Asian and Hispanic patients experienced lower rates.
- These results highlight an urgent need to address drivers of race/ethnicity-based disparities and novel treatments are warranted to reduce the substantial burden for patients with nHCM.

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Disclosures

MB, PG, SS: Employees of and own stock in Cytokinetics, Incorporated. **KB, QA**, **AB:** Employees of Optum/UHG, who were consultants for Cytokinetics, Incorporated for this study. **QA, AB, AA:** Shareholders of UHG Stock. **NR:** Consulting/speaking honoraria: Zoll Inc, Roche Diagnostics, American Regent, Bristol Meyers Squibb, AstraZeneca, Idorsia, Novo Nordisk; research grants to the institution from Bristol Meyers Squibb; supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health under Award Number K23HL166961 (the content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health). **AO:** Consultant/advisor fees: Cytokinetics, Incorporated, Bristol Myers Squibb/MyoKardia, and Pfizer.

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