

Clinical management and health care resource utilization of obstructive hypertrophic cardiomyopathy (oHCM) patients in Spain: a real-world study

Supplementary data

Table 1 of the supplementary data. Comorbidities

Comorbidities	ICD-9
Hypertension	401-405
Diabetes mellitus	250.00-250.03
Dyslipidemia	272
Obesity	278.0
Smoking	305.1
Chronic alcoholism	303.9, 291.x
Cardiac ischemic event	410-414
Cerebrovascular ischemic event	434.91
Peripheral arterial disease	440-449
Chronic obstructive pulmonary disease	491.x, 496.x
Heart failure	428.x
Renal failure	584 585 586
Arrhythmia	427.9
Atrial fibrillation or flutter	427.3
Anemia	280.x
Depressive disorder	296.2, 296.3, 296.5, 300.4, 309.x, 311
Malignant neoplasms	140-209
Mitral failure	424
Syncope	780.2

Table 2 of the supplementary data. Charlson Comorbidity Index

Condition	ICD-09-CM codes	Score
Myocardial infarction	410-410.9, 412	1
Congestive heart failure	428-428.9	1
Peripheral vascular disease	433.9, 441-441.9, 785.4, V43.4	1
Cerebrovascular disease	430-438	1
Dementia	290-290.9	1
Chronic pulmonary disease	490-496, 500-505, 506.4	1
Rheumatological disease	710.0, 710.1, 710.4, 714.0-714.2, 714.81, 725	1
Peptic ulcer	531-534.9	1
Mild liver disease	571.2, 571.5, 571.6, 571.4-571.49	1
Diabetes	250-250.3, 250.7	1
Diabetes with chronic complications	250.4-250.6	2
Hemiplegia or paraplegia	344.1, 342-342.9	2
Kidney disease	582-582.9, 583-583.7, 585, 586, 588-588.9	2
Moderate or severe liver disease	572.2-572.8	3
AIDS	042-044.9	6

AIDS, acquired immunodeficiency syndrome.

Source: Deyo et al., 1992.¹⁵

Table 3 of the supplementary data. Elixhauser Comorbidity Index

Condition	ICD-09-CM codes	Score (AHQR Algorithm)
Congestive heart failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.4-425.9, 428.x	9
Cardiac arrhythmias	426.0, 426.13, 426.7, 426.9, 426.10, 426.12, 427.0-427.4, 427.6-427.9, 785.0, 996.01, 996.04, V45.0, V53.3	0
Valvular disease	093.2, 394.x-397.x, 424.x, 746.3-746.6, V42.2, V43.3	0
Pulmonary circulation disorders	415.0, 415.1, 416.x, 417.0, 417.8, 417.9	6
Peripheral vascular disorders	093.0, 437.3, 440.x, 441.x, 443.1-443.9, 447.1, 557.1, 557.9, V43.4	3
Hypertension, uncomplicated	401.x	-1
Hypertension, complicated	402.x-405.x	-1
Paralysis	334.1, 342.x, 343.x, 344.0-344.6, 344.9	5
Other neurological disorders	331.9, 332.0, 332.1, 333.4, 333.5, 333.92, 334.x-335.x, 336.2, 340.x, 341.x, 345.x, 348.1, 348.3, 780.3, 784.3	5
Chronic pulmonary disease	416.8, 416.9, 490.x-505.x, 506.4, 508.1, 508.8	3
Diabetes, uncomplicated	250.0-250.3	0
Diabetes, complicated	250.4-250.9	-3
Hypothyroidism	240.9, 243.x, 244.x, 246.1, 246.8	0
Chronic kidney disease	403.01, 403.11, 403.91, 404.02, 404.03, 404.12, 404.13, 404.92, 404.93, 585.x, 586.x, 588.0, V42.0, V45.1, V56.x	6
Liver disease	070.22, 070.23, 070.32, 070.33, 070.44, 070.54, 070.6, 070.9, 456.0-456.2, 570.x, 571.x, 572.2-572.8, 573.3, 573.4, 573.8, 573.9, V42.7	4
Peptic ulcer disease, excluding bleeding	531.7, 531.9, 532.7, 532.9, 533.7, 533.9, 534.7, 534.9	0
AIDS/HIV	042.x-044.x	0
Lymphoma	200.x-202.x, 203.0, 238.6	6
Metastatic cancer	196.x-199.x	14
Solid tumor without metastasis	140.x-172.x, 174.x-195.x	7
Rheumatoid arthritis/collagen vascular diseases	446.x, 701.0, 710.0-710.4, 710.8, 710.9, 711.2, 714.x, 719.3, 720.x, 725.x, 728.5, 728.89, 729.30	0
Coagulopathy	286.x, 287.1, 287.3-287.5	11
Obesity	278.0	-5
Weight loss	260.x-263.x, 783.2, 799.4	9
Fluid and electrolyte disorders	253.6, 276.x	11
Blood loss anemia	280.0	-3
Deficiency anemia	280.1-280.9, 281.x	-2
Alcohol abuse	265.2, 291.1-291.3, 291.5-291.9, 303.0, 303.9, 305.0, 357.5, 425.5, 535.3, 571.0-571.3, 980.x, V11.3	-1
Drug abuse	292.x, 304.x, 305.2-305.9, V65.42	-7
Psychoses	293.8, 295.x, 296.04, 296.14, 296.44, 296.54, 297.x, 298.x	0
Depression	296.2, 296.3, 296.5, 300.4, 309.x, 311	-3

AIDS, acquired immunodeficiency syndrome; HIV, human immunodeficiency virus.

Source: Deyo et al., 1992.¹⁵

Table 4 of the supplementary data. ATC codes for associated and concomitant medication

Medication	ATC code
Disopyramide	C01BA03
Antiarrhythmic drugs	C01B
Digitalis glycosides	C01AA
Beta-blocker	C07
Non-dihydropyridine calcium channel blockers	C08DB01 C05AE03 C08DA01 C08DA51 C09BB10
Dihydropyridine calcium channel blockers	C08CA
Sodium channel blocker	N03AF02 C01BA01 C01BA51 C01BA71 C01BA05 C01BA02 C01BA03 A01AD88 C01BB01 C05AD01 D04AB01 N01BB02 N01BB52 N01BB87 N01BB89 S01JA51 C01BB91 N03AB02 N03AB91 N03AB92 N03AB93 N03AB94 N03AB95 C01BB02 C01BC03 C01BC04
Warfarin/acenocoumarol	B01AA03 B01AA07
Direct oral anticoagulants (DOAC)	B01AF
Diuretics	C03
Aldosterone antagonists (MRA)	C03DA
K channel blocker	C03D C03E
Antidiabetic drugs	A10
Antithrombotic drugs	B01
Antihypertensive drugs	C02
Agents acting on the renin-angiotensin system	C09
Lipid-lowering agents	C10
Anti-inflammatory and antirheumatic drugs	M01
Drugs for acid related disorders	A02

Table 5 of the supplementary data. Obstructive hypertrophic cardiomyopathy treatments and procedures

Medication	ICD-09-CM	ICD-10-CM
Percutaneous transluminal septal myocardial ablation	37.3*, 32.26, V03AZ01	0WBG0ZZ, 0WBG3ZZ
Ventricular septal myectomy (with/without mitral valve replacement)	83.45, V42.2, V43.3, 35.23-35.24, 35.0*-35.9*, 745*, 35.02, 35.12, 35.23, 35.24, 35.9*, V42.2, V43.3	02583ZZ, 02583ZZ
Implantable dual chamber pacemaker	35.72, 35.92, 37.8*, 37.7*	0JH606Z, 0JH634Z
Implantable cardioverter-defibrillator	37.9, V45.02	0JH607Z, 0JH634Z,

*All codes within the range were considered.

Table 6 of the supplementary data. Unitary costs (year 2021)

Health care resources	Unitary costs (€)
<i>Medical visits</i>	
Primary care (1st visit)	70.12
Primary care (subsequent visits)	51.88
Specialist visit ^a (1st visit)	159.28
Specialist visit ^a (subsequent visits)	88.72
Emergency visits	182.25
<i>Procedures^b</i>	
Ventricular septal myectomy (with/without mitral valve replacement)	28 000.00
Percutaneous transluminal septal myocardial ablation	4 253.81
Implantable dual chamber pacemaker	7 024.96
Implantable cardioverter-defibrillator (ICD)	23 546.56
<i>Laboratory tests^c</i>	60.71
<i>Medical tests</i>	
Electrocardiogram	18.17
Echocardiogram	100.75
Contrast CT	190.00
MRI	308.69
Holter ^f	160.42
Stress test/ergometry ^d	133.04
<i>Hospitalization (hospital stay)^e</i>	590.00
<i>Pharmaceutic prescription</i>	PVP+VAT

^aCardiology.

^bThese costs were taken from 2023 (source: *Base de datos de costes sanitarios españoles*: eSalud [Internet]. Barcelona: Oblikue Consulting, S.L. 2007. Available at: <http://www.oblikue.com/bddcostes/> or internal communication [specified in materials and methods]).

^cHemogram and biochemical analysis.

^dThese costs were last updated in 2017 PVP+VAT, retail price plus taxes;

^eIntensive care unit is included within this cost; each cost was updated to 2022 costs using the inflation information from INE²⁵ to calculate the final unit costs.

Table 7 of the supplementary data. Baseline characteristics (II) of patients with obstructive-HCM

Study cohorts	NYHA-I	NYHA-II	NYHA-III	NYHA-IV	Total	<i>P</i>
Number of patients	90 (12)	360 (47.9)	237 (31.5)	65 (8.6)	752 (100)	<.001
<i>Year of diagnosis (index date)</i>						
2014	15 (16.7)	40 (11.1)	23 (9.7)	12 (18.5)	90 (12)	.445
2015	13 (14.4)	40 (11.1)	21 (8.9)	12 (18.5)	86 (11.4)	
2016	9 (10)	36 (10)	33 (13.9)	8 (12.3)	86 (11.4)	
2017	13 (14.4)	41 (11.4)	32 (13.5)	7 (10.8)	93 (12.4)	
2018	9 (10)	42 (11.7)	27 (11.4)	8 (12.3)	86 (11.4)	
2019	8 (8.9)	45 (12.5)	27 (11.4)	7 (10.8)	87 (11.6)	
2020	7 (7.8)	41 (11.4)	30 (12.7)	7 (10.8)	85 (11.3)	
2021	10 (11.1)	43 (11.9)	20 (8.4)	2 (3.1)	75 (10)	
2022	6 (6.7)	32 (8.9)	24 (10.1)	2 (3.1)	64 (8.5)	
<i>Other variables</i>						
<i>BMI, kg/m²</i>						
Mean ± SD	28.4 ± 4.5	29.2 ± 4.6	28.5 ± 4.5	26.8 ± 4.7	28.6 ± 4.6	.001
Median [P25- P75]	29.1 [24.6-31.7]	28.8 [25.6-32.9]	28.8 [24.5-32.2]	27 [22.9-30.1]	28.6 [24.7-32.5]	
<i>Time from diagnosis to end of follow-up, d</i>						
Mean ± SD	1438.4 ± 904.5	1204.9 ± 870	1171.1 ± 848.7	1013.5 ± 644.5	1205.6 ± 854.7	.072
Median [P25- P75]	1507 [598.3- 2160.3]	1050 [435.3- 1832.3]	1018 [376- 1823]	1026 [321- 1523]	1087 [435.8- 1828.5]	
<i>Diagnostic specialty</i>						
Cardiology	77 (85.6)	279 (77.5)	182 (76.8)	52 (80)	590 (78.5)	.340
General physicians/others	13 (14.4)	81 (22.5)	55 (23.2)	13 (20)	162 (21.5)	

BMI, body mass index; NYHA, New York Heart Association; P, percentile.
Values are expressed as No. (%), mean ± standard deviation, or median [P25-P75].

Table 8 of the supplementary data. Prevalence on December 12, 2022

Numerators	Total numerators
Number of patients with hypertrophic cardiomyopathy diagnosis	2,545
Number of patients with hypertrophic obstructive cardiomyopathy diagnosis	612
Denominator	Total denominators
Number of active patients in Big-Pac on December 31, 2022	921,451
Prevalence on December 31, 2022	Rates
Hypertrophic cardiomyopathy diagnosis	0.28%
Hypertrophic obstructive cardiomyopathy diagnosis	0.07%