

1 INTRODUCTION

Hereditary transthyretin amyloidosis with polyneuropathy (ATTR-PN) is a rare and multisystemic disease¹. Scarce evidence about its economic burden has been published, especially regarding healthy carriers and early stage patients. To characterize these populations, a descriptive study was developed in Spain.

2 OBJECTIVES

To estimate, in the last 12 months, the burden of healthcare resource utilization and indirect costs of healthy carriers and early stage ATTR-PN patients diagnosed in the last year, from a societal perspective, in Spain.

3 METHODS

- Multicenter, cross-sectional, non-interventional, descriptive epidemiological study carried out in 7 hospitals in Spain, including both endemic areas.
- Characterization of 2 populations:
- HC: healthy carriers of the pathogenic mutation in the TTR gen (HC).
 - PA: Countinho's stage I ATTR-PN patients.
- Inclusion criteria (table 1):

Table 1: Inclusion criteria

Patients	Healthy carriers
• ≥18 years old • Diagnosed with Coutinho's stage I ATTR-PN • Diagnosed in the last 12 months • Signed informed consent	• ≥18 years old • Healthy carriers of the pathogenic mutation in the TTR gen • Signed informed consent

- Secondary endpoints:
 - › Estimation of the use and costs of healthcare resource utilization (HRU).
 - › Estimation of indirect costs from a societal perspective.
- Costs included in the analysis:
 - › Healthcare costs: general medical visits, hospitalizations, specialist visits and complementary tests. Unitary costs were obtained from Spanish official databases (Oblikue)¹.
 - › Indirect costs: sick leave days, workhours loss and caregiver's workhours loss. Cost per work hour and cost per working day were obtained from INE².
- Statistical analysis:
 - › Descriptive univariant analysis. For qualitative data: absolute and relative frequencies. For quantitative data: use the mean, median and standard deviation.
 - › Comparative bivariant analysis. T-test for normal distribution variables; Mann-Whitney for no parametric variables.

4 RESULTS

Table 2: Characteristics of the study population

		Patients		Healthy carriers	
			N		N
■ The study included					
105 participants:	Males, n (%)	57,9	19	56,5	86
mean age 48.1 years	Mean age, years (min-max)	59,7 (37-77)	19	45,5 (18-81)	86
old and 56.7% males	Body mass index (kg/m²), median (min-max)	25,4 (20-36)	19	26,5 (18-42)	85
(table 2).	Endemic zone (%)	53	19	51	86
	Mutations (frequency: %)				
	V50M	84	16	78	67
	S97Y	5,3	1	10,5	9
	E109K	10,5	2	-	-
	V142I	-	-	8,1	7
	A60T	-	-	1	1
	D38N	-	-	2,5	2

- **Direct costs:**
 - Globally, both HRU and its associated costs per patient/year were higher in the PA group when compared to HC group (table 3).
 - Main expenses in both groups were due to **internal medicine** and **neurology** visits. Among diagnostic tests, electromyogram was the resource generating higher costs in both populations.
 - Total PA healthcare costs per patient/year were significantly higher when compared to HC (2,293.7 € vs 945.1 € respectively; $p < 0.001$) (table 4).
 - **PA patients generate a significant incremental burden of 1,348.6 € per patient/year (figure 1).**

Table 3: Healthcare resource utilization and cost per individual per year

		Unitary cost (€,2020)	Patients Mean n° per patient	Cost per patient (€)	Heathy carriers Mean n° per carrier	Mean cost per carrier (€)	<i>p-value*</i>
General medical visits	Emergency room	210.4	0.6	121.8	0.0	2.5	0.002
	Nursing	21.7	0.1	1.1	0.1	2.0	0.664
	Primary Care	47.6	1.2	57.7	0.3	13.9	0.004
Hospitalizations	Inpatient hospitalization	570.2	0.3	150.1	0.0	13.3	0.026
	Intensive care unit	1472.1	0.0	0.0	0.0	0.0	0.000
Specialist visit	Cardiology	148.2	0.8	124.8	0.5	72.4	0.033
	Digestive	199.3	0.0	0.0	0.0	2.3	0.638
	Genetics	248.0	0.2	52.2	0.1	31.7	0.672
	Internal Medicine	250.5	1.9	474.6	1.0	253.4	0.160
	Nephrology	186.2	0.1	9.8	0.0	2.2	0.239
	Neurology	207.9	1.7	350.1	0.7	145.0	0.015
	Neurophysiology	207.9	1.1	218.8	0.5	111.2	0.009
	Ophthalmology	80.6	0.4	29.7	0.1	11.3	0.020
	Others	202.2	0.4	85.1	0.0	7.1	0.001
Complementary tests	Analytics (blood test)	22.4	2.8	62.4	1.5	34.1	0.001
	Echography	65.1	0.6	41.1	0.5	30.3	0.564
	Electrocardiogram	60.2	1.5	88.7	0.9	56.0	0.024
	Electromyogram	177.7	1.2	215.1	0.7	117.8	0.020
	Radiography	26.5	0.2	4.2	0.1	1.5	0.140
	Scintigraphy	215.1	0.4	79.3	0.1	15.0	<0.001
	Tilt test	232.9	0.5	122.6	0.1	21.7	0.020
	Valsalva maneuver	28.8	0.2	4.6	0.0	0.7	0.088
Indirect costs	N° of sick leave days due to the pathology	80.31	9.6	769.3	0.0	0.0	-
	N° of workhours loss	22.86	0.0	0.0	13.8	314.7	-
	Caregiver's n° of workhours loss	22.86	0.5	12.0	2.9	65.4	0.744
	N° of days working in pain/fatigue	-	53.9	-	5.5	-	0.034**

* Comparing PA and HC costs per patient per year; ** Comparing PA and HC mean number; † Cost per working day; ‡ Cost per labor hour.

4 RESULTS – Cont'

- **Indirect costs:**
 - Only PA reported sick leave days, while only HC reported workhours loss (table 3). Interestingly, the mean number of days working in pain/fatigue was significantly higher in PA.
 - In both groups caregiver's workhours loss was reported, being higher in HC (table 3).
 - For total indirect cost, no statistically significant differences were found, being 380.1 € for HC and 781.3 € for PA (table 4, figure 1).
 - **PA generate an incremental burden of 401.2 € per patient/year (fig.1).**
- **Total costs:**
 - Total costs (direct and indirect) of PA population were significantly higher than those of HC (3,075.0 vs 1,325.2€ respectively; $p < 0.001$) (table 4, figure 1).
 - **PA generate a significant incremental burden of 1,749.8€ per patient per year when compared to HC (figure 1).**

Figure 1: Healthcare and indirect costs burden of PA and HC

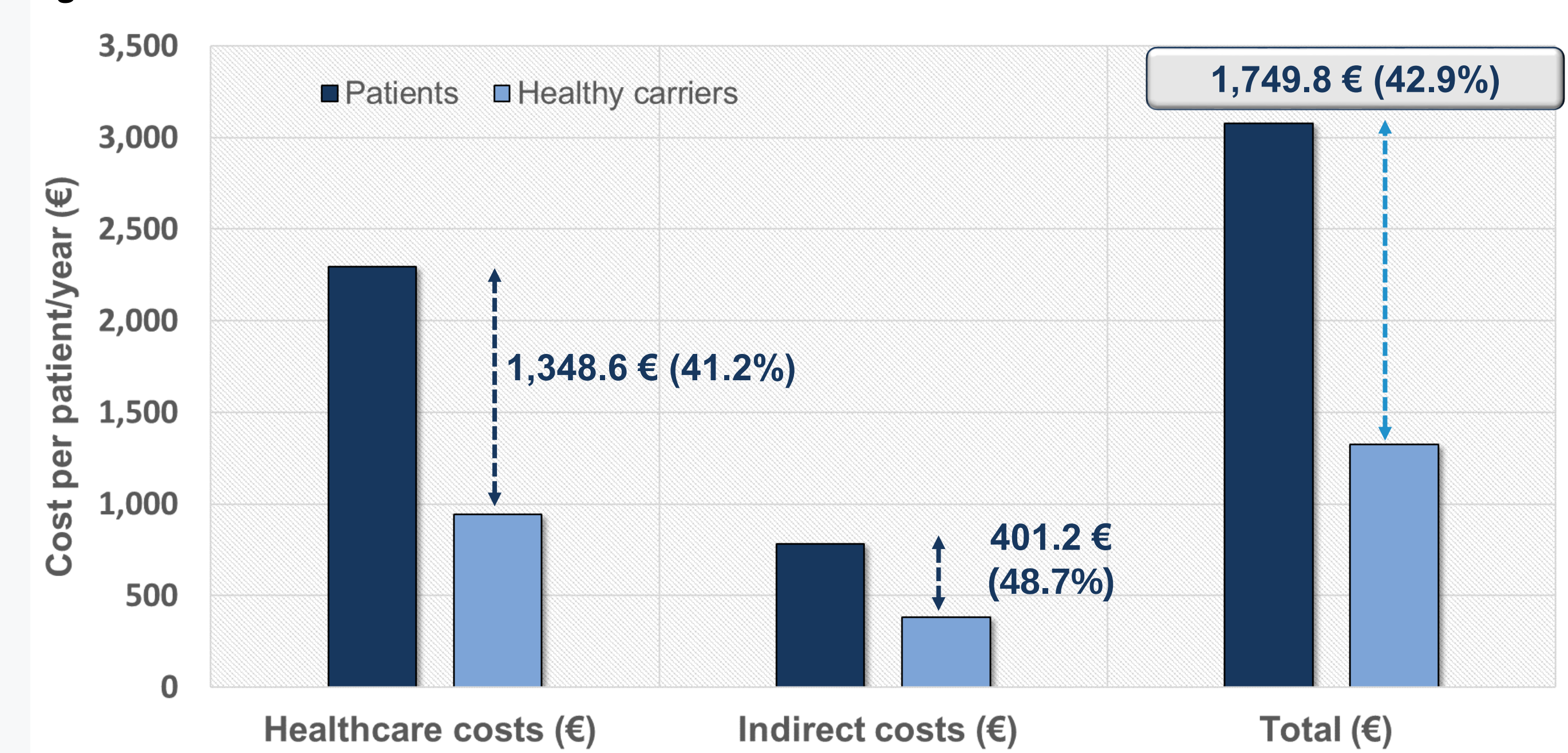


Table 4: Healthcare and indirect costs burden of PA and HC (per patient/year)

	Patients (n=19)	Healthy carriers (n=86)	p-value
Healthcare costs (€)	2,293.7	945.1	<0.001
Indirect costs (€)	781.3	380.1	0.581
Total (€)	3,075.0	1,325.2	<0.001

5 CONCLUSIONS

- ▶ Both healthy carriers and early stage ATTR-PN are generating a significant burden in direct costs to the Spanish Healthcare System, as well as relevant indirect societal costs.
- ▶ EMPATia represents the first study of ATTRv carriers' and patients' management in endemic and non-endemic areas, in Spain.

REFERENCES

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DISCLOSURE

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