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ORIGINAL RESEARCH

Economic Burden of Hidradenitis Suppurativa in Spain

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ABSTRACT

Introduction: Hidradenitis suppurativa (HS) is a highly disabling chronic inflammatory disorder affecting up to 1% of the Spanish population. It is a complex disease that requires significant resources and imposes a considerable economic burden. The aim of this study was to assess the economic burden of diagnosed HS in Spain both at patient and population level.

Methods: The study was conducted from a societal perspective using a bottom-up, prevalence-based approach. We evaluated publicly financed direct healthcare costs (consultations, diagnostic tests, inpatient admissions, surgery, comorbidities, treatment), direct nonhealthcare costs (formal and informal care, out-of-pocket expenses), and indirect costs (absenteeism and productivity loss) incurred by patients diagnosed with HS. A sensitivity analysis was conducted to test the uncertainty of the model.

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Results: The mean annual cost of treating all severities of patients with HS in Spain was €39,535.10. The largest cost components across all categories were informal care (46.05%), treatment (18.24%), out-of-pocket expenses (12.76%), loss of work productivity (10.82%), and surgery (5.62%). Moderate and severe patients cost 64.05% (€34,221.92) and 170.53% (€56,432.77) more than mild patients (€20,860.35), respectively. Assuming a prevalence of 1% and a diagnostic rate of 10%, the total economic burden of diagnosed HS in Spain was estimated at €1587 million.
Conclusions: HS has a significant economic impact on patients, their families, the healthcare system, and wider society. This is particularly evident among patients with moderate-to-severe HS. To reduce the economic burden and improve quality of life, efforts should be made to prevent the disease from progressing and to ensure that patients remain in the milder stages.

Keywords: Hidradenitis suppurativa; Economic burden; Spain; Costs

Key Summary Points

Why carry out this study?

There is little known about the economic burden of HS in Spain. This study was conducted to estimate this burden both for individual patients and for the overall diagnosed population, taking disease severity into account.

What was learned from the study?

The study reveals that HS imposes a considerable societal burden, with an average annual cost of €39,535.10 per patient, driven in part by informal caregiving expenses. These findings emphasize the need for earlier diagnosis and timely treatment to reduce the economic impact and improve patients' quality of life.

INTRODUCTION

Hidradenitis suppurativa (HS) is a chronic inflammatory disorder characterized by painful inflamed nodules, abscesses, and pus-discharging tunnels which typically occur in skin folds of axillary (armpits), inguinal (groin), gluteal, and perianal areas of the body [1]. HS is a disabling disease associated with purulent and malodorous secretions, severe pain, itching, and restricted mobility, all of which profoundly impair patient's social, psychological, and occupational functioning [1, 2]. HS considerably impacts on a patient's quality of life, significantly more than other skin conditions such as psoriasis or atopic dermatitis. Depression, anxiety, poor body image, fear of social rejection, loneliness, and sexual dysfunction are common in people with HS [3]. In addition, patients with HS experience a high burden of associated comorbidities such as metabolic, cardiovascular and mood disorders which further exacerbate their condition [4]. With an estimated prevalence of 1% in Europe and in Spain, HS is not uncommon [5, 6]. Nevertheless, under-recognition of the disease and significant delay in diagnosis mean that only 10% of the patients are accurately diagnosed [7]. Diagnostic delay is clinically significant, allowing disease progression and resulting in many patients presenting with advanced stages of HS at the time of diagnosis [8]. HS is challenging to treat and requires an early, multifaceted, multidisciplinary approach to achieve systemic control of inflammation. Typically, HS treatments comprise a combination of topical and systemic treatments such as antibiotics and occasionally require surgical interventions [9, 10]. Since the availability of biologics, the therapeutic paradigm to treat HS is slowly changing. Adalimumab was the first immunomodulatory properties drug approved for moderate-to-severe HS, followed by secukinumab and bimekizumab [11]. From an economic perspective, HS represents a significant burden on healthcare systems. Disease complexity means that patients require

extensive healthcare resources, with utilization typically rising as disease severity increase [12–14]. Medications, hospital attendance (mainly due to surgery), and specialist's consultations contribute to elevating the direct medical cost [12, 15]. From a societal perspective, HS leads to lower employment rate, absenteeism, and reduction in work productivity which account for a large part of the cost of illness [16]. Measuring the economic burden of HS is essential for healthcare decision-makers, as it supports the formulation and prioritization of health policies, guides interventions, and informs efficient allocation of resources within budgetary constraints [17]. To date, no study has quantified the economic burden of HS in Spain. In this context, the present study aims to estimate the economic impact of HS in Spain at both the individual and population levels.

METHODS

Study Design

The economic burden of diagnosed HS in Spain was estimated for the year 2024 using a bottom-up prevalence-based approach with a 1-year horizon. The study was conducted from a social perspective including publicly financed direct healthcare costs (PFDHC), direct nonhealthcare costs (DNHC), and indirect costs (IC). Estimates of the total economic burden were calculated at both the individual patient level; stratified by disease severity; and at the population level. All costs were expressed in 2024 euros. When necessary, costs were updated to 2024 using the Healthcare Consumer Price Index (CPI) for PFDHC (with the exception of pharmaceutical costs and tariffs from Autonomous Communities, which were already updated), and the general CPI for IC [18].

Data Sources

A narrative literature review was conducted in October 2023, in both English and in Spanish, using the PubMed search engine to identify data on the epidemiology, healthcare resources utilization, comorbidities, necessity of formal and informal care, costs, and work productivity losses related to HS. Studies were selected on the basis of their relevance to the Spanish context and the quality of their methodologies. In addition to published literature, some of the data used in this analysis were obtained from a recent survey conducted between April 2024 and February 2025 in collaboration with the Spanish Hidradenitis Suppurativa Patient Association (ASENDHI). The survey aimed to assess the impact of HS on the lives of patients in Spain (Table S1). The anonymized dataset resulting from this survey was made available to the authors of the present study. The clinical and sociodemographic characteristics of the surveyed patients are presented in Supplementary Table S2. All data included in this analysis were validated by a multidisciplinary panel of nationally recognized experts. This panel consisted of two dermatologists, a hospital pharmacist, a psychologist, a specialized nurse, an economist, the president of the Spanish Hidradenitis Suppurativa Patient Association, a hospital manager, and the president of SEMERGEN Madrid (Spanish Society of Primary Care Physicians) and member of the SEMERGEN Dermatology Working Group. Experts' opinions were gathered through various structured meetings in which they reviewed the evidence and discussed the model assumptions. All parameters included in the analysis were agreed by consensus. No ethical approval was required for this study, as the data were obtained from previously approved studies/registries. Data sourced from the AvanceHS survey were analyzed in anonymized form.

Study Population

Based on data from the Spanish National Institute of Statistics, the adult population (aged 18 and over) totals 40,149,906 individuals [19]. Applying a prevalence rate of 1% and accounting for a 90% underdiagnosis rate, it was estimated that around 40,150 people in Spain have a confirmed diagnosis of HS [5–7]. According to Vilarrasa et al.

methodology [9], in which clinicians assessed severity using multiple criteria, including quality of life impact, symptomatology, Hurley staging, and other clinical indicators, an estimated 29,629 patients were categorized as having mild HS, 9191 as moderate, and 1330 as severe (Supplementary Fig. S1). The population characteristics, specifically the sex distribution (76.05% female [20]) and mean age (35.8 years [9]), were drawn from the AvanceHS survey and the study by Vilarrasa et al., respectively. No weighting adjustments were conducted.

Resource Use and Costs

Publicly Financed Direct Healthcare Costs

We estimated the average number of annual medical visits, emergency department visits, diagnostic tests, surgery interventions, and hospital admissions required by patients categorized according to disease severity. Both ambulatory surgery (incision, drainage, limited local excision) and inpatient surgery (wide excision, grafts or flaps) were considered. The median unit costs of medical visits, diagnostic tests, and outpatient surgeries were obtained from the Spanish Autonomous communities' health care tariffs [21]; meanwhile, hospitalization costs and inpatient surgical costs were retrieved from the Ministry of Health's statistical portal [22] (Table 1). Medication consumption was evaluated from routine clinical practice, as described in the literature. Drug distribution and frequency were obtained from a Spanish observational study [9] and consequently validated by experts (Supplementary Table S3) [23], while dosage regimens were extracted from the corresponding product labels [24] and subsequently validated by the experts [23]. Drug costs were obtained from the General Council of Official Associations of Pharmacists (Botplus) database and calculated using the list price [25], applying the deduction rate stipulated in the Royal Decree-Law (Table 2). Comorbidities attributable exclusively to HS, specifically anxiety and depression, were also incorporated into the analysis. The proportion of patients suffering from these conditions were derived from the patient's survey [20]. To calculate the excess due to HS, the odds ratios from the study by Shavit et al. [26] were applied indicating that 6.38% and 7.45% suffer from anxiety and depression related to HS, respectively. We considered the PFDHC related to each comorbidity which were obtained from Spanish studies [18, 27, 28] (Table 1).

Direct Nonhealthcare Costs

DNHC included formal care, informal care (nonprofessional care from relatives or friends), and out-of-pocket expenses. Out-of-pocket spending included in the DNHC category, was strictly for products and services not covered by public funding. The proportion of patients requiring formal and informal care as well as the number of hours needed were obtained from the AvanceHS survey and are shown in Table 3. Following the proxy good method [29], the hourly wage for both formal and informal caregivers was valued equally at €16.65 [18, 30]. Annual out-of-pocket expenses were self-reported by patients in the AvanceHS survey and included the following categories: skincare products, wound care, over the counter medicines, transport and travel costs, private health insurance, private psychological support, and others (Table 3).

Labor Productivity Losses IC, including absenteeism and work productivity loss, were estimated using the human-capital method [31]. Absenteeism occurs when employees miss work for medical appointments and diagnostic tests as part of disease management. Time lost was estimated from the average duration of medical visits and diagnostic tests reported in the literature, with an additional 90 min allocated for travel and waiting times. Annual time lost was then obtained by multiplying the average duration by the number of visits and diagnostic tests stratified per disease severity. Monetary valuation of absenteeism was measured using the average earnings per minute (0.26/min) [18, 20, 32, 33] calculated by dividing the annual aver-

Table 1 Annual nonpharmaceutical PFDHC resource use per patient with hidradenitis suppurativa by disease severity and unit cost

	Resource consumption				Unit cost	
	n			Ref	EUR (2024)	Ref
	Mild	Moderate	Severe			
Medical visits						
General practitioner	0.74	1.50	2.43	[52]	€53.76	[18, 21]
Nurse	0.50	0.00	0.00	[23]	€30.15	
Dermatology	3.11	3.45	3.61	[14]	€91.81	
Gynecology	0.02	0.05	0.08	[52]		
Digestive	0.02	0.05	0.08	[52]		
Psychology	0.24	0.25	0.29	[14]		
General surgery	0.12	0.25	0.40	[52]		
Plastic surgery	0.17	0.35	0.57	[52]		
Hospital pharmacy	2.01	2.50	4.00	[23]	€90.00	
Hospital nurse	0.00	2.50	7.47	[23]	€53.51	
Emergency	0.25	0.50	0.81	[52]	€204.88	
Diagnostic tests						
Cutaneous ultrasound	0.30	1.58	1.05	[52]	€67.00	[18, 21]
Blood analysis	0.20	1.17	1.33	[52]	€4.49	
MRI with contrast	0.33	0.33	0.33	[52]	€407.00	
Surgery						
Outpatient surgery	1.13	0.82	2.70	[20]	€740.56	[18, 21]
Inpatient surgery	0.13	0.28	0.54		€2,266.78	[18, 53]
Hospitalization	0.00	0.04	0.23	[20]	€1,148.69	[18, 53]
Comorbidities[a]						
Depression (%)	7.45%			[20, 26]	€628.88	[18, 28]
Anxiety (%)	6.38%				€1,360.37	[18, 27]

EUR euros, *MRI* magnetic resonance imaging, *PFDHC* publicly financed direct healthcare costs, *Ref* references

[a]HS-related proportion (%)

Table 2 Drug characteristics and costs

Drugs	Units	Mg/unit	List price [25] (2024 €)	Dosis [23, 54]	List price/unit (2024 €)	Average annual cost (2024 €)
Paracetamol 1 g	40 tablets	1000 mg	1.60	4 g/day Q4W	0.04	2.08
Topic clindamycin 0.1%	1 tube	300 mg	2.00	2 applications/day	2.00	2.00
Clindamycin 300 mg + Rifampicin 300 mg	24 capsules	300 mg	4.21	300 mg twice/day (10 weeks)	0.18	55.83
	24 capsules	300 mg	5.36	300 mg twice/day (10 weeks)	0.22	
Doxycycline 100 mg	21 tablets	100 mg	2.31	100 mg twice/day (10 weeks)	0.11	15.40
Minocycline 100 mg	12 capsules	100 mg	3.51	100 mg twice/day (10 weeks)	0.29	40.95
Adalimumab 40 mg	2 pens	40 mg	627.00	80 mg Q2W	313.50	16,302.00
Secukinumab 300 mg	1 pen	300 mg	1057.38[a]	300 mg (90% Q4W and 10% Q2W)	1143.11	17,235.24
Prednisone	30 tablets	10 mg	1.60	10 mg/day (8 days per flare)[b]	0.05	4.30
Acitretin	30 capsules	25 mg	18.00	25 mg twice/day (9 months)[c]	0.60	328.20
Isotretinoin	30 capsules	40 mg	26.28	40 mg twice/day (20 weeks)[c]	0.88	245.28
Cyproterone/Ethinylestradiol	28 tablets	NA	2.00	1 tablet a day	0.07	26.07

Acitretin and oral cyproterone/estrogens are medicines with reduced contribution [55]

Q2W every 2 weeks, *Q4W* every 4 weeks

[a]Considering the 7.5% discount under Royal Decree Law 8/2010 [56, 57]

[b]It is considered that 83.9% of patients have at least one flare per month [58]

[c]Considering an average weight of 97.3 kg [59]

age income (€25,800.00) by the average number of effective weekly hours worked of total working age population (31.9 h) [33] (Table 4). Owing to insufficient data, IC related to presenteeism, sick leave, and permanent disability among patients with HS were not included in this analysis.

HS can also impair patient's professional life and their ability to work. Consequently, employment is lower among patients with HS [16]. We considered the difference in employment rates between patients with HS and the general population. The general population's employment rate (77.56%) was determined by dividing the number of employed individuals in Spain by the total working-age population, adjusted for age and gender according to the AvanceHS survey distribution (76.05% female)

Table 3 Annual DNHC resource consumption per patient with hidradenitis suppurativa by disease severity and unit costs

	Mild	Moderate	Severe	References
Formal care				
% of patients with formal care	50.00%	36.54%	45.59%	[20]
Daily hours of formal care	0.08	0.18	1.02	
Informal care				
% of patients with informal care	50.00%	59.30%	73.00%	
Daily hours of informal care	0.96	3.86	5.59	
Cost per hour of care		€16.65		
Annual out-of-pocket expenditure by disease severity[a]				[18, 30]
Skincare products	€392.31	€421.76	€765.69	[20]
Wound care	€289.09	€279.09	€403.24	
Over the counter medicines	€285.00	€289.80	€340.57	
Transport and travel costs	€643.20	€508.00	€432.86	
Private healthcare insurance	€440.00	€738.86	€781.89	
Psychological support	€1410.00	€1545.00	€1793.33	
Others	€1200.00	€690.00	€1046.00	

DNHC direct nonhealthcare costs

[a]Patient self-reported

[20, 34, 35]. The employment rate among patients with HS, as reported in the AvanceHS survey, was 60.99% [20], yielding an employment gap of 16.57%. Loss of labor productivity was expressed in monetary terms by multiplying this employment gap by the average annual earnings reported in the Spanish Wage Structure Survey (€25,800.00) [18, 20, 32] (Table 4).

Sensitivity Analysis

A sensitivity analysis was conducted to assess the uncertainty of the model at patient level. A total of 11 scenarios were built on the basis of the possible variation of the most sensitive parameters (Supplementary Table S4). An additional sensitivity analysis at population level was conducted using the same parameters as the patient-level analysis, incorporating the diagnosis rate which was increased by 50%.

RESULTS

HS Annual Cost Per Patient

The average annual cost of a patient with HS in Spain was estimated across all severities combined (mild, moderate, severe) at €39,535.10 of which PFDHC account for €10,621.34, DNHC for €24,479.43, and IC for €4434.33 (Table 5). Across all categories, the largest cost components were informal care (46.05%), pharmacological treatment (18.24%), out-of-pocket expenses (12.76%), work productivity loss (10.82%), and surgery (5.62%) (Fig. 1).

Table 4 Annual indirect costs resource consumption per patient with hidradenitis suppurativa by disease severity

	Mild	Moderate	Severe	Ref
Absenteeism				
Time lost[a] (min)	811.93	1447.69	2237.28	
Visits	718.53	1127.71	1957.46	[60, 61]
Diagnostic tests	93.40	319.98	279.82	
Blood test	19.00	110.83	126.67	[60]
Cutaneous ultrasound	31.50	166.25	110.25	[60, 62]
MRI	42.90			[60, 63]
Cost/min[b]	€0.26			[18, 20, 32, 33]
Work productivity loss				
Employment rate in the general population[c]	77.56%			[34, 35]
Employment rate in the HS population	60.99%			[20]
Annual average earnings per worker[d]	€25,800.00			[18, 20, 32]

HS hidradenitis suppurativa, *MRI* magnetic resonance imaging

[a]An additional 90 min has been added to each visit and diagnostic test for travel and waiting time

[b]Cost per minute was calculated using the average annual salary corresponding to patient's average age and weighted by gender distribution (€25,800.00) [18, 20, 32] as well as the average number of weekly hours worked in Spain (31.9 h) [33]

[c]Weighted by gender distribution (76.05% women versus 23.95% men) [20]

[d]Average annual earnings corresponding to the average age of the patients (35.8 years) [9] and weighted by gender distribution (76.05% women versus 23.95% men)[20]

The average annual costs for a mild, moderate, and severe patient were €20,860.35, €34,221.92, and €56,432.77, respectively. A moderate and severe patient cost 64.05% and 170.53% more than a mild patient, respectively. While the largest part of the total cost in a mild patient is due to treatment (€6598.61), informal care cost account for the majority of the cost of a moderate and severe patient (€13,918.71 and €24,800.97, respectively) (Table 5).

Total Economic Burden

Considering a 1% prevalence, a 10% diagnostic rate, and the estimated average costs per patient, the economic burden of diagnosed HS in Spain in 2024 was estimated to be €1,587.33 million (Supplementary Table S5). PFDHC (€426.45 million), DNHC (€982.85 million) and IC (€178.04 million) represent 26.87%, 61.92%, and 11.22%, respectively (Fig. 2).

Sensitivity Analysis

The sensitivity analysis performed at patient level revealed that the average number of daily hours of informal care was the most sensitive parameter, varying the average annual cost of a patient with HS from €23,899.20 to €68,152.53. As shown in Fig. 3, treatment distribution and the cost of informal care were the next most influential parameters. At population level, the most influential parameter was the diagnosis rate, followed by the average number of daily hours of informal care (Supplementary Fig. S2).

Table 5 Estimated mean annual cost per patient with hidradenitis suppurativa in Spain according to disease severity

	Mild	Moderate	Severe	Total
Medical visits	€625.87	€946.19	€1517.76	€728.75
Diagnostic tests	€155.31	€245.63	€210.65	€177.82
Surgery	€1116.48	€1244.91	€3220.63	€2223.07
Hospitalization	€0.00	€49.94	€259.38	€148.22
Drugs	€6598.61	€8305.11	€13,258.14	€7209.90
Comorbidities	€133.59	€133.59	€133.59	€133.59
Publicly financed direct healthcare costs	€8629.86	€10,925.37	€18,600.15	€10,621.34
Formal care	€253.36	€401.15	€2839.40	€1228.59
Informal care	€2913.60	€13,918.71	€24,800.97	€18,207.32
Out-of-pocket expenses	€4659.60	€4472.51	€5563.59	€5043.52
Direct nonhealthcare costs	€7826.56	€18,792.37	€33,203.96	€24,479.43
Absenteeism	€128.01	€228.25	€352.74	€158.40
Work productivity loss	€4275.92	€4275.92	€4275.92	€4275.92
Indirect costs	€4403.94	€4504.17	€4628.66	€4434.33
Total costs	€20,860.35	€34,221.92	€56,432.77	€39,535.10

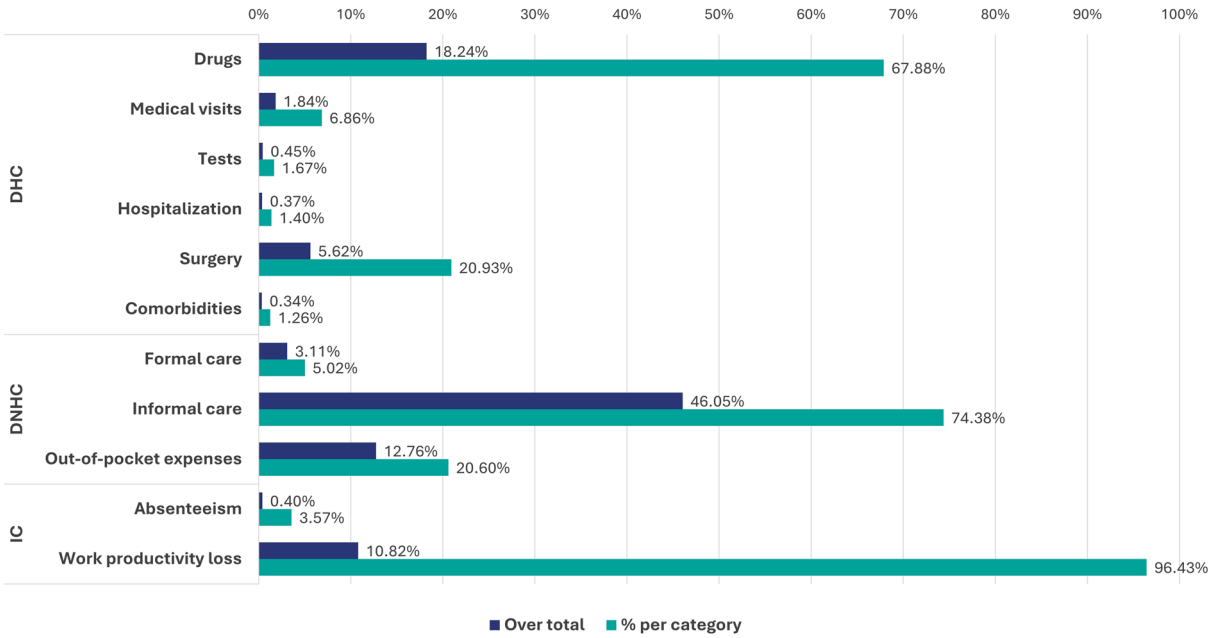

Fig. 1 Proportion of each cost category over PFDHC, DNHC, IC and over total cost of an average patient with hidradenitis suppurativa. *PFDHC* publicly financed direct healthcare costs, *DNHC* direct nonhealthcare costs, *IC* indirect costs

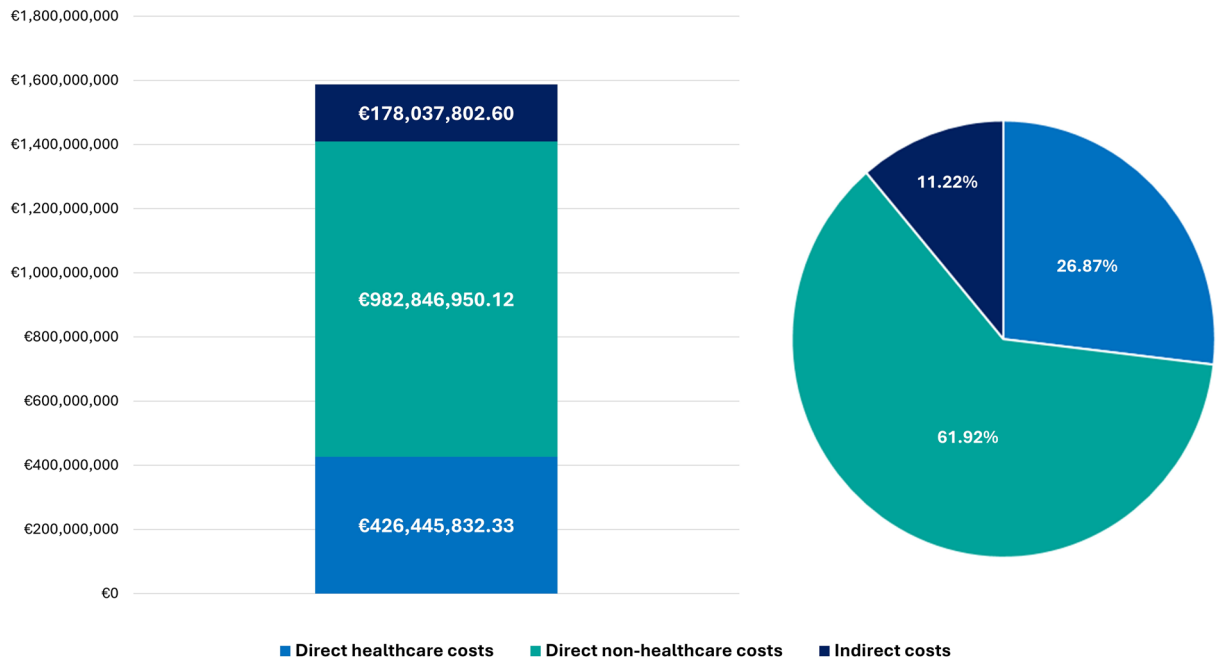

Fig. 2 Annual economic burden of hidradenitis suppurativa diagnosed population

Fig. 3 Sensitivity analysis, % of variation in annual average costs versus base case. A ± 20% was applied to all variables, except for hours of formal and informal care, for which the standard deviation reported in the AvanceHS survey was used [20]

DISCUSSION

To our knowledge, this is the first study to quantify the annual economic burden of diagnosed HS in Spain, incorporating both patient-level analyses by disease severity and estimates at the population level. Overall, this study clearly shows that the economic burden of diagnosed HS is high. It represents a substantial cost from a societal perspective (€1587.33 million), but also from the national payer point of view as publicly financed direct healthcare cost amounts to €426.45 million. Because our study assumes that only 10% of all individuals with HS are diagnosed, our estimates reflect the burden among diagnosed patients only. Therefore, the true population-level economic burden is expected to be substantially higher if all HS cases were identified. At the patient level, the total annual cost is likewise considerable, ranging from €20,860.35 for mild to €34,221.92 and €56,432.77 for moderate and severe disease, respectively.

In comparison, studies on psoriasis and atopic dermatitis in Spain report annual mean costs of €6881 [36] for moderate-to-severe psoriasis and €1278 [37] for atopic dermatitis, which is markedly lower than our own findings. What is particularly noteworthy is the substantial cost of treating severe cases (€56,432.77), which exceeds the per-patient expenditures for managing other prevalent and disabling diseases, including stroke (€27,711.37) [38] and Alzheimer's disease (€42,336.43) [39].

Few studies have examined HS costs in Europe. Desai et al., estimated annual hospitalization costs at £2027 in England [12]. A German study found average total annual patient costs of €545.99, with hospital-based care costing €4493.89 and outpatient care €335.02 [13]. Gáspár et al., in Hungary estimated €6791 per patient, including formal and informal care, transport, and productivity losses [15]. Differences in costs between our study and those previously mentioned may be owing to various factors, such as differences in healthcare system between countries, differences in patients' disease severity included in the analysis, and the cost categories covered in the evaluation and their distribution. Overall, we believe that our study is very comprehensive in terms of cost categories, which may explain why we found costs higher than other previously published studies.

PFDHC are driven by medical treatment, primarily due to the introduction of biologics as a treatment for HS. However, biologics represent a breakthrough option for patients and can help reduce the financial burden associated with HS. Firstly, adequate treatment with biologics has been shown to maintain disease control, helping patients to achieve lower categories of disease severity [40]. Economic savings due to better disease control is a topic for further health economic research as new treatments for HS become available. Furthermore, biologics have shown evidence to reduce healthcare resource utilization such as demonstrated in Oliveira et al. study [41]. Patients with Hurley stage II and III HS who initiated treatment with biologics required fewer surgical or procedural interventions than before biologics initiation. Consultations to healthcare providers, hospital admission, emergency visits, and the use of antibiotics and immunosuppressants were also lower [41]. In addition, an analysis conducted in Italy in chronic plaque psoriasis has demonstrated that biologics can reduce both DNHC and IC by 59.98% and 71.38%, respectively, after 1-year treatment [42]. It is reasonable to hypothesize that there will be an increase in the utilization of biologics. Indeed, it has been recognized in clinical practice that it is imperative to treat patients earlier, within the so-called "window of opportunity" [43, 44]. This is the period in which early and more aggressive treatment with biologics has been shown to improve patient clinical response and quality of life [43, 44]. This new treatment paradigm will probably result in an increase in the utilization of biologics, as well as other targeted therapies, in forthcoming years. Once biologics become part of routine HS clinical practice in Spain it would be advisable to repeat this analysis to measure the economic impact of biologics as a treatment for HS.

Our study also highlights the significant financial impact of DNHC in HS. Among patients with moderate and severe HS, these costs represent more than half of the total cost (54.91% and 58.84%, respectively), primarily driven by

expenditure on informal care (€13,918.71 and €24,800.97, respectively). According to our findings, patients with moderate and severe HS required an average of 3.86 and 5.59 h of informal care per day, which explains the substantial contribution of this component to overall costs. This high demand for informal care is likely related to pain, acute flares, and reduced mobility, all of which are common in HS and interfere with daily functioning [45, 46]. These results are in line with findings from a Spanish study in patients with moderate-to-severe psoriasis, who similarly required up to 4 h of daily informal care, supporting our estimates. However, if in real-life practice the hours of informal care were lower than those used in our analysis, DNHC would considerably decline as demonstrated in our sensitivity analysis.

Given the great relevance of informal care revealed by this study, future research should explore specific aspects of this type of care in more depth such as the tasks involved, the profile of carers, the problems they perceive, the impact on their health, professional careers and family and social relationships, and the positive aspects of the support provided. In addition, the training and support needs of carers, and the evaluation of interventions to reduce the burden on nonprofessional carers, should be included in the research agenda for this disease.

Out-of-pocket spending also places a significant financial burden on patients with HS, with an average cost of €5043.52. However, it should be noted that these values are dependent on self-reported data, which may result in an overstatement of the actual costs incurred. Unsurprisingly, the psychological support was the highest cost in this category (€1410.00–€1793.33) highlighting the psychological distress experienced by patients as already described in the literature. HS affects dramatically patient psychological wellbeing including anger, sadness, anxiety, and depression [3]. The high estimated cost of this item is due to the fact that access times to psychological care in the Spanish public system are very long and demand is usually transferred to private services paid directly by families. This may imply significant inequalities in access, which should be the subject of future studies. Few studies estimating out-of-pocket expenditure have been conducted, which make comparisons between our findings and others difficult. However, in a recent survey carried out in the USA, patients reported spending $2250.00 annually [47]. This study also reveals the financial vulnerability caused by the disease, with 30% of the cohort experiencing moderate or severe financial hardship, a phenomenon that is likely to be similar in Spain. HS mainly affects working-age adults, and their IC were largely due to work productivity loss caused by unemployment (per patient cost: €4275.92). As confirmed in the literature, HS has been shown to have a significant impact on the work performance of those affected [48], with higher scores for work productivity impairment compared with other skin diseases such as psoriasis [49].

This study is subject to certain limitations. First, there is uncertainty associated with some of the data used as the basis for the analysis, including epidemiological estimates. The absence of Spain-specific prevalence data limits the accuracy of the total economic burden calculated for the country. It is likely that the actual number of patients with HS in Spain is higher than currently recognized. In addition, healthcare resource utilization data were extracted from multiple sources, introducing potential heterogeneity. Moreover, because some model inputs were based on expert opinion, some degree of bias is possible. Structured consensus procedures were applied to mitigate this limitation.

The AvanceHS survey, which informed part of this analysis, has a relatively small sample size ($n=270$), which may affect the representativeness of the findings. Additionally, 50.55% of the participants were severe and 76.05% were women, suggesting that these patients may be overrepresented in this sample. This type of selection bias is common in cross-sectional survey studies, as individuals with more severe symptoms or a greater disease burden are often more motivated to participate [50]. Furthermore, owing to a lack of available data, certain cost components were not included in the analysis: productivity losses related to sick leave and presenteeism, as well as intangible costs associated with reduced quality of life. For instance, Gaspar

et al. estimated that the costs associated with presenteeism amounted to €1781.00 per patient per year, while those associated with permanent disability reached €244.00 [15]. Another study conducted in the USA among patients with HS estimated in 2015 the annual costs associated with disability days in $1328.00, a value slightly lower than the cost associated with medically-related absenteeism days, which was $1.598.00 [51]. Although these estimates are based on data from Hungary and the USA rather than Spain, they provide a useful indication of the potential magnitude of the unaccounted IC in our study. These exclusions are important to acknowledge, as their inclusion would likely further increase the estimated economic burden of HS. Finally, the biologic therapy bimekizumab was not included in the cost analysis, as it had not yet been financed at the time of the study.

CONCLUSIONS

This study represents the first assessment of the economic burden associated with diagnosed HS in Spain. Overall, diagnosed HS imposes a significant financial impact on patients, their families, the healthcare system, and wider society derived not only from their clinical management, but also from the need of informal care, and the labor impact caused by the disease. This burden is particularly pronounced among individuals with moderate-to-severe HS. Our findings underscore the critical importance of early diagnosis by HS healthcare professionals to facilitate timely and adequate treatment that can lead to a better disease control and consequently better clinical, economic, and societal benefits.

Moreover, the study highlights the considerable need for psychological support and informal caregiving among patients with HS, indicating that greater emphasis should be placed on interventions aimed at improving their quality of life. These insights offer valuable guidance for policymakers seeking to optimize the allocation of healthcare resources and enhance patient outcomes in the management of HS.

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Data Availability. The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflicts of Interest. Yoana Ivanova Markova and Mathilde Daheron are employed by Weber España, a company that received funding from UCB to conduct this study. Javier Bellas is an employee of UCB. Eva Vilarrasa, Joaquín Borrás Blasco, Silvia Lobo Benito, Marta Loro Pérez, Marta García Núñez-García, Juan Oliva Moreno, David Palacios Martínez, Félix Rubial Bernárdez, and Antonio Martorell received fees from UCB for their expert advice during study conduction. Eva Vilarrasa has received funding and/or honoraria for educational activities, consultancy, advisory roles, or speaking engagements from Abbvie, Aceleryn, Almirall, Amgen, Bayer, Biofrontera, Boehringer Ingelheim, Bristol-Myers Squibb, Celgene, Galderma, Gebro, Incyte, Isdin, Johnson and Johnson, Leo Pharma, Lilly, Merck-Serono, MoonLake, MSD, Novartis, Pfizer, Roche, Sandoz, Sanofi, and UCB. She has also worked as a consultant, investigator, or collaborator with the following companies and startups: iDermApp, Mediktor, DermUS, Biomi, and Barcelona Health Hub. Eva Vilarrasa is an Editorial Board member of Dermatology and Therapy. Eva Vilarrasa was not involved in the selection of peer reviewers for the manuscript nor any of the subsequent editorial decisions. Joaquín Borrás Blasco has received funding and/or honoraria for educational activities, consultancy, research, or speaking engagements at events of medical and scientific interest from Boehringer Ingelheim, Johnson and Johnson, Pfizer, Sanofi, and UCB. Antonio Martorell has received honoraria and/or travel grants and/or has served as a member of advisory committees for Abbvie, Aceleryn, Almirall, Amgen, Boehringer Ingelheim, Bristol-Myers Squibb, Celgene, Incyte, Johnson and Johnson, Leo Pharma, MoonLake, Novartis, Pfizer, Sandoz, Sanofi, UCB, and Legit Health. He has also served as a principal investigator in clinical trials sponsored by Abbvie, Aceleryn, Almirall, Amgen, Boehringer Ingelheim, Bristol-Myers Squibb, Celgene, Incyte, Johnson and Johnson, Leo Pharma, MoonLake, Novartis, Pfizer, MSD, Takeda, Sanofi, UCB, and MSD. Marta Loro Pérez has received financial support for collaborative research projects or and/or consultancy honoraria from Janssen-Cilag, Pzfizer, Novartis, Abbvie and UCB. Juan Oliva Moreno, Silvia Lobo Benito, Marta García Núñez-García, David Palacios Martínez and Félix Rubial Bernárdez do not declare any conflicts of interest.

Ethical Approval. No ethical approval was required for this study, as the data were obtained from previously approved studies/registries. Data sourced from the AvanceHS survey were analyzed in anonymized form.

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