The economic impact and health-related quality of life of Spinal Muscular Atrophy: An analysis across Europe.

Luz María Peña Longobardo (LuzMaria.Pena@uclm.es)
Universidad de Castilla-La Mancha https://orcid.org/0000-0001-7224-2189
Isaac Aranda-Reneo
Universidad de Castilla-La Mancha
Juan Oliva-Moreno
Universidad de Castilla-La Mancha
Svenja Litzkendorf
Center for Health Economics Research Hannover
Isabelle Durand-Zaleski
Cress
Eduardo F. Tizzano
Hospital Vall d'Hebron
Julio López-Bastida
Universidad de Castilla-La Mancha

Research

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Abstract

Background this study aimed to estimate the economic impact and health related quality of life (HRQOL) of patients with spinal muscular atrophy (SMA) in three European countries. For this purpose, it was a cross-sectional study carried out in France, Germany and the United Kingdom. Data were collected from July 2015 to November 2015. Healthcare costs (hospitalizations, emergencies, medical tests, drugs consumption, visits to GPs and specialists, health material and healthcare transport) and non-healthcare costs (social services and informal care) were identified and valued. EuroQol instruments, the Zarit interview and the Barthel Index were also used to reflect the burden and the social impact of the disease beyond the healthcare cost.

Results we included 86 children with SMA, 26.7% of them Type I and 73.3% Type II or III. The annually average cost associated with SMA reaches at 54,295 € in the UK, 32,042 € in France and 51,983 € in Germany. The direct non-healthcare costs ranged between 79%-86% of the total cost and the informal care costs were the main determinant of these costs. Additionally, people suffering from this disease have a very low health related quality of life, showing large differences between countries.

Conclusions SMA represents a considerably high socioeconomic impact both in terms of healthcare and social costs. It was also observed exceptional reduced HRQOL of children affected. The figures shown in this study may help to design more efficient and equitable policies, with special emphasis on the support provided to the families or non-healthcare aids.

Introduction

Studies on the economic impact of a disease, commonly known as cost of illness studies, are a type of analysis that is well known and disseminated in the scientific literature in the field of health economics. The interest of such studies lies in revealing an insufficient known dimension of a disease -its economic burden- and to integrate this information into the body of knowledge of it. Therefore, these studies are the equivalent in the field of health economics to epidemiological studies in the field of public health. And, although they do not allow to identify the most effective or efficient interventions in the framework of a specific disease, they help to put in context its social impact [1–7].

Although in the field of high prevalence diseases, the presence of this type of studies is frequent and growing over time [7, 8], this is not the case in the field of rare diseases, due to the inherent difficulty in obtaining information about the people who suffer from them. Even though in recent years efforts have been made to improve the information on the economic burden posed by rare diseases [9], there are still important information gaps to be found in many of them. Firstly, due to their low prevalence, the correct diagnosis of rare diseases is complex and subject to significant delays. Moreover, most rare diseases have no cure but, for many, there is no effective treatment available or, if treatments exist, there is no guarantee of improvement in life expectancy or quality of life.

There are different factors that could explain such strong social impact that suffers from such disease might have. They are the severity, uncertainty in the diagnostic and the lack of effective treatments. They carry out generative and life-threating for not only its suffers but also for their families. This has been testes in the literature as approximately 50% have a childhood onset and over one-third of deaths of children under one year old are due to rare diseases [9, 10]. Likewise, health related quality of life (HRQOL) of people that suffer these diseases are seriously threatened. The results of recent studies are coincident concluding that people suffering from these diseases show results well below those of the general population, being affected several dimensions of the HRQOL simultaneously [11].

A very common rare disease is Spinal muscular atrophy (SMA). SMA is an autosomal recessive neuromuscular disorder caused by the degeneration of alpha motor neurons in the anterior horns of the spinal cord. It is caused by homozygous absence or pathogenic variants in the Survival motor neuron 1 gene (SMN1) and the phenotype is mainly influenced by the number of copies of a highly homologous gene, SMN2, present in all patients. Weakness is the most important manifestation with several complications such as respiratory insufficiency, scoliosis, contractures and nutritional problems. SMA is classified in three main types according to age of onset and motor milestones achieved. Type I, start in first weeks, months of life, never sit and death in the first two years of life. Type II manifests after 6 months and patients never walk and are wheelchair bounding the whole life. Type III appears after 18 months and patient may walk several years but may also loose this ability lately [12].

In fact, SMA has an incidence of 1/5000 to 1/10,000 births and a carrier frequency of 1/35 to 1/50 [13], being one of the most severe hereditary disease among children. Furthermore, the disability caused by such disease increases the difficulty to carry out the activities of daily living (ADLs) and the burden supported by families [11]. Therefore, a broader perspective (that it, including formal care, unpaid care and other household costs) is necessary to quantify the real economic burden of such disease.

To our knowledge, the evidence of the total economic impact of SMA across Europe is scarce [11, 13]. Therefore, the main aim of this study is cover two gaps of information on SMA disease. First, to estimate the economic costs related to SMA from a societal perspective in the three European countries with the largest population: Germany, France and UK. Second, to study the HRQOL of SMA patients and their caregivers.

Methods

Study population

This was a cross-sectional study of patients diagnosed with SMA who received outpatient care at the time of the study in three different European countries: France, Germany and the United Kingdom. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines have been followed in the study [14].

Data was collected from July 2015 to November 2015. Children/adolescents diagnosed with SMA were eligible. Thus, 86 children and their caregivers were included in the study. The caregivers completed the administered questionnaires to supply information on the use of public health and non-health resources. More detailed information about the design and procedure of the study is available elsewhere [11]. We defined informal caregivers as a heterogeneous personal service, composed of various specific tasks provided to cover basic or instrumental needs of a person with limitations in their autonomy. More precisely, it is a non-professional activity, in the sense that the people who provide this care do not enjoy recognized labour rights, including weekly schedules and rest periods. Likewise, although they may receive family assistance or a public subsidy, it is not a commonly paid activity. Particularly, we considered informal caregivers those reported that they care for at least one hour of care.

No ethical approval was needed; the survey was totally anonymous, as the patients were contacted by their patient organization or registry, and their responses were no associated with any identifying data (name, ID, address, e-mail) and they were sent directly to the researchers in charge of data analysis

Health outcomes for patients and caregivers

It was analysed the health-related quality of life for both patients and their caregivers. For this purpose, we used the proxy version of the EQ-5D-3L for patients and EQ-5D-5L for caregivers. The main reason for using different versions of questionnaires was because the EQ-5D-5L is only validated for adult responders. These questionnaires are generic instruments that are used for assessing the quality of life taking into account five different dimensions: mobility, self-care, everyday activities, pain/discomfort and anxiety/depression [15]. The standardized reference values are 0 (death or similar to death) and 1 (the perfect health), being possible negatives values (health status worse than death). In addition, the EQ-5D instruments include a Visual Analogue Scale (VAS) that represents values from 0 (the worst health status) to 100 (the best) when asking participants for scoring their overall health on the day of the interview.

Two other instruments were used for analysing the degree of dependence of patients and the burden of care for caregivers. Firstly, the Barthel Index measures the (dis)ability to perform the activities of daily living, assessing the degree of dependence [16–18], going from 0 points (totally dependent) to 100 points (totally independent). Secondly, the Zarit burden interview (22-item version) was used to capture the burden supported by caregivers due to the tasks provided. In this case, caregivers are supposed to respond questions in relation to how they face the care. The total score ranges from 0 to 88, with scores under 21 corresponding to little or no burden and scores above 61 to severe burden [19].

Cost methodology

We used a prevalence approach from a societal perspective. Thereby, in order to estimate the economic burden of SMA, several questionnaires were applied to collect information on health and non-health resource utilization of the six months period prior to the study (except for hospitalization admissions that it was 12 months prior to the study). Costs were extrapolated to annual terms. Information on hospital admissions, emergency, medical tests, drug consumption, visits to GP and specialist, health material and

healthcare transport was collected in each country and applied national references prices. More precisely, for the UK, National tariff payment system performance by English National Health System was used. For Germany, the information was obtained from Rosenfluh Publikationen AG that provides official information about German health system. And in the case of France, the information was obtained from “la sécurité sociale française” and “eureka Santé par vidal” web sites, which provide official information about health system in France.

Regarding non-healthcare costs, it was obtained information on social services used as well as informal (non-professional) care. Thus, number of caregiving hours were collected from the questions related to the time spent providing children help to carry out the Activities of Daily Living (ADL). Then, the caregiving hours were valued taking into account the proxy good method [20–22]. This technique values the care provided taking into account how much it would cost if informal caregivers had to be replaced at the labour market by a close substitute. Professional care wages per hour used were 23.88 € in UK, 12.02 € in France and 17.40 € in Germany, taking them from the public tariff provided by each country. Finally, for social services utilization, the information was collected from the questionnaires in relation to the use of programmed domiciliary care, day centre, support social work, occupational centre, respiratory physiotherapy, physiotherapy, occupational physiotherapy, information/advice/assessment, psychosocial care for family, residential centres, hydrotherapy or respite in temporal stays. The unitary cost per each service was obtained from local official sources. All prices are based on 2014 year.

Results

A total of 34, 27 and 25 children with SMA and their caregivers completed the questionnaires in the United Kingdom, France and Germany, respectively (Table 1). Most of the children with SMA were classified as type II (58% and 48% for UK, France and Germany, respectively), and had an average age of 5.5, 6.1 and 9.5 for the three countries considered. The majority of children went to ordinary schools, although there were quite a few of them who went to nursery schools, especially in Germany (20%).

We identified a total of 56 caregivers, 75% of them reported a positive number of caregiving hours. Most of them were females, fundamentally in France (94% vs 78% and 64% in Germany and UK, respectively) (Table 1). They were also on average older in Germany (42 years old compared to 41 and 36 years in UK and France, respectively). In relation to the daily of caregiving hours, it was observed that in the UK the intensity was higher in comparison with France and Germany. Informal caregivers from the UK provided on average of 12.50 hours per day while France and Germany people care for 10.65 and 9.31 hours per day, respectively. Finally, even though in France the intensity of caregiving was lower (in comparison with the UK and Germany), the burden supported due to the care was higher. More precisely, French caregivers experienced a Zarit score of 40.37 versus 26.63 and 21.33 in the UK and Germany, respectively.

Table 2 shows the health-related quality of life for both patients and their caregivers. Regarding children, it was observed that French children had worse quality of life with a 0.12 utility score, figure quite similar to children in the UK, with 0.17. On contrary, German children had a significantly better quality of life with

a time trade-off (TTO) of 0.53. The dimension with worse results was those related to self-care, in which 77% of children in the UK said that there were unable to wash or dress himself/herself (63% in the case of France and 44% in Germany). These results go to in line with those obtained in caregivers as French had on average of 0.39 utility score (the lowest), in comparison with 0.85 and 0.80 TTO score in the UK and Germany, respectively.

The annual average cost associated with SMA reached 54,295 € in the UK, 32,042 € in France and 51,983 € in Germany (Table 3). In the three countries analysed, direct non-healthcare costs ranged between 79%-86% of the total cost associated with SMA disease. More precisely, the item with the highest weight on the total costs was the care provided by relatives (informal care). Nevertheless, although the weight of healthcare and non-healthcare costs above the total cost associated with SMA was quite similar, the amount of such costs differs among countries considered in this study (Fig. 1).

In the United Kingdom, the total cost was the highest one with 54,295 €, with also the highest direct non-healthcare costs, 43,214 € (that is, 79% of its total cost) and with a direct healthcare costs amount at 11,081 € (20.4%). Within direct healthcare cost, specialist visit cost was 4,569 € (8.4% of the total cost), health material cost amounted at 1,958 € (around 3.6% of the total cost), hospitalization cost was 2,219 € (4.1% of the total cost), medical test was 874 €, healthcare transport was 58 € and GP & Emergency 842 €. Finally, drugs are valued at 560 €. Regarding direct non-healthcare cost, informal care cost was estimated at 40,526 € (74.6% of the total cost) per year while social services cost was 2,187 € (almost 4% of the total cost).

France had the lowest total cost associated with SMA (32,042 €). 4,672 € (14.6%) corresponds to direct healthcare costs while direct non-healthcare costs amount at 27,370 € (representing 85.4%). Within direct healthcare cost, medical visit cost plays the most relevant role, with 1,870 € (5.8% of the total cost), followed by hospitalization, which cost reaches 1,229 € (3.8%). Regarding direct non-healthcare cost, informal care cost is estimated at 25,619 € (80.0% of the total cost) per year and social service cost is 1,029 € (3.2%).

In Germany, together with the UK, represents the highest costs estimated (51,983 €). The 86% of the total cost corresponds to direct non-healthcare costs (44,670 €) while direct healthcare represent the 14% (7,313 €). Within direct healthcare cost, hospitalization cost plays the most relevant role with 3,170 € (6%). Regarding direct non-healthcare cost, the care provided by main caregivers is valued at 27,436 €, and the care supplied by other carers is estimated at 12,490 €. Alike, social services cost is 4,380 € (8% of the total cost) (Table 3).

Table 1
Demographic characteristic of participants and their caregivers by country

	UK	**France**	**Germany**
	n = 34	**n = 27**	**n = 25**
	N (%)	**N (%)**	**N (%)**
Patients			
Type I	7 (20.59)	5 (18.52)	11 (44.00)
Type II	20 (58.82)	13 (48.15)	12 (48.00)
Type III	7 (20.59)	9 (33.33)	2 (8.00)
Gender (female)	17 (50.00)	16 (59.26)	18 (72.00)
Age (mean, SD)	5.55 (4.79)	6.19 (6.13)	9.52 (6.19)
Education			
Educated at an ordinary school	10 (29.41)	5 (18.52)	12 (48.00)
Educated at an ordinary center with special sessions	6 (17.65)	8 (29.63)	4 (16.00)
Educated at a special education center	2 (5.88)	1 (3.70)	4 (16.00)
Home schooled	1 (2.94)	1 (3.70)	0
Nursery school	5 (14.71)	5 (18.52)	5 (20.00)
Not received education	7 (20.59)	4 (14.81)	0
NA	3 (8.82)	3 (11.11)	0
Barthel index (mean, SD)	35.93 (28.29)	34.33 (30.11)	47.66 (22.90)
Caregivers	UK	France	Germany
	n = 11	n = 16	N = 14
Gender (female)	7 (63.64)	15 (93.75)	11 (78.57)
Age (mean, SD)	41.09 (11.56)	36.13 (9.15)	42.53 (10.57)
Caregiving time (daily hours) (mean, SD)[a]	12.50 (5.96)	9.31 (8.44)	10.65 (5.45)

	UK n = 34	France n = 27	Germany n = 25
Zarit caregivers burden, (mean, SD)	26.63 (13.39)	40.37 (16.10)	21.33 (18.33)
Risk of burnout (Zarit scale) (n, %)[b]	0	1 (12.50)	0

Source: own elaboration. [a] Number of daily hours of informal caregiving conditioned to hours of informal caregiving was higher than 0. [b] People with a Zarit score equal or higher than 55 points.

Table 2
Health-related quality of life (HRQOL) of patients and caregivers by country

	UK	France	Germany
	n = 34	n = 27	n = 25
	N (%)	N (%)	N (%)
Patients			
HRQOL (TTO social tariff score), mean (SD)	0.167 (0.277)	0.116 (0.285)	0.532 (0.335)
To be confined to bed	11 (32.35)	5 (18.52)	5 (20.00))
Unable to wash or dress himself/herself	14 (41.18)	12 (44.44)	8 (32.00)
Unable to perform usual activities	8 (23.53)	7 (25.93)	3 (12.00)
Extreme pain/discomfort	1 (2.94)	1 (3.70)	0
Suffer anxiety/mid depression	0	2 (7.41)	0
HRQOL (VAS score), mean (SD)	75.44 (19.36)	59.15 (29.84)	69.76 (13.42)
Caregivers	**UK**	**France**	**Germany**
	n = 11	**n = 16**	**n = 14**

[a] (SD). Source: own elaboration

	UK	France	Germany
HRQOL (TTO social tariff score), mean (SD)	0.852 (0.155) [a]	0.396 (0.468) [a]	0.800 (0.298) [a]
Unable to walk	0	0	2 (15.38)
Unable to wash or dress himself/herself	0	4 (25.00)	1 (7.69)
Unable to perform usual activities	0	4 (25.00)	0
Extreme pain/discomfort	0	1 (6.25)	0
Suffer anxiety/mid depression	0	2 (12.50)	0
HRQOL (VAS score), mean (SD)	80.36 (17.01)	62.12 (33.41)	71.92 (14.20)

[a] (SD). Source: own elaboration

Table 3
Average annual costs by country (€ 2014)

	UK		France		Germany	
	N = 34		N = 27		N = 25	
	Mean (SD)	%	Mean (SD)	%	Mean (SD)	%
Drugs	560 (2,085)	1.03%	14 (42)	0.04%	35 (106)	0.07%
Medical tests	874 (1,223)	1.61%	384 (1,375)	1.20%	158 (252)	0.30%
Medical visits	4,569 (9,908)	8.42%	1,870 (2,463)	5.84%	1,954 (3,656)	3.76%
Hospitalizations	2,219 (5,490)	4.09%	1,229 (5,260)	3.84%	3,170 (4,769)	6.10%
GP & Emergency	842 (3,130)	1.55%	144 (274)	0.45%	617 (1,966)	1.19%
Health material	1,958 (2,428)	3.61%	990 (1,770)	3.09%	1,379 (1,648)	2.65%
Healthcare transport	58 (270)	0.11%	41 (152)	0.13%	0	0.00%
Direct healthcare costs	**11,081 (10,764)**	**20.41%**	**4,672 (7,219)**	**14.58%**	**7,313 (8,636)**	14.07%
Social services	2,187 (6,197)	4.03%	1,029 (2,312)	3.21%	4,380 (8,044)	8.43%
Direct non-healthcare formal costs	2,187 (6,197)	4.03%	1,029 (2,312)	3.21%	4,380 (8,044)	**8.43%**
Main informal carer	27,012 (43,826)	49.75%	17,468 (22,550)	54.52%	27,436 (30,060)	52.78%
Other informal carers	13,516 (25,151)	24.89%	8,151 (16,583)	25.44%	12,490 (17,050)	24.03%

[a] It contains costs associated with non-health transport and housing and vehicle adaptation. Source: own elaboration

	UK		France		Germany	
Direct non-healthcare informal costs	40,526 (60,016)	74.64%	25,619 (35,263)	79.95%	39,926 (42,047)	**76.81%**
Non-healthcare transport[a]	501 (1,053)	0.92%	722 (1,733)	2.25%	364 (381)	0.70%
Direct non-healthcare costs	**43,214 (61,139)**	**79.59%**	**27,370 (35,383)**	**85.42%**	**44,670 (45,063)**	**85.94%**
TOTAL COST	**54,295 (68,431)**	**100.00%**	**32,042 (38,303)**	**100.00%**	**51,983 (47,662)**	**100.00%**

[a] It contains costs associated with non-health transport and housing and vehicle adaptation. Source: own elaboration

Discussion

This study represents the first complete and realistic costing study to date of the burden of SMA patients across Europe. Particularly, our results show that SMA is a disease that causes a great economic impact from the perspective of society. In the countries considered, the total costs figures range from 32,000 to 54,000 euros annual per person, depending on the country. These figures include both a high health expenditure (between 4,700 and 11,000 euros on average per person, depending on the country) and even large non-health costs (between 27,000 and 45,000 euros per person, depending on the country). Even though health spending is very relevant, the importance of the resources invested in social services must also be highlighted (Germany stands out at 4,400 euros per person per year). However, the cost of informal care stands out as the main cost item, oscillating between 75% and 80% of the total economic impact. Therefore, in addition to the impact on health, most of the economic impact falls on families in the form of time care.

Broadly, our estimations do not highly differ from those analysed previously in Germany [13] and in Spain [12], but some numbers need to be clarified. For instance, the total costs of SMA was 54,721 € for German patients and 33,721 € for Spanish patients (slightly different from ours). The main differences might come from the account of direct healthcare resources and the economic assessment of informal care. First, the previous study carried out in Germany included more expensive health care resources (such as artificial nutrition systems, rehabilitation services or respiratory management) in the direct healthcare costs that we did not include in either the present study or the study carried out in Spain. Second, it was not used the same method for assessing the cost of informal caregiving time in comparison with the previous German study. Klug et al. only included the economic assessment of

informal care costs for non-working parents in order to prevent double accounting because they also estimated the loss of productivity of working parents (we did not).

Regarding the HRQOL, the present study is the first estimating the utility index score associated with the health status through the EQ-5D instrument in SMA patients and their caregivers. The previous study carried out by Klug et al. used a different tool for estimating this condition and the results cannot be compared. However, the instrument used in our paper was the same used previously in the Spanish study. In this sense, the utility score of Spaniards SMA patients was quite lower (0.16 vs. 0.53) for German SMA patients. However, the VAS score results included in the EQ-5D did not show so huge differences (54 vs. 69). Meanwhile, the HRQOL of informal caregiver were also different for the utility index score (0.49 vs. 0.81) but very similar in the VAS results (69 vs 71).

Another point that should be highlighted is the large differences identified in our study in HRQOL of the patients in France and UK compared to those in Germany. It does not seem that either the age of the patients or the degree of disease progression explains the differences observed. Therefore, we can only point out this fact and leave open as a line of future research the analysis of HRQOL in several countries, with as wide samples as possible and with questions specially designed to understand this variability. The same can be said about the important difference identified in HRQOL of French caregivers compared to caregivers in the UK and in Germany.

Among the main limitations of the analysis, we can mention the limited sample size. Obviously, since it is a disease of low prevalence, it is expected that large sample sizes will not be available. However, it must be recognized that, given the distribution of SMA types over the total samples, it was not possible to perform an additional analysis for each phase of disease progression. Likewise, the design of our study was cross-sectional and the questions related to the health and non-health resources was retrospective. Ideally, the study would be a prospective and a longitudinal cohort of people with SMA avoiding, for instance, the recall bias. However, we used an ad-hoc questionnaire aimed to avoid recall bias and the participants could answer the question with no time limit. On the other hand, we should take into account that it is difficult in studies where the subjects are children, to identify how much time of care was provided due the illness and how much time was provided due to the development of the child. In this sense, we included questions aimed to estimate the informal care time with a specific statement that highlighted that the time provided should be referred only due to the illness.

Among rare diseases, SMA is one of which receives attention from the health authorities and society as a whole. Firstly, because of its social consequences worldwide, and secondly, because of its incidence, prevalence and its consequences in terms of loss of quality of life, mortality and morbidity. In fact, the estimated cost of SMA turns out to be higher than the social costs (i.e. informal care costs) of other rare diseases as ataxia (€18,776, base year 2004) [23] and similar to fragile X syndrome (€31,008, base year 2012) [24], amyotrophic lateral sclerosis (€36,194) [25] and Duchenne muscular dystrophy (€36,970, base year 2012) [26].

In brief, the economic assessment of the informal caregiving time provided due to SMA disease reached figures higher than the 70% of the total costs. It means that the majority of resources needed by SMA patients seem to come from outside the healthcare system. Even though some authors have assessed how the activities provided by informal caregivers affects their wellbeing [27–29] or their job promotion in the workplace [30], there is still a lack of evidence in the field of SMA disease. Consequently, further researches focused on identifying the effects of care on the health, labor status or socio-familiar dimension of informal caregiver are needed. This information would help decision makers to comprise the vast effect of this disease in the society, beyond the consequence on patients or the healthcare system. For instance, the inclusion of public health strategies focused on respite services may mitigate the aftermath of this illness beyond the patients [31, 32], even in other caregiving population [33]. Furthermore, economic aids for low-incomes households would also help the families where, apart for the health-related problems or the work-related problems suffered from the main informal caregiver, it emerges economic-related problems due to the required expensive health material. In fact, the costs of medical material or out-of-pocket expenditure (such as medical material or house adaptation) that families have to do may increase the cost of this illness beyond the health care resources needed [34]. Thus, therapeutic agents for SMA treatment have been approved for clinical use or are in ongoing clinical trials. An antisense oligonucleotide that affects splicing of the pre-mRNA from SMN2 gene (nusinersen-Spinraza)® was approved by FDA in December 2016 and by EMA in June 2017 [35]. A self-complementary adeno associated virus serotype 9 (AAV9) SMN1 gene therapy (Onasemnogene Abeparvovec, ZolgenSMA®) was approved recently in May this year 2019. New disease trajectories and evolving phenotypes are observed with these treatments [36]. High cost of these treatments raises concerns about access and equity that should also be considered in the global burden of the disease and evaluation of these treatments.

Conclusion

SMA produces considerable societal costs in France, Germany and UK, because its relevant economic impact and the deterioration in the HRQOL, not only of the patients but also of their caregivers. For this reason, when designing and evaluation any strategy or intervention for this population, the economic impact should be considered, as well as for the economic evaluation of new treatments in this field.

Declarations

- Ethics approval and consent to participate

NA

- Consent for publication

NA

- Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due [REASON WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.

- Competing interest

NA

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- Authors' contributions

JP and JO design the study. LP carried out the analysis and wrote a first draft of the manuscript. All authors contributed the final version of the manuscript

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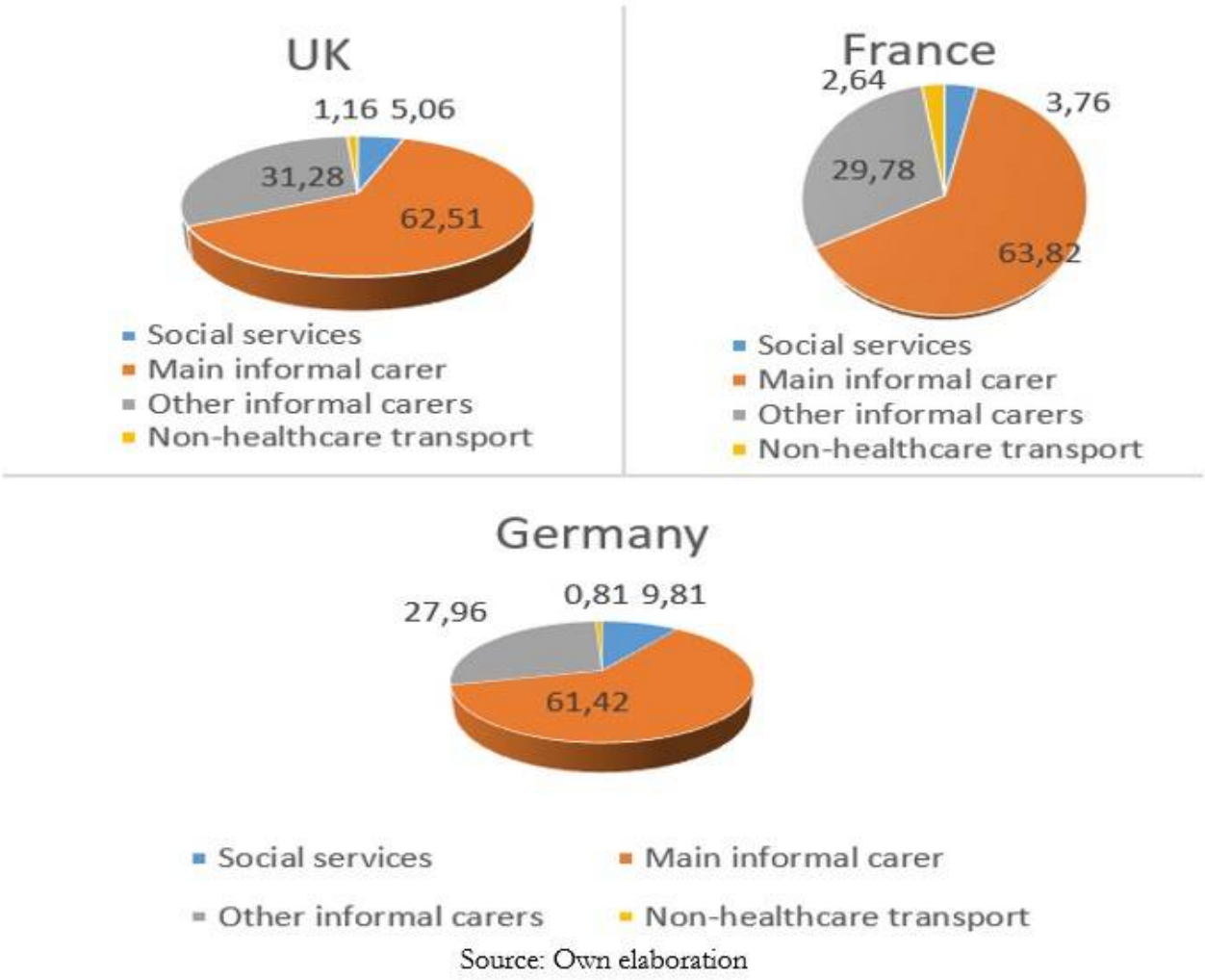
Figures



Source: Own elaboration

Figure 1

Weight of non-health care resources over the total costs by country