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Dependency and Elderly Care: The Cost of Long Term Care System in the Context of the SDGs

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Dependency and Elderly Care: The Cost of Long Term Care System in the Context of the SDGs

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Abstract: The rapid ageing of populations around the World is creating complex challenges for national governments. The establishment of sustainable and equitable long-term care systems for old and dependent people is one of the main issues of social policy in developed countries. The aim of this work is to define a cost model for residential and day care centres for dependent persons in Cantabria (Spain). The cost model will make it possible to establish the theoretical cost of attending to the needs of the different types of dependent persons in the different types of care centres, and the methodology used could be extrapolated to other regions. The daily cost per user for elderly residential care is €53.72. The cost per user in elderly day centres (5 days) is 32.56 euros. In residential centres for people with disabilities, the values range between €47.41 and €75.25 depending on the category of the centre. In three categories of centres the public price is not enough to cover the cost (physical disability, intellectual disability, mental illness – low care), and therefore the administration should reconsider their public prices for these kind of centres if they want to really contribute to the sustainability of these residential care centres. This research will have important implications for policy-makers in a context of fulfilment of SDGs and where better support for old and disabled people and their carers, as well as fair and efficient financing of social care services, are essential to address the current and future challenges of dependency.

Keywords: dependency; elderly; long term care; costs; Sustainable Development Goals; public policies; human rights

1. Introduction

The 17 Sustainable Development Goals (SDGs) developed by the United Nations in 2015 provide 169 targets that the World must meet by 2030 in order to ensure wellbeing and prosperity for each person living with dignity and security in society. By committing to erasing inequalities, these SDGs are closely linked to human rights. Around the globe, older people are among the most vulnerable to marginalization, poor health, poverty, and income insecurity (Cox, 2019).

For decades, Europe in general and Spain in particular have been undergoing a major demographic change, characterised by an ageing population, a reduction in the birth rate and the internationalisation of the population through migratory processes.

The rapid ageing of populations around the World is creating complex challenges for national governments. Although people are living longer, it is not clear if these extra years are experienced in good health (Pot et al. 2018). Addressing the needs of these older populations in a sustainable and equitable way, will be a fundamental pillar of socioeconomic development in the 21st Century.

In this context, the establishment of sustainable and equitable long-term care systems for old and dependent people and the promotion of their personal autonomy is one of the main issues of social policy in developed countries.

The World Health Organization (WHO) defines long-term care as "the activities undertaken by others to ensure that people with, or at risk of, a significant ongoing loss of intrinsic capacity can maintain a level of functional ability consistent with their basic rights, fundamental freedoms and human dignity". The share of population aged 80 years and over is expected to rise in OECD countries from 4% in 2010 to 10% in 2050. Expenditure on long-term care for the elderly is expected to increase from on average 1.5% of GDP in 2010 to more than 3% of GDP in 2050 (Colombo et al. 2011).

In most OECD countries, the government has to manage tension between growth in the need for long-term care (LTC) services for older people and significant public budget constraints.

Ageing populations have forced national governments to control growing long-term care (LTC) public expenditure. This has resulted in an increasing centrality of cost-containment policies (Gori and Luppi, 2022).

Cost-containment policies cluster in two areas according to their focus: demand-side policies, which reduce the actual chances of receiving LTC services and/or make them more expensive for users; and supply- side ones, which modify the provision of services. Knowing the costs of dependency care will help to determine policies for the control of public budgets. A comparison of the costs of residential care and home care shows that the former is more expensive for society. However, elderly people seem to be happier in residential care (Kok et. al, 2015).

In Spain, the number of dependent people in June 2023 was 1,547,544, an increase of 18.6% over 2018 (IMSERSO, 2023). This rise presents major challenges to families, formal care services, and to public and private budgets. Understanding the economic consequences of such a prevalent condition is essential to engaging the public and encouraging policymakers to invest in appropriate treatment, care and support.

In Spain, the Act 39/2006 of 14th December was passed to create a new System for Promotion of Personal Autonomy and Assistance for Persons in Situation of Dependency. This Dependency Act granted universal entitlement to social services with eligibility set on the basis of degree of dependency (Peña-Longobardo et al. 2016).

The Spanish care system was developed during the economic boom in 2006 but implemented during the bust years. According to Spijker and Zueras (2020) this fact may have consolidated informal care through the economic compensation of mainly family carers. However, the increase in combined formal and informal care could be because of preferences of potential family caregivers or due to a lack of alternatives because of the cost of formal care.

Therefore, without knowledge of all the costs involved in long term care activities, it will not be possible to establish policies that guarantee the sustainability of the system. Previous studies have shown different results in relation to the quantification of costs, depending on the variables included in the quantification, the type of service analysed (mostly residential) and even the geographical area where the study was carried out.

In 2021, two major milestones took place in the field of the dependency care sector in Cantabria (a region in the North of Spain), which up to that time questioned whether public prices could cover the costs of the service. On the one hand, the publication of Order EPS/6/2021, of March 26, regulating the material and functional requirements of the specialized social services centres and the accreditation requirements of the dependency care centres in the Autonomous Community of Cantabria, which, among other issues, regulates the ratios of professionals that the centres must have. On the other hand, the publication of Order EPS/16/2021, of May 27, which sets the public prices of the services of the Cantabrian Institute of Social Services for the care of dependent people.

In this context, there is a need to analyse the real costs of residential and day care centres for dependent persons in Cantabria, in order to define policies for the sustainability of long- term care, taking into account all the costs necessary for the exercise of the activity.

Despite the important role played by cost considerations in policy decisions regarding services for the elderly and dependency there has been relatively little reliable research on this topic. Moreover, although social investment has recently received much attention among policy-makers and welfare state scholars, the existing literature remains focused on policy-making on the macro level (Garritzmann et al., 2018). However, more research focus on the micro level is needed.

Therefore, the aim of this work will be to define a cost model for residential and day care centres for dependent persons in the geographical area of the Autonomous Community of Cantabria, which will allow the definition of policies and which will take into account all the costs necessary for the exercise of the activity. The cost model will make it possible to establish the theoretical cost of attending to the needs of the different types of dependent persons in the different types of care centres, and the methodology used could be extrapolated to other regions.

During the collection and subsequent analysis of the information required to carry out the study, it has been possible to draw an initial conclusion that should be pointed out in order to highlight the complexity of the sector and to demonstrate the need to professionalise the management of these centres: the long-term care companies constitute a complex and diverse sector, where information on their operation and costs is sometimes difficult to obtain, and sometimes, the data obtained do not seem to correspond to reality.

In this context, the development of a single cost model for all long-term care companies is complicated, since each company has its own particularities that would lead to the development of an individual cost model for each centre. However, this would not make it possible to have a reference with which to establish policies and concerted actions for dependency and elderly care, and there is a need to establish standards, as far as possible, for quantifying the human and material resources used in the development of the activity.

This research will have important implications for policy-makers in a context of fulfilment of SDGs and where better support for old and disabled people and their carers, as well as fair and efficient financing of social care services, are essential to address the current and future challenges of dependency.

2. Materials and Methods

2.1. Sample

The sample under study is made up of the universe of care centres for dependent persons in the region of Cantabria (including both care for the elderly and care for dependent persons). Specifically, the sample under study is made up of 167 centres with 9,618 authorised places, of which 60.7% are in homes for the elderly and 13.3% in day centres for the elderly, so that almost 74% of the places are linked to elderly people.

In order to estimate the cost of long-term care, three sources of information were analysed:

- Previous research studies developed in Spain about cost models in care centres for dependent persons (BIC Galicia, 2008; Deloitte, 2006; CEIN, 2003; Montserrat, 2005; Guillén, 2007; Granell et al, 2018; De Prada and Borges, 2015; KPMG, 2015; Tortosa et al., 2015; BIC Galicia, 2012; Fernández-Moreno et al., 2011; Dizy et al., 2009, among others).
- The quantitative information collected through a questionnaire to those responsible for the centres, which allows for the establishment of a real primary source of information on which to support the cost model. Data collection was carried out during the third quarter of 2021 , with a total of 68 responses and a response rate of 40.7%. The sampling error for a confidence level of 95% is 9.18% taking into account the number of centres and 1.17% if the number of authorised places is considered. Since the study sample includes the largest dependency care centres in the region, the results obtained have a broad representativeness.
- Current regulations on the promotion of personal autonomy and care for dependent persons.

2.2. Methodology

To estimate the cost of dependency and elderly care, the following steps have been followed:

- Analysis of the answers given in the questionnaire by the responsible of each centre about the costs they support for each person attended.

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- 13 variables have been identified to construct a cost model for each kind of centre. 16 categories of residential and day care centres were considered according to the classification stablished in the Cantabria´s regulation.
- Definition of hypotheses to calculate the value of each variable and verification of the coherence of the hypotheses using previous literature and different sources of information.
- Calculation of the cost for each kind of centre and comparison with the public price offered by the regional government to these centres.

2.3. Variables

Table 1 summarises the variables included in the cost model, the details of which are explained in the following sections.

Table 1. Summary of variables included in the cost model.

Cost	Variables	Source used
Depreciation of buildings and equipment	Residential centres: • Initial investment in buildings and equipment = 69.761,62 €/user • Size = 47.35 m² / user Day centres • Size = 7 m² / user • Initial investment in building and equipment = 14.8%*initial investment in residential centres Amortization period 35 years - Buildings 5 years - IT equipment 10 years - other equipment	• Questionnaire to the responsible of the centres • Interviews with operators in the sector • Review of previous literature • Order EPS/6/2021
Staff cost	Staff costs = Annual basic salary stipulated in the collective agreement according to professional category + possible night, Sunday and public holiday bonuses + 32.5% of social security + additional staff costs of 11.04%.	• Questionnaire to the responsible of the centres • Review of previous literature • Order EPS/6/2021 • Collective agreements and salary tables applicable to the sector (the 15th General Collective Agreement for Centres and Services for the Care of Persons with Disabilities and the 7th State Framework Collective Agreement for Services for the Care of Dependent Persons and Development of the Promotion of Personal Autonomy).

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Other operating costs	Feeding Supplies (electricity, gas, water, telecommunications) Materials (office supplies, sanitary consumables, textiles...) Insurance Maintenance and repairs Cleaning Security Administration and management Other costs (banking services, data protection, etc.)	• Questionnaire to the responsible of the centres
Safety margin	% of total operational cost	• Questionnaire to the responsible of the centres • Review of previous literature
Financing costs	(% of long-term external financing * Cost of long-term external financing * Start-up Investment + % of other sources of funding * Cost of other sources of funding * Start-up Investment)/365	• Questionnaire to the responsible of the centres • Review of previous literature

3. Results

3.1. Initial Investment: Land and Building Costs Per User

The investment required for the start-up of a long-term care centre is high, mainly because of the building costs (new construction or refurbishment of an existing one). This cost must be taken into account when calculating the cost per place in the centre, as this initial investment will deteriorate and be amortised over time.

The information on the investment for the start-up of long-term care centres (including construction and equipment) in Cantabria varies from one centre to another. In fact, on a national level, the existing information on the volume of such investment also differs from one study to another, varying between 36,000 euros/place excluding land and 75,000 euros/place. Thus, the following references are available:

- European Business and Innovation Centre of Navarra (2003): 36,000-60,000 euros/user (excluding land).
- Magariño (2006): 48,000-75,000 euros/user.
- Deloitte (2006): 56,199 euros/user (excluding land).
- KPMG (2015): 40,000 euros/user
- PlantaDoce (2019): 65,000 euros/user (excluding land)
- Experts in the sector in Cantabria through personal interview in 2021: 50,000-60,000 euros/user.

In Cantabria, the analysis of the 68 centres that provided information allows us to draw a series of conclusions in relation to residential centres, without there being significant differences when distinguishing between centres for the elderly and centres for the disabled:

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- The average investment per user, both in land and building and all the equipment necessary for start-up, amounts to 69,761.62 euros/place in residential centres (48,373.33 euros/place excluding land). This value is in the range of values of the average investment per place in previous studies.
- Investment in buildings, land and infrastructure represents 78.2% of the total (68.6% if the investment in land is not considered because it is not depreciable).
- Investment in other equipment (furniture, vehicles, IT equipment, etc.) represents 21.8% of the total (31.4% if land investment is not considered).

Table 2. Structure of the initial investment of Cantabria's long-term care centres. Average investment per place at the start of the activity according to the answers provided in the questionnaires.

	Residential Centres		
	Considering Investment in Land		**Excluding Investment in Land**
	Mean value	**%**	**%**
Land	21,388.29	30.7%	
Buildings (acquisition or refurbishment)	24,564.74	35.2%	50.8%
Infrastructure	8,614.86	12.3%	17.8%
Furniture	6,550.28	9.4%	13.5%
Transport vehicles	1,616.28	2.3%	3.3%
Computer equipment	1,638.75	2.3%	3.4%
Physical rehabilitation equipment	215.84	0.3%	0.4%
Cognitive rehabilitation equipment	139.1	0.2%	0.3%
Other	5,033.48	7.2%	10.4%
TOTAL	**69,761.62**	**100.0%**	**100.0%**

In relation to the investment in day centres, the great variability in the responses to the questionnaire made it necessary to establish a theoretical cost based on the following hypotheses:

- The average value of floor area per residential care user in Cantabria is 47.35 m2, according to the responses to the questionnaire. This value corresponds to that observed on average in previous studies, in which the size of residential centres per user ranges between 40 m2 and 73 m2 (Montserrat, 2005; Deloitte, 2006; Tortosa et al., 2015 and Granell et al., 2018).
- The minimum useful surface area per authorised place in day centres, according to Order EPS/6/2021 is 7 m2.
- Therefore, the size per user in day care centres represents 14.8% of the residential place, which can be extrapolated to the investment. If the investment per user in a residential centre on average turned out to be 69,761.62 euros, the investment in a day centre should be 10,324.7 euros.

The initial investment is attributable to the cost per user in the centre through depreciation. The depreciation period considered for buildings is 35 years, for computer equipment 5 years and for other equipment 10 years (in accordance with the usual practice in the sector as indicated in the answers to the questionnaire).

In summary, the average cost linked to the amortisation of buildings and equipment in residential centres is 6.59 euros/place and in day centres 1.27 euros/place.

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3.2. Fixed and Variable Costs

The annual costs of the activity include the expenditure necessary to carry out the activity even if there are no customers. This concept includes both variable costs (those that depend on the volume of occupancy) and fixed costs (those that are independent of occupancy). The occupancy rate of the 68 centres analysed in Cantabria is 90.24%.

3.2.1. Staff Costs

In Cantabria, the centres surveyed provide information on the cost of staff per user with a high degree of variability. Therefore, the theoretical personnel cost that the centres should have is calculated taking into account the human resources and personnel organisation requirements established by Order EPS/6/2021 and the collective agreements and salary tables applicable to the sector (the 15th General Collective Agreement for Centres and Services for the Care of Persons with Disabilities and the 7th State Framework Collective Agreement for Services for the Care of Dependent Persons and Development of the Promotion of Personal Autonomy).

For the calculation of staff costs the following formula was used:

Staff costs = Annual basic salary stipulated in the collective agreement according to professional category + possible night, Sunday and public holiday bonuses + 32.5% of social security + additional personnel costs bonus of 11.04%.

The questionnaire asked for information about additional staff costs care centres have annually, and in particular about:

- Night bonus
- Public holiday bonus
- Experience/Seniority
- Specific training
- Prevention of occupational hazards
- Equality plans, improvement actions, etc.
- Replacements, departures, etc.
- Other

The percentage that the amount for all these items represents of the wage costs in the centres surveyed is on average 13.13% . If we exclude the amount for night work and public holidays (which is regulated in the collective agreement), the percentage drops to 11.04%.

Therefore, an increase of 11.04% in staff costs is hypothesised for additional costs derived from substitutions, seniority or risk prevention, among others.

The theoretical personnel cost according to Order EPS/6/2021 and the applicable collective agreement, as well as its comparison with the personnel cost revealed in the replies to the questionnaire, is shown in Table 3.

Table 3. Theoretical staff cost according to Order EPS/6/2021 and applicable collective agreement.

		Order EPS/6/2021				
		Staff per user ratio	**Staff costs per user and day (collective agreement)**	**Staff costs per user and day (+11.04%)**	**Staff Cost in the questionnaire**	**Variation Questionnaire vs. Order EPS/6/2021**
RESIDE	Elderly	0.46	26.36	29.27	34.57	18.1%
	Physical disability	0.60	39.3	43.64	37.83	-13.3%
	Intellectual disability	0.55	35.58	39.51	37.83	-4.2%

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	Mental illness – closed regime	0.69	45.06	50.03	37.83	-24.4%
	Mental illness – High care	0.67	43.6	48.41	37.83	-21.9%
	Mental illness – Low care	0.64	40.5	44.97	37.83	-15.9%
	Mental illness - Psychogeriatrics	0.66	44.5	49.41	37.83	-23.4%
	Basic attention - Physical disability	0.42	26.64	29.58	44.68	51.0%
	Basic attention – Intellectual disability	0.33	20.91	23.22	44.68	92.4%
	Basic attention – Mental illness	0.33	20.91	23.22	44.68	92.4%
DAY CARE	Elderly 7 days/week	0.32	19.11	21.22	33.78	59.2%
	Elderly 5 days/week	0.23	18.63	20.69	33.78	63.3%
	Physical disability	0.39	35.73	39.67	44.4	11.9%
	Intelectual Disability	0.35	32.76	36.38	44.4	22.1%
	Occupational	0.19	19.27	21.40	22.38	4.6%
	Psychosocial rehabilitation center	0.19	20.97	23.29	21.31	-8.5%

On average, staff costs are structured as follows: direct care 73.7%; administration 11.4% and general services (maintenance, cleaning, kitchen, etc.) 14.9%.

Staff costs per user and per day (Table 3) in elderly residential care centres amounts to €34.57 (according to the answers to the questionnaire) which is 18.1% above the €29.27 that would result from the application of the Order. In elderly day centres it is €33.78 (63.3% above the €20.69 that would result from the application of the Order in 5-day/week centres).These differences between what the responsible of the centres answer in the questionnaire and what the regulation says it should be led us to consider the results obtained when applying the regulation. These differences are also observed in care centers for disabled people, and the same criteria as for elderly was used.

3.2.2. Other Operating Costs

This section quantifies other operating costs of the centres, which are derived either from services provided directly by the centre or from outsourced services. All the values are obtained from the answers to the questionnaire given by the responsible of the centres and are contrasted with the evidence observed in previous studies that analyse the costs in dependency care centres. In all cases the values obtained for the region of Cantabria are in line with those observed in other studies carried out in other regions.

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Table 4. Other operating costs in residential and day care centres for old and disabled people.

	Residential centres €/user/day	**Day centres €/user/day**	**Evidence from other studies**
Feeding[1]	4.12	3.07	Similar to that observed in the Price Waterhouse Coopers (2010) and Díaz (2012) studies.
Supplies (electricity, gas, water, telecommunications)	1.95	1.29	Between €0.71 (BIC Galicia, 2012) and €2.33 (Granell et al., 2018).
Materials (office supplies, sanitary consumables, textiles...)	0.42	0.22	
Insurance	0.24	0.24	Between €0.19 (Fernandez -Moreno et al., 2011) and €0.30 (Price Waterhouse Coopers, 2010)
Maintenance and repairs	1.66	0.71	Between 0.66 € (BIC Galicia, 2012) and €1.09 (Granell et al., 2018).
Cleaning	1.89	0.61	Between €0.28 (Price Waterhouse Coopers, 2010) and €0.80 (Fernández-Moreno et al., 2011)
Security	0.15	0.09	
Administration and management	1.42	1.42	Below the cost observed in Granell et al. (2018) of €3.5 or in Tortosa et al. (2015) of €3.9.
Other costs (banking services, data protection, etc.)	1.43	0.88	

3.3. Profit Margin

According to the centres surveyed in Cantabria, the average profit margin is 4.19%, with a wide variability in the results, mainly in day centres. 22.06% of the centres report losses and 33.82% of the centres present profit margins of less than 5%.

[1] The feeding cost includes the cost of food, but not staff costs (which would be part of the staff cost variable).

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Table 5. Profit margin (in %) per user according to the type of centre and the type of user.

Type of centre	No. of centres	Mean	Standard deviation	Minimum	Maximum
Residences	28	2.18	6.26	-14.36	13.26
Day centres	36	5.75	13.03	-38	35
Total	64	4.19	10.69	-38	35
Type of user	**No. of centres**	**Mean**	**Standard deviation**	**Minimum**	**Maximum**
Elderly	31	6.49	7.15	-38	21.34
Disabled	33	2.04	12.94	-1.15	35
Total	64	4.19	10.69	-38	35

Table 6. Profit margin (percentage and number of centres).

	Percentage	No. of centres
Losses	22.06%	15
Less than 5%.	33.82%	23
Between 5 and 15%.	26.47%	18
More than 15%.	11.76%	8
Ns/Nc	5.88%	4
Total	100.0%	68

Losses are mainly concentrated in the smaller centres with less than 50 users. 13 out of the 15 centres reporting losses have fewer than 50 users.

Table 7. Profit margin by size of centre.

Size of the Centre	No. of centres	Mean	Standard deviation	Minimum	Maximum
Less than 50 users	43	3.29	12.32	-35	38
Between 50 and 100	12	6.55	7.50	-1.37	20
More than 100	9	5.36	3.42	0	11
Total	64	4.19	10.69	-38	35

According to previous studies, profit margins are around 8-12% (BIC Galicia, 2008) or 10-15% (BIC Galicia, 2012) depending on the type of centre.

Deloitte (2006), CEIN (2003) and Price Waterhouse Coopers (2010) establish a commercial margin in residential care centres of 7%. The particularity of these studies is that they only consider in their analysis centres for the elderly residential care, thus leaving out of the study centres for the disabled or day care centres, which will be taken into account in this research. Also referring to residential care centres, the studies done by Fernández-Moreno et al. (2011) and KPMG (2015) observe higher profit margin values, 7.5% and 8.4% respectively.

In contrast to previous studies, Granell et al. (2018) consider that the profit margin should not be part of the cost in any type of centre. However, they recognise that centres need to have a safety margin that allows them to face unexpected needs in their financial and cash management, and

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although there is no consensus about the size of this safety margin, a recent study has set it at around 5% (KPMG, LARES Andalucia, 2010).

According to the above information, a safety margin of 4.17% of the total cost, which is the average value of the profit margin observed in Cantabria, will be considered as a safety margin for the care centres when calculating the cost model.

3.4. Financing

On average 60% of financing comes from self-financing, 20% from long-term external financing (loans from banks or similar institutions) and 19% from other sources of financing (mainly credit accounts and factoring).

Table 8. Sources of financing of the dependent care centres in Cantabria.

	Financing structure	Average cost (%)	Standard deviation (%)	Minimum (%)	Maximum (%)
Self-financing	60.5%				
Long-term external financing	20.1%	2.42	2.12	0.18	8
Other sources of funding	19.4%	0.74	1.08	0	2.78

The average cost of long-term borrowing is 2.42%, while the cost of other sources of financing is 0.74%.

This cost of financing is in line with the evolution of interest rates published by the Bank of Spain in relation to mortgage loans (which in the period 2014-2019 presented an average value of 2.23%).

Evidence shows that financial costs represent a small percentage of the total cost in previous studies. Granell et al. (2018) consider a daily cost per user of €0.14 (representing 0.3% of total costs). BIC Galicia (2012) considers a financial cost of €0.93/user/day in mini-residences with 50 places and €0.58 in residences with 100 places.

In any case, it seems necessary to consider the explicit costs of financing the investment necessary for the start-up of the centre (already defined above) taking into account the structure of such financing.

In particular, the following financing costs are established:

– Residential centres:

(20.1% * 2.42% * €69,761.62 + 19.4% * 0.74% * €69,761.62) / 365 = 1.2 euros/user/day

– Day centres:

(20.1% * 2.42% * €10,324.7 + 19.4% * 0.74% * €10,324.7) / 365 = 0.18 euros/user/day

3.5. Results of the estimation of the cost model

Having defined the variables that form part of the cost model and the information on which they are based, we summarise their values in Table 9.

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Table 9. Summary of variables and assumptions for calculating the cost model (values expressed in €/user/day unless otherwise stated).

	Staff cost (residential/day care) agreement in 2021		
	+ Other staff costs (11.04% * staff cost (residential/day care) agreement)		
A	**= Total staff costs**		
	Other operating costs (value as at 2019)		
		Residential Centre	Day Centre
	Depreciation on buildings and equipment	6.59	1.27
	Feeding	4.12	3.07
	Supplies	1.95	1.29
	Materials	0.42	0.22
	Insurance	0.24	0.24
	Maintenance	1.66	0.71
	Cleaning	1.89	0.61
	Security	0.15	0.09
	Administration and management	1.42	1.42
	Other costs	1.43	0.88
B	**Total other operating costs**	**19.87**	**9.8**
	Cost of financing	1.20	0.18
C	**Total other operating and financial costs**	**21.07**	**9.98**
	Value converter from 2019 to 2021 (6% increase[2])		
D	6% * Total other operating and financial costs		
	Margin (4.19% on total operating cost to 2021)		
E	4.19%* (Total staff costs + Other operating costs)		
	Total costs		
	A + C + D + E		

The results of the application of the above assumptions to the calculation of costs in elderly and disabled people care centres are shown in Table 10.

The cost analysis has been carried out considering the staff cost that the centres should assume in accordance with the staffing requirements established in Order EPS 6/2021 for each type of centre, which makes it possible to distinguish between 15 categories of centres. Once the personnel cost has been calculated, the rest of the operating costs are added, as well as the financing costs and the safety margin to calculate the total cost per user and day.

In the case of day centres for people with disabilities, the cost of feeding is not included in the cost of the centres, as the current regulations do not require feeding services in these centres, so this concept cannot be included in the calculation of the cost. If any centre provides this service, the user pays the cost in full.

[2] This increase considers the evolution of inflation in Spain between 2019 and 2021.

Table 10. Cost per user and day (with staff costs based on EPS Order 6/2021).

		Staff ratio	Staff costs per user and day (collective agreement)	Staff costs per user and day (+11.04%)	Other costs 2019	Other costs 2021	Safety margin 4.19%	Total costs 2021	Public Price	Deficit or surplus (Public price-Total costs)	Staff costs/Total costs
RESIDENTIAL CARE	Elderly	0.46	26.36	29.27	21.07	22.33	2.11	**53.72**	57.46	3.75	54.5%
	Physical disability	0.6	39.3	43.64	21.07	22.33	2.71	**68.69**	68.44	-0.24	63.5%
	Intellectual disability	0.55	35.58	39.51	21.07	22.33	2.54	**64.38**	62.51	-1.87	61.4%
	Mental illness – closed regime	0.69	45.06	50.03	21.07	22.33	2.98	**75.35**	132.17	56.82	66.4%
	Mental illness – High care	0.67	43.6	48.41	21.07	22.33	2.91	**73.66**	75.96	2.30	65.7%
	Mental illness – Low care	0.64	40.5	44.97	21.07	22.33	2.77	**70.08**	66.07	-4.01	64.2%
	Mental illness - Psychogeriatrics	0.66	44.5	49.41	21.07	22.33	2.96	**74.70**	77.17	2.47	66.1%
	Basic attention -Physical disability	0.42	26.64	29.58	21.07	22.33	2.12	**54.04**	62.63	8.58	54.7%
	Basic attention – Intellectual disability	0.33	20.91	23.22	21.07	22.33	1.86	**47.41**	50.67	3.26	49.0%
	Basic attention – Mental illness	0.33	20.91	23.22	21.07	22.33	1.86	**47.41**	50.67	3.26	49.0%
DAY CARE	Elderly 7 days/week	0.32	19.11	21.22	9.98	10.58	1.32	**33.11**	37.97	4.86	64.1%
	Elderly 5 days/week	0.23	18.63	20.69	9.98	10.58	1.29	**32.56**	37.97	5.41	63.5%
	Physical disability	0.39	35.73	39.67	6.91	7.32	1.95	**48.95**	65.76	16.81	81.0%
	Intelectual Disability	0.35	32.76	36.38	6.91	7.32	1.81	**45.52**	52.70	7.19	79.9%
	Occupational	0.19	19.27	21.40	6.91	7.32	1.19	**29.91**	32.45	2.54	71.5%
	Psychosocial rehabilitation center	0.19	20.97	23.29	6.91	7.32	1.27	**31.88**	32.45	0.58	73.0%

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4. Discussion and Conclusions

The daily cost per user for elderly residential care is €53.72 (€3.75 below the price paid by the administration - public price).

The result obtained for Cantabria is in the range observed in previous studies, between 28.02 and 70.89 euros per user and per day. Guillén (2007) estimates an average cost of 53 euros per day, similar to the results obtained in Granell et al. (2018) who estimated a daily cost of €54.75 and Tortosa et al. (2015) who calculated a cost of €56.39. Montserrat (2005), which analyses 8 residences, establishes costs ranging from 28.02 euros/user/day for one centre to 61.63 euros/user/day for another, establishing an average value of around 46.66 euros. Imserso (2020) obtained a cost of 62.34 euros per day and the highest cost is obtained by Fernández-Moreno et al. (2011) achieving 70.89 euros.

The cost per user in elderly day centres (5 days) is 32.56 euros, which is lower than the value obtained by Granell et al. (2018) of 41.86 euros (excluding transport) and is €5.41 below the public price.

In residential centres for people with disabilities, the values range between €47.41 and €75.25 depending on the category of the centre. It should be highlighted that in three categories of centres the public price is no enough to cover the cost (physical disability, intellectual disability, mental illness – low care), and therefore the administration should reconsider their public prices for these kind of centres if they want to really contribute to the sustainability of these residential care centres. However, the costs obtained for Cantabria (Spain) are lower than the average costs of mild, moderate and severe dementia found for the UK, which are £66.85, £75.06, and £126.16, respectively, per person per day (Wittenberg et al., 2019).

In day care centres for people with disabilities, the values range from €29.91 to €48.95 and in all the categories of centre the public price is enough to cover the costs.

The complexity and diversity within the long-term care sector highlights the need to collect information directly from the centres, so that the cost study can be adjusted to the reality of the sector despite the variability observed in the data provided.

The results have revealed a deficit between the public price and the costs assumed in some types of centres (in 3 out of the 15 types of centres analysed), such as residential care for physical disability, for intellectual disability and for mental illness – low care.

The price that the Government pays to residential and day care centres for elderly and disabled people will be key for the sustainability of long-term care and to cover the number of dependent people expected in Spain and, in particular, in Cantabria.

In addition, it has become clear that staff costs is the most important cost for care centres representing between 49% and 81% of total costs depending on the category of the centre.

In any case, the results of the cost model proposed in this study should not be considered as static and unique, as its value will depend, among other factors, on the evolution of the inflation and the staffing ratios required in the sector at any given time, which would lead to recalculate the values.

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