

# Functional, Sensorial, Mobility and Communication Difficulties in the Portuguese Oldest Old (80+)

## Dificuldades Funcionais, Sensoriais, de Mobilidade e de Comunicação nos Muito Idosos (80+) Portugueses



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### ABSTRACT

**Introduction:** The ageing of populations is evident in most developed countries, and the oldest old group is one of the segments with the fastest growing. The aim of this paper is to examine sociodemographic and health related characteristics of the portuguese oldest old, using a census-based approach.

**Material and Methods:** A descriptive study considering all residents aged 80 years and older at the time of the 2011 Census (n = 532 219) was conducted. Information on sociodemographic characteristics, sensory functions (seeing, hearing), functional status (walking/climbing stairs, bathing/dressing alone), cognition (memory/concentration), and communication (understanding others/being understood) as assessed by the Portuguese census official questionnaires were analyzed.

**Results:** Findings revealed that most of the oldest old are women (64.5%), widowed (53.9%), illiterate (46.1%) and live in private households (88.8%). Walking/climbing stairs (57.1%), vision (39.1%) and hearing (35.1%) were the dimensions where the oldest old presented major constraints. In parallel, understanding others/being understood (25.9%) and memory/concentration (34.4%) were the dimensions with lower percentages of difficulties. Significant differences were found between octogenarians/nonagenarians and centenarians for vision, walk/climb stairs, and bathing/dressing alone, with centenarians presenting a higher percentage of difficulties.

**Discussion:** Portuguese oldest old showed significant difficulties in activities of daily living, nevertheless cognitive and communication capacities seem to be commonly maintained. Taken together, these findings suggest the need for functional assistance, which can be ultimately managed by the older person him/herself.

**Conclusion:** Based on the observed differences between centenarians and younger oldest old, specific interventions should be equated to better respond to their potentially distinctive needs.

**Keywords:** Activities of Daily Living; Aged, 80 and over; Censuses; Demography; Disability Evaluation; Frail Elderly; Portugal

### RESUMO

**Introdução:** O envelhecimento da população é evidente na maioria dos países desenvolvidos, e o grupo dos muito idosos é um dos segmentos da população com mais rápido crescimento. O objetivo deste estudo é analisar as características sociodemográficas e de saúde dos muito idosos portugueses, usando uma abordagem baseada nos dados dos censos populacionais.

**Material e Métodos:** Foi conduzido um estudo descritivo considerando todos os residentes com 80 ou mais anos à data dos Censos 2011 (n = 532 219). Os dados dos questionários dos Censos acerca das características sociodemográficas, funções sensoriais (visão, audição), estado funcional (andar/subir degraus, tomar banho/vestir-se sozinho), cognição (memória/concentração) e comunicação (compreender os outros/fazer-se entender) foram analisados.

**Resultados:** Os resultados revelaram que a maioria dos muito idosos são mulheres (64,5%), viúvos (53,9%), analfabetos (46,1%) e vivem em contexto domiciliar (88,8%). Andar/subir degraus (57,1%), visão (39,1%) e audição (35,1%) foram as dimensões onde os muito idosos apresentavam maiores constrangimentos. Em paralelo, compreender os outros/fazer-se entender (25,9%) e memória/concentração (34,4%) foram as dimensões com percentagens mais baixas de dificuldade. Foram encontradas diferenças significativas entre a população octogenária/nonagenária e a população centenária para a visão, andar/subir escadas, e tomar banho/vestir-se sozinho, com os centenários a apresentarem uma maior percentagem de dificuldade.

**Discussão:** Os muito idosos portugueses apresentam dificuldades significativas nas atividades de vida diária, contudo, as capacidades cognitivas e de comunicação parecem ser comumente mantidas. Em conjunto, estes resultados sugerem a necessidade de assistência funcional, mas que pode ser, em última instância, gerida pelo próprio idoso.

**Conclusão:** Considerando as diferenças observadas entre os centenários e os idosos mais jovens, devem ser equacionadas intervenções capazes de responder às necessidades potencialmente específicas de cada grupo.

**Palavras-chave:** Atividades da Vida Diária; Avaliação da Deficiência; Censo; Demografia; Idoso, 80 anos e mais; Idoso Fragilizado; Portugal

### INTRODUCTION

The number of individuals reaching advanced ages is rising rapidly worldwide, and the 80+ age group is one of the segments with a fastest growing.<sup>1</sup> A recent report of the United Nations refers that among those aged 60 or over worldwide, 14% were aged 80 or over in 2015, and this percentage is expected to grow to 21% in 2050.<sup>2</sup>

In Portugal, individuals aged 80 and plus represent

5.6% of the total 10 562 178 population and 26.5% of the older population (2 010 064), i.e., slightly above a quarter of those aged 65 and over in 2011.<sup>3</sup> The number of oldest old suffered a great increase over the last decades, and according to the most recent projections life expectancy is expected to continue to increase, and in 2060 it will be 84.21 years for men and 89.88 years for women.<sup>4</sup> Life expectancy

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at age 80 also suffered a positive tendency: in 1980-1985 it was 6.5 years, currently it is projected to rise to 11.5 years in 2045 - 2050, according to a report of the United Nations on the profiles of ageing.<sup>5</sup>

These improvements on life expectancy are one of the findings that best reflect the positive change in health indicators that have occurred over last decades in Portugal. Nonetheless, this trend has not been accompanied by clear policy measures that consider the needs of the elderly population.<sup>6</sup>

Although the achievement of increased longevity is a result of improvements in health and medical care services, those with very advanced ages are likely to have more frailty conditions and disabilities, requiring more medical services and social support.<sup>7</sup> The World Health Organization defines disability as “an umbrella term, covering impairments, activity limitations, and participation restrictions” in one or more functional areas (e.g. cognitive, sensorial), which are commonly associated with morbidity and dependence.<sup>8-10</sup>

Findings from 2014 regarding the Active Ageing Index which measures the extent to which older people can realize their full potential in terms of employment, participation in social and cultural life and independent living) revealed that Portugal appears in the 16<sup>th</sup> place on the ranking of EU 28 countries in the overall domain, but only in the 21<sup>st</sup> place in the independent living domain,<sup>5</sup> reinforcing the great need of some source of support in this population.

The number of older people facing disability is expected to increase in the coming years. Main reasons are due to the growing number of older persons, and also the growing number of individuals achieving extremely long lives (i.e. centenarians). Some studies that compare different age groups among the oldest old have found a higher number of physical difficulties and chronic conditions in centenarians when compared to octogenarians.<sup>11-13</sup> In addition, age seems to predict a higher usage of care services, and the increase in the number of extremely long-lived individuals is expected to raise the burden on caregiving and long-term care services.<sup>14</sup> Nevertheless, in the aging research, attention to the oldest old population is still scarce, and some of the available findings contradictory.<sup>15</sup>

The aim of this study is to provide a profile of the sociodemographic characteristics and self-reported disabilities in sensorial, functional, and cognitive and communication domains of the Portuguese oldest old. Knowledge about this increasingly expressive group is important in order to establish adequate prevention programs, and implement effective interventions to deal with adverse outcomes commonly associated with very old age.

## MATERIAL AND METHODS

Information was obtained using data from the 2011 Portuguese National Census provided by National Statistical Institute of Portugal (INE), of all persons resident in Portugal with 80 or more years at the moment of census data collection.

**Table 1** - Sociodemographic characteristics of the Portuguese 2011 Census

Sociodemographic characteristics	
Gender	
Female	
Male	
Marital status	
Widowed	
Married	
Single	
Divorced	
Common law marriage	
Separated	
Education (yrs completed)	
Illiterate	
4 years	
6 years	
9 years	
12 years	
Higher education	
Residence	
Community	
Institution	
Persons living alone (community)	
Place of birth	
Other municipality than that where resides actually	
Same parish	
Same municipality, but other parish	
Other country	
Income source	
Pension	
Family support	
Properties or business	
Social support	
Work	
Other	
Religion	
Catholic	
Without religion	
Other	
Do not answer	
Nationality	
Portuguese	
Foreign	
Dual nationality	

sample of oldest old

Total n = 532 219		80 - 99 yrs n = 530 693		100+ yrs n = 1526		p
n	% (IC 95%)	n	% (IC 95%)	n	% (IC 95%)	
343 491	64.5 (64.37% to 64.63%)	342 238	64.5 (64.37% to 64.63%)	1253	82.1 (80.18% to 84.02%)	< 0.001
188 728	35.5 (35.37% to 35.63%)	188 455	35.5 (35.37% to 35.63%)	273	17.9 (15.98% to 19.82%)	
287 032	53.9 (53.77% to 54.03%)	285 781	53.9 (53.77% to 54.03%)	1251	82.0 (80.07% to 83.93%)	0.013
193 654	36.4 (36.27% to 36.53%)	193 568	36.5 (36.37% to 36.63%)	86	5.6 (4.45% to 6.75%)	
39 360	7.4 (7.33% to 7.47%)	39 188	7.4 (7.33% to 7.47%)	172	11.3 (9.71% to 12.89%)	
10 146	1.9 (1.86% to 1.94%)	10 130	1.9 (1.86% to 1.94%)	16	1.0 (0.5% to 1.5%)	
4685	0.9 (0.87% to 0.93%)	4676	0.9 (0.87% to 0.93%)	9	0.6 (0.21% to 0.99%)	
2027	0.4 (0.38% to 0.42%)	2026	0.4 (0.38% to 0.42%)	1	0.07 (-0.06% to 0.2%)	
245 506	46.1 (45.97% to 46.23%)	244 566	46.1 (45.97% to 46.23%)	940	61.6 (59.16% to 64.04%)	0.009
223 185	41.9 (41.77% to 42.03%)	222 749	42.0 (41.87% to 42.13%)	436	28.6 (26.33% to 30.87%)	
14 124	2.6 (2.56% to 2.64%)	14 082	2.7 (2.66% to 2.74%)	42	2.8 (1.97% to 3.63%)	
18 115	3.4 (3.35% to 3.45%)	18 066	3.4 (3.35% to 3.45%)	49	3.2 (2.32% to 4.08%)	
14 817	2.8 (2.76% to 2.84%)	14 787	2.8 (2.76% to 2.84%)	30	1.9 (1.22% to 2.58%)	
16 475	3.1 (3.05% to 3.15%)	16 446	3.0 (2.95% to 3.05%)	29	1.9 (1.22% to 2.58%)	
472 649	88.8 (88.72% to 88.88%)	471 565	88.9 (88.82% to 88.98%)	1084	71.0 (68.72% to 73.28%)	0.227
59 570	11.2 (11.12% to 11.28%)	59 128	11.1 (11.02% to 11.18%)	442	29.0 (26.72% to 31.28%)	
142 153	30.7 (30.58% to 30.82%)	141 936	26.8 (26.68% to 26.92%)	217	14.2 (12.45% to 15.95%)	
192 492	36.2 (36.07% to 36.33%)	191 883	36.2 (36.07% to 36.33%)	609	39.9 (37.44% to 42.36%)	0.003
229 998	43.2 (43.07% to 43.33%)	229 425	43.2 (43.07% to 43.33%)	573	37.5 (35.07% to 39.93%)	
98 083	18.4 (18.3% to 18.5%)	97 785	18.4 (18.3% to 18.5%)	298	19.5 (17.51% to 21.49%)	
13 172	2.5 (2.46% to 2.54%)	13 126	2.5 (2.46% to 2.54%)	46	3.1 (2.23% to 3.97%)	
512 620	96.3 (96.25% to 96.35%)	511 176	96.3 (96.25% to 96.35%)	1444	94.6 (93.47% to 95.73%)	0.265
9018	1.7 (1.67% to 1.73%)	8977	1.7 (1.67% to 1.73%)	41	2.7 (1.89% to 3.51%)	
3265	0.6 (0.58% to 0.62%)	3248	0.6 (0.58% to 0.62%)	17	1.1 (0.58% to 1.62%)	
1197	0.2 (0.19% to 0.21%)	1183	0.2 (0.19% to 0.21%)	14	0.9 (0.43% to 1.37%)	
2258	0.4 (0.38% to 0.42%)	2249	0.4 (0.38% to 0.42%)	9	0.6 (0.21% to 0.99%)	
3475	0.6 (0.58% to 0.62%)	3474	0.7 (0.68% to 0.72%)	1	0.07 (-0.06% to 0.2%)	
467 715	87.9 (87.81% to 87.99%)	466 399	87.9 (87.81% to 87.99%)	1316	86.2 (84.47% to 87.93%)	0.139
13 904	2.6 (2.56% to 2.64%)	13 880	2.6 (2.56% to 2.64%)	24	1.6 (0.97% to 2.23%)	
10 726	2.0 (1.96% to 2.04%)	10 701	2.0 (1.96% to 2.04%)	25	12.2 (10.56% to 13.84%)	
39 874	7.5 (7.53% to 7.67%)	39 713	7.5 (7.43% to 7.57%)	161	10.6 (9.06% to 12.14%)	
52 5298	98.7 (98.67% to 98.73%)	52 3801	98.7 (98.67% to 98.73%)	1497	98.1 (97.42% to 98.78%)	0.270
31 127	5.8 (5.74% to 5.86%)	31 108	0.6 (0.58% to 0.62%)	19	1.2 (0.65% to 1.75%)	
3791	0.7 (0.68% to 0.72%)	3781	0.7 (0.68% to 0.72%)	10	0.7 (0.28% to 1.12%)	

Sociodemographic characteristics include gender (male; female), marital status (married; common law marriage; single; widowed; divorced; separated), years of education completed (illiterate; 4 years; 6 years; 9 years; 12 years; high education), income (pension; family support; properties or business; social support; other), religion (catholic; other; without religion; not available), type of residence (community; institution), place of birth (other municipality than that where resides actually; same parish; same municipality, but other parish; other country), and nationality (Portuguese; foreign; dual nationality).

Information on the presence of difficulties in: (i) sensory status ("difficulty seeing, even if wearing glasses"; "difficulty hearing, even in using a hearing aid") (ii) functional status ("difficulty in walking or climbing steps"; "difficulty (with self-care such as) washing all over or dressing") (iii) cognition ("difficulty remembering or concentrating") and (iv) communication ("difficulty communicating, for example understanding or being understood by others") was analyzed to assess self-reported disability. These six questions included in the census questionnaire regarding the individual's functionality were developed by the Washington Group on Disability Statistics, and evaluate the ability to perform several activities of daily living.<sup>16</sup> This set of questions is consistent with the International Classification of Functioning, Disability and Health.

Exploratory descriptive analyses were performed in order to obtain the profile of the Portuguese oldest old. Results were presented for the total sample, and for the subgroup of centenarians *versus* octogenarians/nonagenarians. Differences between the two sub-samples were explored using Chi-Square tests, and gender differences in the perceived difficulties were also explored. A significance level of  $\alpha = 0.05$  was considered.

## RESULTS

There were 534 219 people aged 80 and over living in Portugal in the data of the 2011 Census, of which 530 693 (99.7%) had between 80 and 99 years, and 1526 (0.3%) have 100 or more years. Most were women (64.5%), widowed (53.9%) or married (34.6%). Regarding education, most never attended school (46.1%) or had completed only 4 years of education (41.9%); a minority had higher education (3.1%). About half (43.2%) were born in the place they currently live, and 18.4% lived in the same municipality, but other parish. The majority lived in private households (88.8%) and 30.7% lived alone. Noteworthy is the fact that the great majority of centenarians lived in the community (71.0%); and that among these, 14.2% lived alone. Monthly income came mostly from their own pension (96.3%), and 1.7% relied on their family as the main source of economic support. The majority was catholic (87.9%). Descriptive characteristics for the total sample, octogenarians/nonagenarians and centenarians are summarized in Table 1.

Analysis of the sociodemographic characteristics by age group revealed that gender, marital status, education

and place of birth varied according to the age group. A higher percentage of women (82.1%) was found in the centenarian group when compared to the octogenarian/nonagenarian group (64.5%), and a higher percentage of widowed and singles was found among centenarians than among octogenarians/nonagenarians (82.0% vs 53.9%, and 11.3% vs 7.4%, respectively). Data also pointed to a higher percentage of centenarians being illiterate (61.6% vs 46.1%), and a higher percentage of octogenarians/nonagenarians than centenarians living in the same parish where they were born (43.2% vs 37.5%).

A first look at self-reported disability (Fig. 1) showed major constraints in walk/climb stairs (57.1%), vision (39.1%) and hearing (35.1%), and less constraints in understanding others/being understood (25.9%) and memory/concentration (34.4%). The dimensions with higher percentage of people mentioning a total incapacity were bathing/dressing (14.3%) and walk/climb stairs (10.0%). On the contrary, vision (1.8%) and hearing (1.5%) were the dimensions with lower percentages of total incapacity.

The analysis of self-reported difficulties by gender (Table 2) points to higher percentages of total incapacity in women in all the assessed dimensions, differences only not significant for vision and hearing. The more accentuated differences were found in understand others/being understood (16.1% in women vs 3.2% in men) and walk/climb stairs (11.6% vs 7.0%).

The existence of problems in sensorial, functional and cognitive status, and communication was also assessed considering a distinction between octogenarians/nonagenarians and centenarians.

In what regards sensory functions (Fig. 2), 33.5% of the octogenarians/nonagenarians mentioned having great difficulties in hearing and 37.2% in vision, while in the centenarian group these percentages were higher (63.4% and 58.2%, respectively). Also notable is the higher percentages of total incapacity in hearing compared with vision, which was present in both sub-groups, but was specially accentuated in the centenarian group (89.0% vs 9.2%). Analysis by age group revealed significant differences for vision ( $p < 0.05$ ), but not for hearing.

In respect to functional status (Fig. 3), 25.2% of octogenarians/nonagenarians reported having great

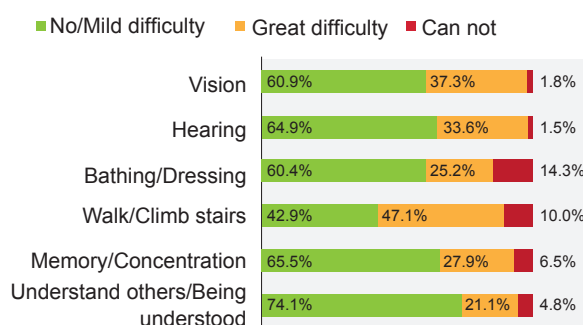


Figure 1 – Sensorial status, functionality, cognitive status and communication of the portuguese oldest old (Census, 2011)

**Table 2** - Sensorial status, functionality, cognitive status and communication of the portuguese oldest old, by gender (Census, 2011)

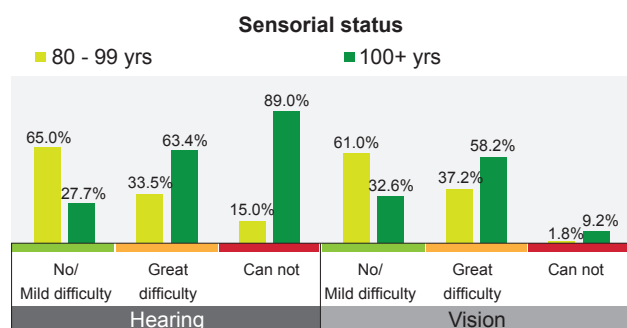
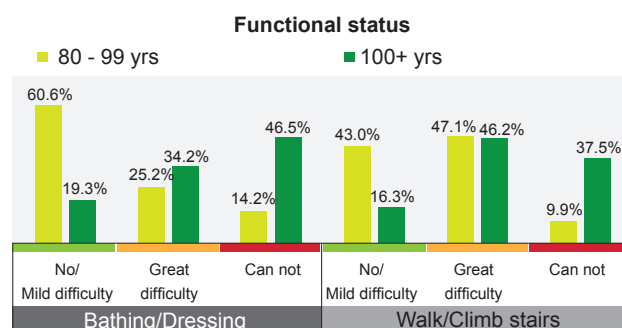
Dimension	Female n = 343 491		Male n = 188 728	
	n	% (95% IC)	n	% (95% IC)
<b>Vision</b>				
No/mild difficulty*	197 002	57.3 (57.13% to 57.47%)	127 160	67.4 (67.19% to 67.61%)
Great difficulty*	139 727	40.7 (40.54% to 40.86%)	58 842	31.2 (30.99% to 31.41%)
Can not	6762	2.0 (1.95% to 2.05%)	2756	1.5 (1.45% to 1.55%)
<b>Hearing</b>				
No/mild difficulty*	219 987	64.1 (63.94% to 64.26%)	125 174	66.3 (66.09% to 66.51%)
Great difficulty*	117 613	34.2 (34.04% to 34.36%)	61 252	32.4 (32.19% to 32.61%)
Can not	5874	1.7 (1.66% to 1.74%)	2322	1.2 (1.15% to 1.25%)
<b>Bathing/dressing</b>				
No/mild difficulty*	213 189	62.1 (61.94% to 62.26%)	135 404	71.7 (71.6% to 72.0%)
Great difficulty*	103 318	30.1 (29.95% to 30.25%)	44 916	23.8 (23.61% to 23.99%)
Can not*	26 984	7.8 (7.71% to 7.89%)	8408	4.4 (4.31% to 4.49%)
<b>Walk/climb stairs</b>				
No/mild difficulty*	129 237	37.6 (37.44% to 37.76%)	99 170	52.5 (52.27% to 52.73%)
Great difficulty*	174 373	50.8 (50.63% to 50.97%)	76 332	40.4 (40.18% to 40.62%)
Can not*	39 881	11.6 (11.49% to 11.71%)	13 226	7.0 (6.88% to 7.12%)
<b>Memory/concentration</b>				
No/mild difficulty*	213 438	62.1 (61.94% to 62.26%)	135 458	71.8 (71.6% to 72%)
Great difficulty*	103 383	30.1 (29.95% to 30.25%)	44 923	23.8 (23.61% to 23.99%)
Can not*	26 670	7.8 (7.71% to 7.89%)	8347	4.4 (4.31% to 4.49%)
<b>Understand others/Being understood</b>				
No/mild difficulty*	192 672	56.1 (55.93% to 56.27%)	147 391	78.1 (77.91% to 78.29%)
Great difficulty*	95 529	27.8 (27.65% to 27.95%)	35 273	18.7 (18.52% to 18.88%)
Can not*	55 290	16.1 (15.98% to 16.22%)	6064	3.2 (3.12% to 3.28%)

\* Variables with significant differences

difficulties in bathing/dressing alone, and 47.1% in walking/climbing stairs. In the centenarian group these percentages were higher for bathing/dressing alone (34.2%), but similar for walking/climbing stairs (46.2%). Likewise, higher percentages of total incapacity were found for bathing/dressing than for walking/climbing stairs in both groups (14.2% vs 9.9% in octogenarians/nonagenarians and 46.5% vs 37.5% in centenarians). Significant differences by age group were found for both bathing/dressing and

walking/climbing stairs

In respect to cognition and communication (Fig. 4), 27.8% of octogenarians/nonagenarians reported having great difficulties in memory/concentration, and 21.0% great difficulties in understand others/being understood. In the centenarian group, the percentages increase to 38.9% and 39.7%, respectively. Similarly, higher percentages of total incapacity were found for memory/concentration when compared to understanding others/being understood, which

**Figure 2** – Sensorial status of the oldest old (80 - 99 years vs 100+ years)**Figure 3** – Functional status of the oldest old (80 - 99 years vs 100+ years)



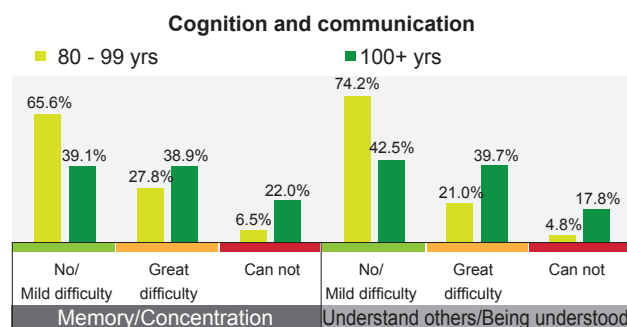


Figure 4 – Cognition and communication of the oldest old (80 - 99 years vs 100+ years)

occurred in both groups (6.5% vs 4.8% in octogenarians/nonagenarians, and 22.0% vs 17.8% in centenarians). Significant differences by age group were found for memory/concentration, but not for understanding others/being understood.

Only 0.3% octogenarians/nonagenarians and 2.5% centenarians showed no capacity in all considered dimensions (functional, sensorial, cognitive and communication functions) concurrently. On the contrary, 27.4% octogenarians/nonagenarians, and 6.0% centenarians presented no/mild difficulties in all considered dimensions.

## DISCUSSION

The sociodemographic profile of the Portuguese oldest old is globally in line with previous studies on the oldest old population.<sup>17,18</sup> The existence of significant differences in some sociodemographic characteristics and sensorial, functional and cognitive status reinforces the heterogeneity of the older population, even in the oldest subgroup (centenarians). Gender differences on life expectancy (higher for women) are commonly cited in the literature<sup>19-21</sup> and corroborated by the preponderance of females in our study.

The high levels of illiteracy of the Portuguese oldest old can be a distinct aspect when considering other European countries. In general, the portuguese oldest population attended school for a mean of 5.79 years, which is clearly below the mean of the European countries that participated in the 4<sup>th</sup> wave of SHARE (Denmark, Sweden, Austria, France, Germany, Switzerland, Belgium, Netherlands, Spain, Italy, Greece, Estonia, Hungary, Luxemburg, Portugal and Slovenia) with a mean of 10.4 years of schooling.<sup>22</sup> Illiteracy is decreasing and the new cohorts arriving to old age are successively more educated, but the current cohort of old people evidently attained low levels of education or were even unschooled. Findings from the last Portuguese population census revealed that 46.1% of the 80 - 99 years old people never attended school; the percentage of illiteracy rises to 61.6% in centenarians. In Portugal the low level of education and the illiteracy of older cohorts seem associated with poor aging outcomes, namely cognition.<sup>23</sup> According to findings from SHARE, Mediterranean countries that present

the highest prevalence of relative cognitive impairment have also the lowest levels of education.<sup>24</sup> The hypothetical influence of education in disability indicators is apparent in several studies and deserves further attention.<sup>24-26</sup>

Also noteworthy is the high percentage of individuals living in the community. This finding is consistent with previous studies around the world on oldest old and centenarians<sup>27,28</sup> but in order to interpret this finding we must consider the strong tradition of family care in southern countries, where Portugal is included, and the frequent desire of older persons to stay at home for as long as possible.<sup>29,30</sup> Among those living in the community, our data revealed that about one-third lives alone. A report about health and incapacities in Portugal revealed that more than half of older persons ( $\geq 65$  years) lived alone or accompanied exclusively by other older persons.<sup>31</sup> The SHARE project found even higher percentages for those 80 and plus, with 56% of the community-dwellers living alone.<sup>32</sup> Living alone with an advanced age can be challenging, and contribute to a higher risk of unmet care needs.<sup>33</sup> Those who live alone seem to be more likely to have health problems, have fewer social contacts and not receive help with their functional limitations, increasing the risk of under met needs.<sup>34</sup>

Another important finding from the SHARE project is that children were the most important group to provide help to their parents in all countries considered. Accordingly, preliminary findings from the first population-based study on portuguese centenarians found that more than half of the sample lived in the community, and among these, 36% lived with their children.<sup>35</sup> Nevertheless, the advanced age and (potential) existence of health problems of their children (which can also be older persons), along with a decrease in the number of children and persons per household, constitute serious challenges to their availability to provide care, and assure their long-term care needs. Moreover, the parent support ratio (the ratio of the population 85 or older to those aged 50 to 64) in 2000 was estimated in 4 persons aged 85 or older for every 100 persons aged 50-64, and it is projected to reach to 11 per 100 in 2050, in a global level.<sup>36</sup> Data on this indicator for Europe follows the same direction: in 2007 the parent support ratio was estimated in 8.1, and it is projected to reach 12.9 in 2025.<sup>37</sup> Taking into account all of these aspects it seems of particular importance the development of home and community-based support services, and the promotion of neighborhood networks. Moreover, more attention to the impacts of caregiving demands is needed, namely in order to study (possible) differences in the impacts felt by caregiving of oldest old patients compared with those caring for younger older patients.

In Portugal, life expectancy at age 65 was 21.6 years for women and 17.8 years for men in 2011, representing an increase of 2.5 years for women and 2.1 years for men over the period 2001 - 2011. But the number of healthy life years is also important. In 2011, at age 65 women and men could expect to spend 29% and 44% of their life without self-reported long-term activity limitations, respectively.<sup>38</sup>

Despite this positive trend for the older portuguese population, our findings generally showed the presence of high levels of self-reported disability, particularly in personal activities of daily living (ADL) and, secondly, on sensorial functions (hearing and vision), and reinforced the worst health and functional condition of women when compared to men. Sensory losses in older adults commonly compromise the ability to social participation, and can concur to negative outcomes, such as depression. Thus, this finding reinforces the importance of assessing sensory impairments in this population, and their impacts in the capacity for independent living, in order to a better identification and management of the difficulties, and subsequently a promotion of an active and participative ageing. This is of particular relevance when we observe that more than half of the oldest old included in the study reported having no/mild difficulties in cognitive functions (i.e., memory/concentration; understand others and being understood), which emphasizes the potential autonomy that these individuals may retain, regardless of the functional impairments. The increasing proportion of older people reinforces the importance of organizing and delivering care in a way that gives the opportunity to maintain the individual's greatest amount of control, even when they are dependent on others for help in everyday life. Thus, health promotion (the process of enabling people to take control over and to improve their health) should be a key goal to policy makers, and contemplated in healthcare policies for very advanced ages.<sup>39</sup>

Older age has been associated with a decline in functional status and an increase in long-term conditions.<sup>40</sup> Considering this, the observed higher prevalence of difficulties in all the dimensions considered in the centenarians subgroup when compared to the octogenarians/nonagenarians subgroup is somewhat expected. Nevertheless, when evaluating in more detail the differences between the two subgroups, differences were only significant for vision, bathing/dressing, walking/climbing stairs and memory/concentration. This suggests that as age advances the greater impact is in the (perceived) ability to perform personal activities of daily living, which can be associated with the difficulties in vision and memory/concentration commonly reported in the centenarian population.<sup>27</sup> A recent portuguese study that compared oldest old with younger older adults on health objective indicators, also found a global deterioration with age, with a diminution of sensorial capacities, and increase in functional impairment, especially in instrumental activities of daily living.<sup>41</sup> Some studies verified that older persons with dual sensory loss are at risk for decreased everyday competence and capacity for independent living.<sup>42</sup> Considering this, vision and hearing screening should be part of regular physical assessment for older individuals, and healthcare providers need to be sensitive to the importance of the identification of sensory impairment to outline subsequent interventions, which can include effective vision and hearing rehabilitation and help in maintaining functional independence by specific helping devices.

Finally, certain limitations of the present study should

be addressed. Firstly, the subjective measurement of the dimensions considered (sensory functions, functional status, cognition and communication), which can contribute to an underestimation of the difficulties.<sup>43,44</sup> The census methodology does not account for the presence of objective information, so we had to rely on self-perceived difficulties. It is important to mention, though, that other studies pointed to the validity of self-report functional disability measures among older adults, as well as a high correlation between self-reported disability and health status.<sup>45,46</sup> Secondly, caution is also needed when analyzing the results regarding the low percentages of cognitive impairment. Along with the self-report of difficulty, it is possible that it was a family member or the interviewer who filled the census questionnaire in those cases where the older person didn't had the capacity to respond autonomously. Regardless of these two major limitations, we believe the obtained profile provides valuable information to develop intervention programs directed to this population, and allows for the identification of areas requiring further attention. Longevity constitutes a challenging phenomenon to health and social care services, as well as to the families. The significant levels of functional incapacity, along with the preponderance of community-dwellers, highlight the great need of support from informal caregiving and formal in-home care services. Such services should be designed in order to cover the oldest old functional needs, without constraining autonomy. Programs of financial assistance to the oldest old and their caregivers, as well as the recognition of the role of the informal caregivers should therefore be implemented.

## CONCLUSION

Currently little is known about the characteristics and functional status of the portuguese oldest old. This study provides important descriptive information on this population, and revealed a higher percentage of constraints in ADL and sensorial aspects. Conversely, the majority seems to maintain their ability to understand others/being understood and in cognitive dimensions (memory/concentration). Taken together, these findings suggest the need for assistance, which can be ultimately managed by the older person him/herself. Nonetheless, the subjective measurement of the dimensions considered in the census implies some interpretative cautions, since an underestimation of the difficulties can be present. Considering that most individuals lived in the community, informal caregivers, namely family members, are expected to play a very important role in the care provision. Further studies should be conducted, namely by considering more detailed and objective analyses of functionality and memory, since the characteristics of the oldest old remain poorly described in the national context. Having this profile can result in important implications for healthcare and social services planning for an ageing population.

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## PROTECTION OF HUMANS AND ANIMALS

This study was conducted in accordance with the principles of the Declaration of Helsinki, ICH Guidelines for Good Clinical Practice and in full conformity with relevant regulations. Patients provided written informed consent for study participation. The study protocol was approved by the local ethics committee.

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## DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

## CONFLICTS OF INTEREST

All authors report no conflict of interest.

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