Access for those who want or for those who can? Equity in the use of doctor's appointments in Portugal based on the HIS 2019

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Abstract *Horizontal equity in the use of healthcare implies equal use for equal needs, regardless of other factors – be they predisposing or enabling (Andersen's model). This study aimed to assess equity in the use of doctor's appointments in Portugal in 2019, comparing the results with those obtained in a previous study, based on data from 2014. Data were retrieved from the Health Interview Survey 2019 (HIS 2019). Healthcare is measured by the number of doctor's appointments. Our study adopted the Negative Binomial Model to assess the factors affecting use. The concentration index was calculated to quantify income-related inequality/inequity. Compared to 2014, the effects of self-assessed health, limitations in daily living activities, and longstanding illnesses are more pronounced, and the region, income, household type and marital status are significant for appointments scheduled with a General Practitioner. In the case of appointments with specialists, health insurance lost statistical significance and the effect of education dropped; however, income became significant. The inequity index is not significant for appointments scheduled with a General Practitioner, as in 2014, but the (significant) value of this index increased for appointments with other specialists.*

Key words *Equity in access to health services, Concentration index, Health survey, Portugal*

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Introduction

The theme of equity in the use of healthcare and health services in general is still quite up-to-date. Some 40 years have passed since the publication, in 1980, of the report known as the *Black Report*[1], which had a major impact upon the subsequent conceptual and empirical investigation in the areas of inequality in health and access to health care[2]. Although much attention has been given to this issue, the reality is that the inequalities continue and, in many cases, have even increased. This same information has been released in two recent reports on inequality in health, one from the World Health Organization (WHO)[3] and the other from the Organisation for Economic Cooperation and Development (OECD)[4], both published in 2019. Besides its intrinsic value, health is an essential component for the quality of life and is extremely important in order to achieve success in such areas as work, education and active participation in community life[4]. Although health depends on a set of determining factors[5], access to healthcare, regardless of the socioeconomic circumstances, is a highly regarded means through which to improve one's health and combat inequality[4]. In this sense, it is of utmost importance to continually monitor people's access to healthcare.

However, access to healthcare is a multifaceted concept, involving several factors, be they supply or demand-sided. Therefore, access is influenced by such determinants as the need for health care and one's own perception of health and healthcare services, as well as by availability, proximity and cost of healthcare services available to the population[6]. According to Andersen's well-known model[7] concerning healthcare use, this use can be seen as successful access and depends on three types of factors: i) the need for health care; ii) predisposing factors (variables that influence the tendency for individuals to seek medical care, be they sociodemographic or attitudes relevant to health/disease); and iii) empowerment factors (the resources available to individuals that facilitate either their greater or their lesser use of the services). From the point of view of the analysis of equity, it is important to group these factors into need variables, on the one hand, and the remainder – *non-need* variables – on the other. That is, it is important to evaluate the compliance with the principle of "equal healthcare use for equal needs". This is the concept of (horizontal) equity, which has guided empirical analyses concerning healthcare use[8].

In Portugal, the questions related to equity and healthcare access have been contemplated in regulatory and planned documents since the creation of the National Health Service (NHS)[9], passing the Health Basic Law of 1990[10], up to the National Health Plan, which remained in effect until 2020[11]. The recognition of the importance of equity was maintained in the new 2019 Health Basic Law[12], which advocates, as a foundation of health policy, "Equality and non-discrimination in the access to high-quality health care in a timely manner, the guarantee of equity in the distribution of resources and in the use of services, as well as the adoption of measures that positively differentiate people and groups in situations of greater vulnerability" (Base 4 – N. 2, d). It is also defended that the work of the NHS should be to stand up for a wide range of principles, including equity (Base 20 – N.2, e). Health technologies themselves are allotted the role of promoting equity in access to health care (Base 17 – N.1). The National Health Plan, 2021-2030, is still under development, but inequities in health are among the main challenges for the coming decade[13].

Prior evidence regarding equity in the use of doctor's appointments in Portugal is rather scarce. The results found show evidence of the existence of factors, in addition to need, with an impact upon the use of doctor's appointments[14-20]. Examples of these factors are income, education and health insurance, in which the greater the income, the higher the level of education, and together with double or triple healthcare coverage, the greater the use of doctor's appointments, especially appointments with specialists. Nonetheless, these studies have shown a significant reduction in the magnitude of inequity in the case of appointments with specialists. Despite this favourable evolution, it is important to highlight that, in the OECD report from 2019[4], Portugal emerged among the three countries with the greatest inequity (on average) for this type of appointment. This has been a consistent result over time. In 2004, in a study conducted with 21 countries of the OECD[15], Portugal was the country with the highest level of inequity in appointments with specialists (data from 2000). In this light, in addition to the general relevance of equity in the use of doctor's appointments, Portugal is one of the countries for which scrutiny on this issue is justified. Therefore, the present study aims to analyse the use of doctor's appointments in Portugal, based on the most recent data from the Health Interview Survey from 2019 (HIS 2019), emphasizing its evolution when compared

to 2014 (data from the previous HIS). In other words, it is our objective to understand if there has been approximation to or a distancing from the principle of horizontal equity in which there should be equal use for equal needs, for appointments with a General Practitioner, as well as for appointments with specialists. Although this study concerns a sample for Portugal, it will also serve to contribute to the literature on the issue, where more recent empirical studies are scarce, as shown in the systemic review conducted by Lueckmann et al.[21]. This study thus fulfils its role to warn about the changes that may also occur in other OECD countries, be they in terms of determining factors of use, be they in terms of the behaviour of concentration indexes.

Methods

Data source

The data used in this article were retrieved from the HIS 2019, conducted by the National Institute of Statistics, based on a representative sample of 22,191 dwellings throughout the country. This survey's target population was the group of all individuals with an age of 15 years or older, during the reference period, who resided in the country. In each dwelling, only one individual was selected based on the last birthday method. Data collection took place from September 2019 to January 2020, by means of face-to-face and online interviews, obtaining 14,617 valid answers[22]. The samples used in this study included 10,112 observations referring to appointments with a general practitioner, 6,540 for the analysis of appointments with specialists, and finally, 11,122 observations referring to the total number of doctor's appointments. It is important to note that the number of observations for this last analysis is less than the sum of the observations used in the two previous analyses, given that there is a group of individuals who are included in either the sample of appointments with a general practitioner or in the sample of appointments with specialists. Thus, the analysis of the total number of appointments is referent to the sum of all of the doctor's appointments for these individuals, but each individual is only counted once in the sample.

Variables used

To measure healthcare use, two questions from the HIS 2019 were used, which were referent to the appointments with a general practitioner in the last four weeks and to the appointments with specialists in the last four weeks. These questions were asked only to the individuals who in a previous question had answered that the last doctor's appointment (for general practitioner or for specialists, as the case may be) occurred within the last 12 months. Therefore, only these individuals were considered in our study. From these two questions, an additional variable was created to measure the total number of doctor's appointments in the last four weeks, be they for General Practitioner or for specialists.

Econometric strategy

To evaluate the factors that have an impact on the use of doctor's appointments, our study used the multivariate regression analysis, considering need and non-need variables (according to Chart 1). Since the variable "number of doctor's appointments" assumed integer, non-negative values and with no upper limit defined, with the respective distribution characterized by many zeros and large tails, our study adopted the negative binomial model, recommended for these cases[14,19]. In terms of the interpretation of the results of this regression analysis, a statistically significant marginal effect in the non-need variables indicates the violation of the principle of equal use for equal needs.

This study used the concentration index method to quantify the inequalities related to income in the use of doctor's appointments[23,24]. When this index is null, there is an equal use of doctor´s appointments, regardless of the income level. When it is negative (positive), the use is disproportionately concentrated on the poor (rich). However, to judge equity, it is of utmost importance to compare healthcare use with need. Hence, our study opted to use the horizontal inequity index. If this index is null (absence of statistical significance), then we cannot exclude the hypothesis of equity in the use of doctor´s appointments; if it is positive, we can then affirm a horizontal inequity in favour of the richer population; if the index is negative, the individuals from the lowest income quintiles are the most benefitted[23]. To estimate the concentration and inequity indexes, we used the *conindex* command from the Stata 15.1 software[25].

As regards ethical questions, no primary collection of data was performed. The data were retrieved from the Portuguese HIS 2019, which was part of the European Health Interview Sur-

Chart 1. Description of the dependent (each type of appointment) and explanatory variables (need and non-need variables).

Variable	Description
Dependent variables	
Appointments with a General Practitioner	Number of appointments with a General Practitioner in the last 4 weeks
Appointments with specialists	Number of appointments with specialists in the last 4 weeks
Total number of doctor's appointments	Number of appointments with a General Practitioner or with specialists in the last 4 weeks
Need variables	
Woman	=1 if the individual is female; 0, if not
Age 15-24	=1 if the individual is between 15 and 24 years; 0, otherwise
Age 25-34	=1 if the individual is between 25 and 34 years; 0, otherwise
Age 35-44	=1 if the individual is between 35 and 44 years; 0, otherwise
Age 45-54	=1 if the individual is between 45 and 54 years; 0, otherwise
Age 55-64	=1 if the individual is between 55 and 64 years; 0, otherwise
Age 65-74	=1 if the individual is between 65 and 74 years; 0, otherwise
Age 75-84	=1 if the individual is between 75 and 84 years; 0, otherwise
Age >=85	=1 if the individual is 85 years or older; 0, if not (omitted category)
Good or very good health	=1 if the individual self-assesses own health status as very good or good; 0, otherwise
Fair health	=1 if the individual self-assesses own health status as fair; 0, otherwise
Bad or very bad health	=1 if the individual self-assesses own health status as bad or very bad; 0, otherwise (omitted category)
Longstanding health problem	=1 if the individual reports a longstanding health problem; 0, otherwise
Without limitations	=1 if the individual does not feel limited in activities of daily living due to health; 0, otherwise (ADL - 'activities of daily living')
ADL few limitations	=1 if the individual feels fairly limited in activities of daily living due to health; 0, otherwise (ADL - 'activities of daily living')
ADL mild limitations	=1 if the individual feels mildly limited in activities of daily living due to health; 0, otherwise (ADL - 'activities of daily living')
ADL many limitations	=1 if the individual feels very or extremely limited in activities of daily living due to health; 0, otherwise (ADL - 'activities of daily living') (omitted category)
Excess weight	=1 if the individual has a body mass index equal to or above 25; 0, otherwise
Number of chronic diseases	número de doenças crónicas sofridas pelo indivíduo nos últimos 12 meses Number of chronic diseases suffered by the individual in the last 12 months (sum of affirmative responses regarding: asthma, chronic bronchitis, chronic obstructive pulmonary disease or emphysema, myocardial infarction, coronary heart disease or angina pectoris, hypertension, stroke, arthrosis, lower back pain or other chronic back pain, cervical pain or other chronic pain in the neck, diabetes, allergies, hepatic cirrhosis, urinary incontinence, kidney problems, depression and cholesterol)

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vey (EHIS) project, whose regular collection is set forth in the European Commission (EC) Regulation 1338/2008. The European Union (EU) Regulation 2018/255, of February 19th, established the applicable variables and criteria for the data collection of 2019[22].

Results

According to that observed in Table 1, the sample referent to the appointments with a General Practitioner mostly consists of women (60%, versus 40% in 2014), with 42% of the surveyed individuals aged 65 years or older. Approximate-

Chart 1. Description of the dependent (each type of appointment) and explanatory variables (need and non-need variables).

Variable	Description
Non-need variables	
Income quintile 1	=1 if the individual is in 1st quintile of net monthly income per equivalent adult; 0 otherwise
Income quintile 2	=1 if the individual is in 2nd quintile of net monthly income per equivalent adult, 0 otherwise
Income quintile 3	=1 if the individual is in 3rd quintile of net monthly income per equivalent adult, 0 otherwise
Income quintile 4	=1 if the individual in in 4th quintile of net monthly income per equivalent adult, 0 otherwise
Income quintile 5	=1 if the individual is in the 5th quintile of net monthly income per equivalent adult, 0 otherwise (omitted category)
No education	=1 if the individual did not attend school; 0 otherwise (omitted category)
Basic education	=1 if the individual has completed the 1st, 2nd, and 3rd cycles of basic education, 0 otherwise
Secondary Education	=1 if the individual has completed secondary education, post-secondary education, or a technical-professional course, 0 otherwise
Higher education	=1 if the individual has completed higher education, 0 otherwise
Urban area	=1 if the area is densely populated; 0 otherwise
Mixed area	=1 if the area is intermediate populated; 0 otherwise
Rural area	=1 if the area is thinly populated; 0 otherwise (omitted category)
Lives alone	=1 if the individual belongs to a one-person household; 0 otherwise
Single-parent household	=1 if the individual belongs to a lone-parent household with at least one child under 25 years of age; 0 otherwise
Couple with younger children	=1 if the individual belongs to a household with a couple and at least one child under 25 years of age; 0 otherwise
Couple with no children	=1 if the individual belongs to a household with a couple and without children; 0 otherwise
Other type of household	=1 if the individual belongs to a single-parent household or household with a couple in which all of the children are aged 25 years or older, or other type of household, 0 otherwise (omitted category)
Employed	=1 if the individual is employed or is working; 0 otherwise
Unemployed	=1 if the individual is unemployed; 0 otherwise
Other occupations	=1 if the individual is unemployed; 0 otherwise
Married	=1 if the individual is married or lives in a legal conjugal or de facto relationship; 0 otherwise
Widow(er)	=1 if the individual is a widow(er) and lives alone or has no conjugal relationship; 0 otherwise
Divorced	=1 if the individual is divorced and lives alone or has no conjugal relationship; 0 otherwise
Single	=1 if the individual is single and lives alone or has no conjugal relationship; 0 otherwise (omitted category)
Only NHS	=1 if the individual has no health subsystem nor private health insurance, 0 otherwise
North	=1 if the individual belongs to NUTII North; 0 otherwise (omitted category)
Centre	=1 if the individual belongs to NUTII Centre; 0 otherwise
Lisbon	=1 if the individual belongs to NUTII Metropolitan area of Lisbon; 0 otherwise
Alentejo	=1 if the individual belongs to NUTII Alentejo; 0 otherwise
Algarve	=1 if the individual belongs to NUTII Algarve; 0 otherwise
Açores	=1 if the individual belongs to NUTII Azores; 0 otherwise
Madeira	=1 if the individual belongs to NUTII Madeira; 0 otherwise

Source: Authors.

ly 18% consider their state of health to be bad or very bad, and two-thirds present some type of longstanding health problem. Even so, nearly half (49%) feel that they have no limitations in their daily activities due to health questions, representing a slight decline when compared to results in 2014 (55%). The average number of chronic diseases is three (in a maximum of 14) and 61% are overweight, a value that is higher than that of 2014 (58%).

As regards the non-need variables, no significant differences were found in terms of the distribution per quintile of income, although the proportion of individuals in the highest income quintile is the lowest (17%). Similarly, the results for the level of education remained simi-lar to those from the HIS 2014, with 58% of the individuals with a complete basic education. A slight decline was observed in the percentage of individuals who reside in less populated zones (34%, versus 38% in 2014). More than one fourth of the surveyed individuals (27%) live alone and 32% belong to a household with a couple and no children. Moreover, 40% of the individuals were employed and 58% were married or lived in a domestic partnership, similar to those from HIS 2014. The percentage of individuals who did not benefit from any type of subsystem or health insurance fell from 70% in 2014 to 65% in 2019. In terms of geographic distribution of the surveyed individuals, the highest percentage (19%) was found in the Algarve region.

Table 1. Descriptive statistics regarding need and non-need variables. for each type of doctor's appointment (appointments with a General Practitioner. appointments with specialists. and total number of appointments).

	Appointments with a General Practitioner				Appointments with specialists				Total number of appointments			
	N = 10.112				N = 6.540				N = 11.122			
Variable	*Average*	*S.D.*	*Min*	*Max*	*Average*	*S.D.*	*Min*	*Max*	*Average*	*S.D.*	*Min*	*Max*
Appointments with a General Practitioner	0.5484	0.9093	0	12	-	-	-	-	-	-	-	-
Appointments with specialists	-	-	-	-	0.6495	1.1382	0	20	-	-	-	-
Total number of appointments	-	-	-	-	-	-	-	-	0.8772	1.4132	0	20
Variáveis de necessidade												
Woman	0.6004	0.4898	0	1	0.6177	0.4860	0	1	0.5957	0.4908	0	1
Age_15_24	0.0576	0.2329	0	1	0.0639	0.2446	0	1	0.0636	0.2440	0	1
Age_25_34	0.0617	0.2406	0	1	0.0674	0.2508	0	1	0.0663	0.2488	0	1
Age_35_44	0.1148	0.3188	0	1	0.1225	0.3279	0	1	0.1211	0.3263	0	1
Age_45_54	0.1481	0.3553	0	1	0.1512	0.3583	0	1	0.1511	0.3581	0	1
Age_55_64	0.1996	0.3997	0	1	0.1919	0.3938	0	1	0.1977	0.3983	0	1
Age_65_74	0.2124	0.4090	0	1	0.2109	0.4079	0	1	0.2047	0.4035	0	1
Age_75_84	0.1571	0.3640	0	1	0.1495	0.3566	0	1	0.1491	0.3562	0	1
Age_85	0.0487	0.2152	0	1	0.0427	0.2021	0	1	0.0465	0.2105	0	1
Good or very good health	0.3815	0.4858	0	1	0.3720	0.4834	0	1	0.3986	0.4896	0	1
Fair health	0.4365	0.4960	0	1	0.4243	0.4943	0	1	0.4265	0.4946	0	1
Bad or very bad health	0.1820	0.3858	0	1	0.2037	0.4028	0	1	0.1750	0.3800	0	1
Longstanding health problem	0.6478	0.4777	0	1	0.6791	0.4669	0	1	0.6363	0.4811	0	1
ADL without limitations	0.4890	0.4999	0	1	0.4657	0.4989	0	1	0.5031	0.5000	0	1
ADL few limitations	0.2178	0.4127	0	1	0.2122	0.4089	0	1	0.2143	0.4103	0	1
ADL mild limitations	0.1367	0.3435	0	1	0.1480	0.3551	0	1	0.1332	0.3398	0	1
ADL many limitations	0.1565	0.3634	0	1	0.1740	0.3791	0	1	0.1494	0.3565	0	1
Excess weight	0.6059	0.4887	0	1	0.5898	0.4919	0	1	0.5962	0.4907	0	1
Number of chronic diseases	2.9495	2.5282	0	14	3.0813	2.5772	0	14	2.8494	2.5076	0	14

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Table 1. Descriptive statistics regarding need and non-need variables, for each type of doctor's appointment (appointments with a General Practitioner, appointments with specialists, and total number of appointments).

	Appointments with a General Practitioner				Appointments with specialists				Total number of appointments			
	N = 10.112				N = 6.540				N = 11.122			
Variable	*Average*	*S.D.*	*Min*	*Max*	*Average*	*S.D.*	*Min*	*Max*	*Average*	*S.D.*	*Min*	*Max*
Non-need variables												
Income quintile 1	0.1826	0.3863	0	1	0.1673	0.3733	0	1	0.1805	0.3847	0	1
Income quintile 2	0.2634	0.4405	0	1	0.2318	0.4220	0	1	0.2546	0.4357	0	1
Income quintile 3	0.2159	0.4115	0	1	0.2055	0.4041	0	1	0.2126	0.4091	0	1
Income quintile 4	0.1722	0.3775	0	1	0.1823	0.3861	0	1	0.1748	0.3798	0	1
Income quintile 5	0.1659	0.3720	0	1	0.2131	0.4096	0	1	0.1775	0.3821	0	1
No education	0.1117	0.3151	0	1	0.0927	0.2900	0	1	0.1057	0.3075	0	1
Basic education	0.5837	0.4930	0	1	0.5424	0.4982	0	1	0.5697	0.4951	0	1
Secondary education	0.1625	0.3689	0	1	0.1662	0.3723	0	1	0.1682	0.3741	0	1
Higher education	0.1421	0.3492	0	1	0.1988	0.3991	0	1	0.1564	0.3632	0	1
Urban area	0.2745	0.4463	0	1	0.3035	0.4598	0	1	0.2826	0.4503	0	1
Mixed area	0.3868	0.4870	0	1	0.3899	0.4878	0	1	0.3857	0.4868	0	1
Rural area	0.3387	0.4733	0	1	0.3066	0.4611	0	1	0.3317	0.4708	0	1
Lives alone	0.2734	0.4457	0	1	0.2651	0.4414	0	1	0.2698	0.4439	0	1
Single-parent household	0.0477	0.2131	0	1	0.0483	0.2145	0	1	0.0497	0.2174	0	1
Couple with younger children	0.1953	0.3965	0	1	0.2046	0.4034	0	1	0.2046	0.4035	0	1
Couple with no children	0.3220	0.4673	0	1	0.3268	0.4691	0	1	0.3126	0.4636	0	1
Other type of household	0.1616	0.3681	0	1	0.1552	0.3621	0	1	0.1632	0.3696	0	1
Employed	0.4004	0.4900	0	1	0.4116	0.4922	0	1	0.4134	0.4925	0	1
Unemployed	0.0634	0.2437	0	1	0.0566	0.2310	0	1	0.0636	0.2440	0	1
Other occupations	0.5362	0.4987	0	1	0.5318	0.4990	0	1	0.5230	0.4995	0	1
Only NHS	0.5807	0.4935	0	1	0.5827	0.4931	0	1	0.5746	0.4944	0	1
North	0.1709	0.3764	0	1	0.1537	0.3607	0	1	0.1632	0.3696	0	1
Centre	0.0793	0.2702	0	1	0.0824	0.2750	0	1	0.0804	0.2719	0	1
Lisbon	0.1691	0.3749	0	1	0.1812	0.3852	0	1	0.1818	0.3857	0	1
Alentejo	0.6446	0.4787	0	1	0.5719	0.4948	0	1	0.6288	0.4831	0	1
Algarve	0.1570	0.3639	0	1	0.1500	0.3571	0	1	0.1522	0.3593	0	1
Azores	0.1658	0.3720	0	1	0.1775	0.3821	0	1	0.1662	0.3723	0	1
Madeira	0.1410	0.3481	0	1	0.1211	0.3263	0	1	0.1356	0.3424	0	1
Alentejo	0.1065	0.3085	0	1	0.1066	0.3086	0	1	0.1054	0.3071	0	1
Algarve	0.1923	0.3942	0	1	0.1924	0.3942	0	1	0.1887	0.3913	0	1
Açores	0.1147	0.3187	0	1	0.1261	0.3320	0	1	0.1225	0.3278	0	1
Madeira	0.1225	0.3279	0	1	0.1263	0.3322	0	1	0.1294	0.3356	0	1

Source: Authors.

As regards the sample for appointments with specialists, no significant differences were found in relation to the need variables, when compared to the previous sample. Regarding the non-need variables, the percentage of individuals in the 5th income quintile is more expressive now, with the proportion of the individuals from the 1st income quintile being that which dropped the most (16%), while the proportion from the 2nd quintile proved to be the highest (23%). As concerns the level of education, the proportion of individuals with a secondary or higher level of education is also higher now (37% versus 30%). In 2014, these percentages were lower and more similar between the two samples (34% versus 28%). The percentage of individuals who live in less populated regions (31%) is slightly lower when compared to that from the sample of appointments with a General Practitioner. Moreover, 41% of the individuals were employed (similar to 2014),

and when compared with the previous sample, here, there are only 57% of the individuals with the NHS (as compared to 65% in the appointments with a general practitioner). In 2014, that percentage was 62% (thus diminishing the proportion of the individuals with only the NHS coverage in the sample of appointments with specialists). The Algarve region is once again the region that is relatively most represented (19%).

The descriptive statistics for the total number of appointments do not differ much from the previous statistics.

Table 2 presents the average marginal effects of the explanatory variables regarding use for each type of appointment. Figures 1 and 2 represent only the effects significant at the 1% and 5% levels, regarding the use of appointments with a general practitioner and appointments with specialists, respectively, as it is possible to compare the results obtained from the HIS 2014 with the more current results from the HIS 2019.

As concerns the need variables, in general, the statistically significant results, were as expected. A better self-assessed health status and less limitations in daily activities diminish the use of all categories of appointments. The magnitude of the effects is in accordance with the levels within each indicator, that is, the further the distance from the categories of reference (bad/very bad health and being very/extremely limited), the higher the (absolute) values of the effects in Table 2. By contrast, the existence of longstanding health problems increases transversally the use of all doctor's appointments. The number of chronic diseases also positively affects the use, but only in the total number of doctor's appointments. The excess weight and sex have no impact on the use. For age, the groups are compared with the older group (85 years or older), showing negative and not statistically significant effects in the appointments with a general practitioner. In the other appointments, the effects become positive and are significant up to 64 (54) years for appointments with specialists (total).

As regards the non-need variables, belonging to the 2nd income quintile has a negative impact upon the use of appointments with a General Practitioner, while belonging to the two highest income quintiles leads to the highest use of other appointments. Likewise, the fact that the individual has a higher level of education (higher education) leads to a greater use of these appointments. The circumstance of the individual being married or a widow(er) increases the use of appointments with specialists (and total), while being

divorced has the same type of impact in all of the appointments. Being employed leads to a lesser use of appointments with specialists. Benefitting only from the NHS increases (reduces) the use of the appointments with a General Practitioner (total), but it does present statistical significance only at the level of 10%. As regards the regional effects, a positive impact was registered in Lisbon and in the Azores for appointments with specialists, while a negative impact was registered in the Algarve and Centre regions for appointments with a General Practitioner (and total appointments). A negative impact was also registered for the Alentejo region for total appointments and in the Madeira region for all types of appointments, when compared to the North region.

Comparing the results from 2019 with those from 2014, it is possible to observe that the need variables that had, in 2014, a statistically significant impact at 1% or 5%, upon the use of appointments with a general practitioner, now have a more pronounced impact (good/very good or fair state of health, the existence of longstanding health problems, the existence of limitations in daily activities), with the exception of the number of chronic diseases, which is no longer significant. As regards the non-need variables, belonging to the 2nd income quintile, living in a medium populated zone or belonging to the Algarve, Centre or Madeira regions presents a negative and statistically significant impact. By contrast, it was found that the fact that the individual lives alone, is a single-parent, or is divorced, positively affects the use of this type of appointment. It is important to note that, within this group of non-need variables, only one (living in Madeira) presented statistical significance in 2014.

In relation to the impact factors of the appointments with specialists, it was observed that the need variables, which proved to be significant at 1% or 5%, according to data from the HIS 2014, now present a more pronounced magnitude. This novelty can be found in the fact that age (up to 64 years) reveals a positive and significant result regarding the use of this type of appointment. Concerning the non-need variables, the differences in results are more evident. The only significant variable common to the two moments is that of higher education, now with a more reduced impact. Having a lower level of education, residing in a densely populated zone or belonging to the region of Lisbon no longer produces a significant effect. Benefitting only from the NHS, with a negative impact upon the search for health care in 2014, loses significance. By contrast, with the

Table 2. Average marginal effects of the need and non-need variables for each proxy of use and concentration index for the effective number of appointments and for use, standardised by need.

Variable	Appointments with a General Practitioner		Appointments with specialists[a]		Total number of appointments[a]	
Need variables						
Woman	0.0151		-0.0178		0.0356	
Age 15-24	-0.0631		0.3999	***	0.2296	**
Age 25-34	0.0419		0.3813	***	0.2966	***
Age 35-44	-0.0185		0.2824	***	0.1606	*
Age 45-54	-0.0040		0.3081	***	0.1888	**
Age 55-64	-0.0438		0.1631	**	0.0541	
Age 65-74	-0.0135		0.0959		0.0569	
Age 75-84	-0.0405		0.0831		0.0200	
Good or very good health	-0.2116	***	-0.3681	***	-0.4846	***
Fair health	-0.1057	***	-0.1496	***	-0.2215	***
Longstanding health problem	0.0818	***	0.0717	*	0.1747	***
ADL without limitations	-0.2300	***	-0.2988	***	-0.4420	***
ADL few limitations	-0.1483	***	-0.2076	***	-0.2992	***
ADL mild limitations	-0.1023	***	-0.0957	**	-0.1635	***
Excess weight	-0.0076		-0.0196		-0.0143	
Number of chronic diseases	0.0060		0.0032		0.0177	***
Non-need variables						
Income quintile 2	-0.0714	**	0.0394		-0.0548	
Income quintile 3	-0.0071		0.0884	*	0.0487	
Income quintile 4	-0.0139		0.1431	***	0.0947	**
Income quintile 5	-0.0264		0.1684	***	0.1057	***
Basic education	-0.0425		0.0520		0.0083	
Secondary education	-0.0545		0.0668		0.0255	
Higher education	-0.0069		0.1341	**	0.1513	**
Urban area	-0.0222		0.0579		0.0445	
Mixed area	-0.0524	**	-0.0349		-0.0419	
Lives alone	0.0873	***	0.0487		0.1262	***
Single-parent household	0.1428	**	-0.0348		0.1211	*
Couple with younger children	-0.0185		-0.0119		0.0026	
Couple without children	0.0410		0.0304		0.0839	*
Employed	-0.0044		-0.0790	*	-0.0692	
Unemployed	0.0466		-0.0042		0.0132	
Married	0.0626		0.1239	*	0.1427	**
Widow(er)	0.0485		0.1589	**	0.1274	**
Divorced	0.0872	**	0.1707	***	0.1834	***
Only NHS	0.0342	*	-0.0365		-0.0496	*
Centre	-0.1052	***	-0.0514		-0.1275	***
Lisbon	-0.0202		0.0847	*	0.0284	
Alentejo	-0.0447		-0.0174		-0.0844	*
Algarve	-0.0862	**	-0.0514		-0.1125	**
Azores	-0.0169		0.1024	**	0.0268	
Madeira	-0.1445	***	-0.0771	*	-0.2294	***
Concentration indexes						
Concentration index	-0.0453	***	0.0219	*	-0.0038	
Horizontal inequity index	-0.0039		0.0732	***	0.0544	***

***p < 0.01; **p < 0.05; *p < 0.1. [a] Number of appointments in the last four weeks, considering that the individual used this service at least once in the last 12 months.
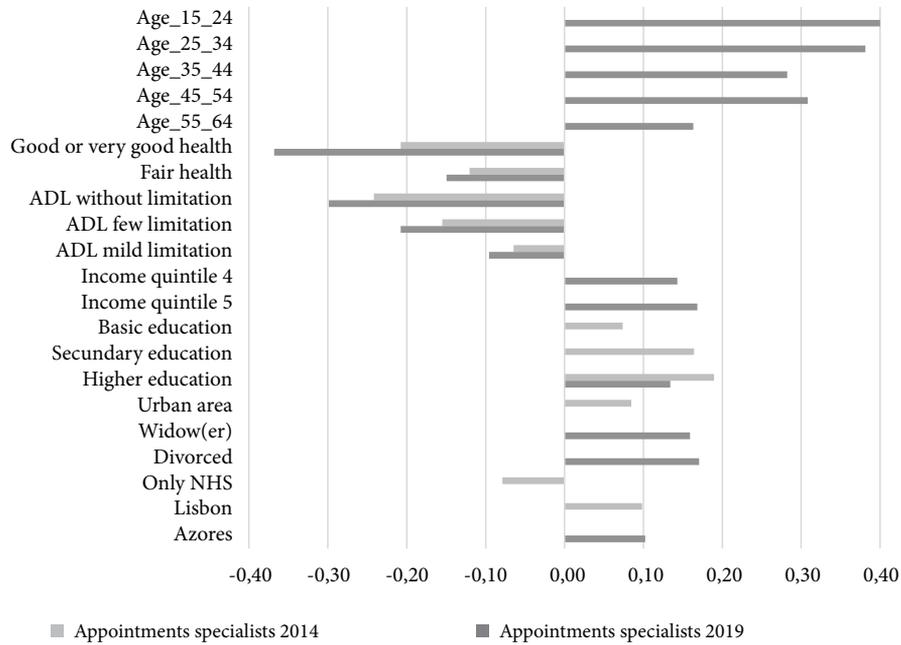
Source: Authors.
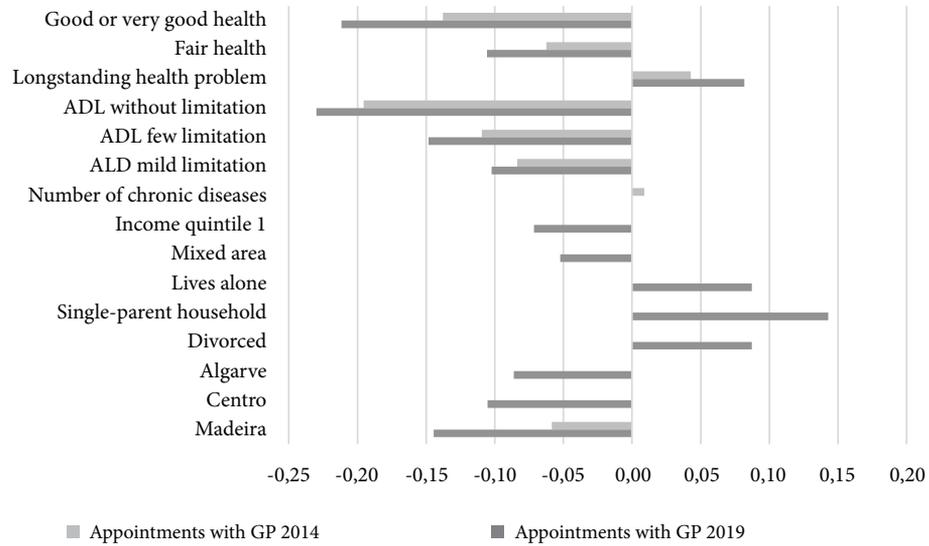
Figure 1. Significant marginal effects of need and non-need variables, at 1% and 5%, for the appointments with a General Practitioner, HIS 2014 and HIS 2019.

The results for 2014 come from a previous study (Quintal and Antunes, 2020).

Source: Authors.

Figure 2. Significant marginal effects of need and non-need variables, at 1% and 5%, for the appointments with specialists, HIS 2014 and HIS 2019.

The results for 2014 come from a previous study (Quintal and Antunes, 2020).

Source: Authors.

data from the HIS 2019, it is possible to affirm that belonging to a higher income quintile (4th or 5th), being a widow(er) or divorced, or residing in the Azores now has a positive and statistically significant effect concerning the use of appointments with specialists.

Analysing the distribution of the use of doctor's appointments (Table 2), one can see that this is disproportionately concentrated in the poorer groups in the case of appointments with a general practitioner, and in richer families, in the case of appointments with specialists. The combined effect of these results leads to a concentration index for the total number of appointments that is near zero (and insignificant).

In terms of the analysis of equity, for the appointments with a general practitioner, the inequity index has no statistical significance. Thus, the existence of equity in the use of doctor's appointments cannot be excluded. By contrast, for the appointments with specialists and total appointments, the index of horizontal inequity is positive and significant, indicating a favourable use for richer individuals.

Discussion

The present study sought to analyse evidence regarding equity in the use of doctor's appointments in Portugal, comparing the results obtained in the HIS 2019 with those from the HIS 2014[20]. Regarding the appointments with a General Practitioner, and similarly to 2014, no evidence of income-related inequity related to the use of doctor's appointments was found. This result suggests that individuals from different income quintiles tend to search for these types of doctor's appointments according to their own needs, regardless of their income. For appointments with specialists, and once again in accordance with the results from 2014, the value of the horizontal inequity index is positive. Therefore, evidence suggests that individuals with higher incomes tend to use health care/schedule doctor's appointments more than expected according to their needs. These results have been interpreted as a consequence of the fact that poorer individuals, in Portugal, more often search for primary health care, which tends to be free, while richer individuals search for doctor's appointments within the private sector[14-16]. However, this combination of results, the horizontal inequity index for appointments with a General Practitioner not being statistically significant and a positive result

for appointments with specialists, is extendable to other countries where evidence of this nature exists[21]. It is also important to highlight that the horizontal inequity index for appointments with specialists, in Portugal, rose in 2019 as compared to 2014 (0.0732 versus 0.0668), which can reflect the inversion of the previously identified decline[20]. Based on the literature, the value of this index reached its peak (0.208) in 2000[14], having presented lower values for later waves of the HIS.

As regards the total number of doctor's appointments, the inequity index, based on data from the HIS 2019 (0.0544), is similar to that obtained with data from the HIS 2014 (0.0535), also leading to the conclusion, in this case, that there is inequity that is favourable for higher income individuals. In this sense, even admitting that there is a substitution between appointments with a General Practitioner and appointments with specialists (the hypothesis that underlies the joint analysis of the doctor's appointments), the concentration of appointments with a general practitioner among poorer individuals is insufficient to compensate the concentration of appointments with specialists among richer individuals, which means that the need proves to be even more concentrated among poorer individuals. In comparison, in a study conducted in Brazil[26], the inequity index, for the dichotomic variable "scheduled/did not schedule any type of doctor's appointment' in the last 12 months", presented values of 0.0537 and 0.0586, in 2008 and 2013, respectively. Even though this comparison is limited, since the present study considers the total number of doctor's appointments, the magnitude of inequity for these appointments found in Portugal in 2019 is comparable with the existing magnitude in Brazil in 2008. In the context of South America as well, one study from Chile[27], with data from 2009, obtained inequity indexes equal to 0.036, 0.191 and 0.097 for appointments with a general practitioner, appointments with specialists and the total number of doctor's appointments, respectively. This last situation is similar to that verified in Portugal a decade ago (in 2000).

The international comparisons are limited by the scarcity of contemporary studies (see, for example, the literature review conducted by Lueckmann et al.[21], where in 57 studies, only 10 have been published since 2015 and mostly with data up to 2011/12). One study conducted in the north of Sweden[28], with data from 2014, found results that were contrary to international evidence. That is, inequity indexes for appointments

with specialists that are not statistically significant, and positive and significant inequity indexes for appointments with a general practitioner (0.0245). While not offering explanations for this result, the authors note that it is something rather worrisome (in 2006 this index was practically null, while in 2010 it became positive). In any case, in absolute terms, the inequity index for the total number of doctor's appointments (which includes appointments with a general practitioner) for Portugal is more than double the index for Sweden. In another study, also conducted in the north of Sweden[29] and with data from 2014, but limited to young individuals aged 16 to 25 years, the authors found evidence in line with the more common results, that is, concentration in poorer individuals regarding the use (adjusted by need) of appointments with a general practitioner, with an inequity index equal to -0.097. However, in the case of "Youth Clinics", evidence showed a concentration among richer individuals in overall terms and, in particular, among young women, with inequity indexes of 0.097 and 0.166, respectively. These clinics are specialized in the health of young people, including sexual and reproductive health. These last inequity indexes are substantially larger than those found for Portugal (although the comparison is limited by the very specific sample considered in Sweden).

Tavares and Zantomio[19], using data from 2010 (individuals aged 50 years or older) obtained, for Portugal, inequity indexes equal to 0.085 and 0.114, for appointments with a general practitioner and appointments with specialists, respectively. For Italy (Spain), the indexes found were -0.073 and 0.096 (-0.043 and 0.067). These results suggest that in Italy and Spain, the inequity related to the level of education (ranking variable) follows the same pattern as that of inequity related to income. By contrast, in Portugal, in the two types of doctor's appointments, individuals with a higher level of education used the doctor's appointments more than expected (in absolute terms, these indexes are above the value found in our study regarding appointments with specialists). In addition to the analysis of the distribution of the doctor's appointments concerning income groups, it is also pertinent to observe the determining factors of the use, grouping these into need and non-need variables. As concerns the former, the results were as expected, with the exception of the effect of age. In the data from the HIS 2014, age was not significant for any of the types of appointments.

In 2019, age emerged with an impact (statistically significant effect) on appointments with specialists and the total number of appointments, but with a result that was apparently contrary to what was expected. That is, in principle, as age advances, the need increases. However, our results identified a higher use of doctor's appointments in younger age ranges, when compared with the group of individuals aged 85 years or older. This result is most likely related to the advanced age of the reference category. In fact, the impact of age became less significant in the age ranges above 65 years. Once an individual reaches an older age, evidence suggests that there are no differences related to age in the use of these specialised forms of care. The variables of sex and the number of chronic diseases no longer show a statistical significance when compared to 2014, but the magnitude of the effects of the variables of self-assessed health status, of limitations in daily activities and longstanding health problems were reinforced. These results are in accordance with the vertical dimension of equity in the use of doctor's appointments, in which those with a greater need use them more, introducing an even greater distinction, in comparison to 2014, between those who need health care and those who do not.

As concerns the non-need variables, our study found statistically significant effects, which constitutes a violation of horizontal equity in the use of health care according to need. One clear difference in 2019, as compared to 2014, is related to the greater number of factors that impact the use of appointments with a general practitioner. In fact, in 2014, only living in the Madeira region showed statistical significance, while in 2019 eight variables showed statistical significance. These are related to the regions, as well as to income, the type of household, and the marital status. As regards the appointments with specialists, comparing 2019 to 2014, it could be observed that health insurance coverage no longer having an impact on the use appears as a positive outcome, and the level of education becomes more influential only for higher education (with an attenuated effect). Nonetheless, new effects arose related to income and marital status. Hence, evidence suggests that the differentiation in the use of appointments with specialists is not so much explained by the double and triple health insurance coverages, traditionally seen as a reason for direct access to these types of appointments[30], but mostly by high incomes. In terms of regions, no generalized effects were found. For each one of the moments, evidence of greater use was only found in one region. In 2014, this effect appeared

for Lisbon, while in 2019, it arose for the Azores. Some substitution between appointments with a general practitioner and appointments for other specialties may have occurred.

Comparing our results with those from other studies, and bearing in mind the scarcity of contemporary studies mentioned above, in a study conducted in Spain[31], with data from 2006 and 2011/12, the authors, in general found no significant effects of the analysed variables (income, sex, age, private health insurance) upon the use of appointments with a General Practitioner and appointments with specialists. One exception refers to the positive impact of private insurance, in the case of appointments with specialists. This result is, to a certain extent, similar to those from Portugal, considering data from 2014. Regarding income, in the study conducted in Spain, significant effects (greater use) were found only in 2011/12 in the 3rd quartile for appointments with a General Practitioner and in the 2nd quartile for appointments for other specialties. Our results for Portugal show clearer results for income concerning the use of appointments with specialists, but in 2019. One study conducted for 21 European countries[32], with data from 2014, found evidence of a lesser (greater) use of appointments with a General Practitioner among individuals with a higher level of education in Portugal, Lithuania and Ireland (Estonia, Poland and Slovenia). In the case of appointments with specialists, the results of this study point out a greater use among individuals with a higher level of education in 11 countries, with Portugal presenting the effect with the greatest magnitude. Our results are in line with these, especially as regards appointments with specialists in 2014, and suggest that in 2019 the impact of the level of education, when compared to 2014, had diminished.

Our study, by the very nature of the data and methodology used, was impacted by the usual limitations. In particular, the proxies of need do not allow one to distinguish between the need for appointments with a General Practitioner versus the need for appointments with specialists. The variables of use did not include the dimension of the quality of care nor did they consider other types of health care, such as hospital urgencies (which can be used as substitutes for appointments with specialists[18]). Moreover, the financial burden is not included in the analysis of equity in the use of health care, but we cannot ignore that equal use of medical care for equal needs can be achieved at the cost of high sacrifices by poorer individuals, who must forego other essen-

tial goods and services. One study, based on data from the last Household Budget Suvey[33] concluded that the weight of the expenses with medical costs in the total direct payments of Portuguese households has risen, including expenses with appointments with a general practitioner. One thing to bear in mind refers to the fact that the analysis of equity is based on deviations when compared to average use, which might not correspond to the clinically adequate level of care.

Comparing the data from 2019 with that from 2014, one can affirm that the average use of doctor's appointments increased, be they in appointments with a general practitioner (0.55 versus 0.41), be they in appointments with specialists (0.65 versus 0.44). Therefore, what was considered the norm in 2014, for each case, should not be considered, in absolute terms, the same for similar cases in 2019. Nonetheless, as these limitations apply both to 2014 and to 2019, they are not strong limitations for our objectives to analyse the evolution between the two periods. The fact that we have replicated the methods is a strength in this work, providing a robust comparison of results. Finally, regardless of equity in the use of health care being an objective *per se*, one question arises concerning to what extent the inequities in the use of doctor's appointments translate into health inequalities. The challenge to reduce these inequalities remains and even the Nordic countries of Europe, which are considered to be more egalitarian, have not achieved substantially better results in this respect[34].

Conclusion

The present study aimed to evaluate Portugal's performance concerning equity in the use of doctor's appointments, using data from the end of the last decade. Evidence suggests that non-need variables continue to influence this use, running contrary to the principle of horizontal equity of equal use for equal needs. While in 2014 this was the situation found mostly in appointments with specialists, in 2019, various statistically significant effects were also found for appointments with a general practitioner. In this respect, what stands out are the geographic inequities, with three regions presenting less use of doctor's appointments. In the case of appointments with specialists, the impact of education seems to have diminished, but in compensation, an effect upon income has emerged. By contrast, one favourable result is the absence of a statistically significant

impact of the variable that compares individuals who only receive benefits from the NHS with the rest of the population (with double, triple or higher insurance coverage).

As regards the concentration indexes, the results show the common pattern of an inequity index that is not statistically significant for appointments with a general practitioner and a positive index for appointments with specialists. The country is far from the peak observed in 2000; however, the tendency of decline in this index, which has been observed since then, may have been interrupted. This result is particularly worrisome, considering that after the data collection for the HIS 2019, we entered into a pandemic, which caused disruptions in the medical care activities of the NHS, as well as in the private and social sectors. In this sense, it is important to continue to monitor these indicators in order to understand if the value found in the present study is limited to 2019 or if we have once again begun to distance ourselves from the goal of equity.

Collaborations

Both authors contributed to the study design, analysis and discussion of results, original text writing and review. C Quintal prepared the literature review. M Antunes developed the empirical application.

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