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Access to health services and its influence on adherence to treatment of arterial hypertension during the COVID-19 pandemic in a Hospital in Callao, Peru

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Abstract: Access to health services compromises therapeutic adherence in patients with HTN, which is a risk factor for cardiovascular disease and premature death. The aim of the research is to determine the influence of access to health services on adherence to antihypertensive treatment during the COVID-19 pandemic. We included a cross-sectional analytical study. A survey was applied to 241 hypertensive patients at the Daniel Alcides Carrión Hospital, Callao-Peru. Data were analyzed using SPSS software. Absolute and relative frequencies were reported and the chi-square test was applied with a statistical significance level of p<0.05. In addition, multiple logistic regression analysis was performed using the Stepwise method. An association was found between non-adherence to treatment and health expenses (ORa: 1.9 CI 95% 1.7-2.2), not receiving care due to lack of a doctor (ORa: 2.8 CI 95% 1.5-3.2), having difficulty with schedules (ORa: 3.7 CI 95% 2.3-5.5), fear of receiving care at the hospital (ORa: 4.5 CI 95 % 2.7-6.8), trust in health personnel (ORa: 7.5 CI 95% 2.3-10.5) and considering that the physician does not have enough knowledge (ORa: 3.1 CI 95% 2.4-7.8). Therapeutic adherence was associated with physician availability for care, difficulty with schedules, fear of being seen in the hospital, trust in health personnel, and waiting time.

Keywords: adherence; COVID-19; arterial hypertension; health services

1. Introduction

Non-communicable diseases (NCDs) are the cause of 71% (41 million) deaths per year worldwide, with cardiovascular diseases being the leading cause [1]. Arterial hypertension (HTN) is one of the main risk factors for the development of cardiovascular disease and is the leading cause of premature death worldwide, making it a threat to public health [2] despite the fact that early detection, treatment and adequate control make it possible to reduce its morbidity, mortality and complications [3]. This mainly affects middle- and low-income countries, complicating the achievement of the Sustainable Development Goals (SDGs), especially the reduction of premature deaths from NCDs by 33% by 2030 [4].

In Peru, according to the Demographic and Family Health Survey 2020 (ENDES 2020), the prevalence of arterial hypertension in the population aged 15 years and older is 16.4%, with notorious differences between males (21.3%) and females (12%) [5], where 68% of the population with the disease received treatment [6]. In this sense, hypertension control involves risk identification, appropriate treatment, lifestyle changes and adherence to treatment [7].



Currently, adherence to treatment is an important point for the successful control of HTN [8]; however, studies conducted in Peru report that less than 50% of the population has optimal blood pressure levels and adherence to treatment. This situation makes them vulnerable to the development of complications such as acute myocardial infarction, stroke, among others [9–12].

Likewise, the control of hypertension can be affected by the limitations of health systems and the patient's personal factors [7]. The literature mentions that access to health services can be explained thanks to facilitating elements and personal, geographic, economic, and health system barriers, among others [13,14].

Due to the great global impact of HTN and its complications, in addition to the partial or total interruption in access and provision of health services for non-communicable diseases in the world caused by the COVID-19 pandemic [15], it is more necessary than ever to ensure access to care for patients with HTN, since there has been a neglect of diseases other than those caused by the coronavirus from the beginning of 2020 [16]. This is a challenge for weak health systems and for countries with limited resources, as it implies having policies that guarantee quality and equitable care that favors adherence to treatment and control of the disease [17].

Even though several factors that contribute to nonadherence to antihypertensive treatment have been postulated [18–20], it is important to develop studies to determine the influence of the determinants of access to health services on adherence to treatment, in order to prevent complications of the disease, in addition to having an impact on improving the Peruvian health system. Therefore, the aim of the present study was to determine the influence of access to health services on adherence to antihypertensive treatment during the COVID-19 pandemic.

2. Materials and Methods

Study design, instrument and population

This was an observational study with cross-sectional analytical design, in which a structured survey was applied to a sample of 241 adult patients with hypertension who came for consultation at the Cardiology Service of the Daniel Alcides Carrion Hospital in the Callao region of Peru. The sample was obtained by nonprobabilistic sampling. The survey included sociodemographic aspects and questions on access to health services according to the Tanahashi model [8], which considers four stages in the access process to obtain quality coverage: availability, accessibility, acceptability, contact and effective coverage. Adherence to treatment was measured by means of the Morisky-Green test [9].

Operational definition of variables

Tanahashi's definition of access to health care was used, understood as: "the interaction between specific aspects of service provision and the population that is influenced both by the characteristics of the health system and by the population's resources and capacities to recognize needs and seek care" [8].

Adherence was defined according to the World Health Organization (WHO): "The degree to which a person's behavior - taking medication, following a dietary regimen, and making lifestyle changes - corresponds to the agreed-upon recommendations of a health provider" [21].

Procedures and statistical analysis

Data were collected in Excel 2010 format and analyzed using SPSS 21.0 software. Descriptive analysis included frequency distribution for sociodemographic, adherence variables, and dimensions of health care access. For the bivariate analysis, contingency tableswere performed and p-values were calculated using the chi-square test. The level of statistical significance was established with a value of p<0.05.

Next, a multiple logistic regression analysis was performed, using the Stepwise method, where the indicators that showed a value of p<0.05 in the bivariate analysis were added step by step. The regression equations were elaborated until no more indicators were found to contribute to the model. The advantage of this method lies in the continuous evaluation of the predictors included in the model, so that the indicator that is explained by the remaining one is eliminated.

Ethical aspects

This study was conducted following the guidelines of the Declaration of Helsinki 1964 and its subsequent amendments. In addition, the study was approved by the Research Ethics Committee of the Hospital Daniel Alcides Carrion of the Callao region, Peru. All the participants in the study signed the informed consent before their participation and their identity was anonymized for the elaboration of the database, so their integrity was not violated.

3. Results

Descriptive and bivariate analysis according to adherence to antihypertensive treatment in the study sample

A total of 241 adult patients with a diagnosis of hypertension were analyzed, of whom 65.15 % (n=157) were female and 72.61 % (n=175) were 60 years of age or older. In addition, 52.28% (n=126) were married or cohabitant. Likewise, only 4.15% (n=10) had a university education. On the other hand, 21.99% (n=53) were not affiliated to the Public Health Insurance Scheme (SIS), 26.14% (n=3) indicated that they spent on medical consultations and 64.73% (n=156) spent on medicines. The bivariate analysis of the sociodemographic characteristics according to adherence is shown in Table 1.

Table 1. Descriptive and bivariate analysis according to adherence to antihypertensive treatment in adult patients with arterial hypertension treated at the Daniel Alcides Carrion National Hospital between September and December 2021.

			Adherence to antihype	rtensive treatment	
Characteristics	n	%	Non-adherent (%)	Adherent (%)	p-value ¹
			n=224 (92.94)	n=17 (7.06)	•
Gender					0,625
Female	157	65.15	145 (92.4)	12 (7.6)	
Male	84	34.85	79 (94.1)	5 (6.0)	
Age					0,117
10-37	9	3.73	9 (100.0)	-	
38-59	57	23.65	56 (98.3)	1 (1.8)	
≥60	175	72.61	159 (90.9)	16 (9.1)	
Civil status					0,285
Single	39	16.18	37 (94.9)	2 (5.1)	
Married or cohabitant	126	52.28	114 (90.5)	12 (9.5)	
Widowed or divorced	76	31.54	73 (96.1)	3 (4.0)	
Schooling					0,313
Never attended school	6	2.49	6 (100.0)	-	
Elementary school	49	20.33	48 (98.0)	1 (2.0)	
High school	139	57.26	125 (90.6)	13 (9.4)	
College	48	19.92	45 (93.8)	3 (6.3)	
Occupation					0,571
Homemaker	144	59.75	132 (91.7)	12 (8.3)	

Student	4	1.66	4 (100.0)	-	
Laborer or tradesman	16	6.64	16 (100.0)	-	
Employee	13	5.39	13 (100.0)	-	
Unemployed	64	26.56	59 (92.2)	5 (7.8)	
Employment status					0,361
Pensioner	65	26.97	63 (96.9)	2 (3.1)	
Independent	57	23.65	52 (91.2)	5 (8.8)	
Dependent	9	3.73	9 (100.0)	-	
Unemployed	110	45.64	100 (90.9)	10 (9.1)	
Family income					0,004
≤\$750	73	30.29	71 (97.3)	2 (2.7)	
\$751-1500	84	34.85	76 (90.5)	8 (9.5)	
>\$1500	39	16.18	32 (82.1)	7 (18.0)	
Does not report	45	16.87	45 (100.0)	-	
Public Health Insurance (SIS)					0,824
Subsidy	183	75.93	171 (93.4)	12 (6.6)	
Semi-contributory subsidy	2	0.83	2 (100.0)	-	
Independent insurance	3	1.24	3 (100.0)	-	
Does not have SIS	53	21.99	48 (90.6)	5 (9.4)	
Spends on consultations					0,143
No	178	73.86	168 (94.4)	10 (5.6)	
Yes	63	26.14	56 (88.9)	7 (11.1)	
Spends on medicines					0,002
No	85	35.27	85 (100.0)	-	
Yes	156	64.73	139 (89.1)	17 (10.9)	
Residence					0,287
Family	98	40.66	93 (94.9)	5 (5.1)	
Rented	31	12.86	29 (93.6)	2 (6.5)	
Inherited	54	22.41	47 (87.0)	7 (13.0)	
Owned	58	24.07	55 (94.8)	3 (5.2)	

¹ p-value estimated by chi-square test, with a significance level of p<0.05.

Regarding the characteristics and availability of health services, 66.8 % (n=161) responded that they did not receive care because the physician was not available. In addition, when asked about the timely care received, 32.78% (n=79) reported not having received timely care for their consultations or examinations (29.88%, n=72). Finally, 46.89 % (n=113) responded that they did not receive any information about their disease. The bivariate analysis of the characteristics and availability of health services according to adherence is shown in Table 2. **Table 2.** Descriptive and bivariate analysis of the characteristics and availability of health services according to adherence to antihypertensive treatment in adult patients with arterial hypertension treated at the Daniel Alcides Carrion National Hospital between September and December 2021.

			Adherence to an	p-value ¹	
Channatariatian		0/	treatm		
Characteristics	n	~/o	Non-adherent (%) Adherent (%)		
			n=224 (92.94)	n=17 (7.06)	
Considers the environment clean					0,004
Does not know	1	0.41	1 (100.0)	-	
No	60	24.9	50 (83.3)	10 (16.7)	
Yes	180	74.69	173 (96.1)	7 (3.9)	
Considers the bathrooms clean					0,329
Does not know	11	4.56	9 (81.8)	2 (18.2)	
No	189	78.42	177 (93.7)	12 (6.4)	
Yes	41	17.01	38 (92.7)	3 (7.3)	
When going to the physician's office, blood					
pressure is checked with a sphygmomanom-					0,168
eter					
Does not know	4	1.66	4 (100.0)	-	
No	4	1.66	3 (75.0)	1 (25.0)	
Yes	200	82.99	184 (92.0)	16 (8.0)	
Not reported	33	13.69	33 (100.0)	-	
Did not receive care because the physician					-0.001
was not available					<0,001
Does not know	3	1.24	1 (33.3)	2 (66.7)	
No	161	66.8	154 (95.7)	7 (4.4)	
Yes	77	31.95	69 (89.6)	8 (10.4)	
Would prefer to be seen in the afternoon					-0.001
shift					<0,001
Does not know	4	1.66	4 (100.0)	-	
No	180	74.69	174 (96.8)	6 (3.3)	
Yes	57	23.65	46 (80.7)	11 (19.3)	
Received timely attention for consultations					0,193
No	79	32.78	71 (89.9)	8 (10.1)	
Yes	162	67.22	153 (94.4)	9 (5.6)	
Received timely attention for exams					0,184
Does not know	4	1.66	3 (75.0)	1 (25.0)	
No	72	29.88	65 (90.3)	7 (9.7)	
Yes	165	68.46	156 (94.6)	9 (5.5)	
Knows the laboratory service			. ,		0,024
Does not know	17	7.05	14 (82.4)	3 (17.7)	
No	55	22.82	55 (100.0)	-	
Yes	169	70.12	155 (91.7)	14 (8.3)	
Received any information about the disease			. ,	× /	0,200
Does not know	13	5.39	11 (84.6)	2 (15.4)	
No	113	46.89	103 (91.2)	10 (8.9)	
Yes	115	47.72	110 (95.7)	5 (4.4)	

¹ p-value estimated by chi-square test, with a significance level of p<0.05.

Regarding accessibility, 24.48% (n=59) reported a travel time of more than 40 minutes, and the most frequently used means of transportation was the bus (78.42%, n=189). A total of 82.57% (n=199) responded that they considered that the health personnel were trained to provide care. Likewise, 58.51% (n=141) responded that they had had difficulties with administrative procedures, where the most common problem was the availability of the service (50.62%, n=122), while the least common was the lack of authorization of the service (0.41%, n=1).

On the other hand, it was found that 55.19 % (n=133) considered inadequate the time they had to wait from the time they requested their appointment until they received care. Similarly, 49.8% (n=120) reported having waited more than 60 minutes to be seen on the day of their appointment and 39% (n=94) reported not having received timely care. Regarding the economic aspect, it was found that the median loss in soles for attending a consultation was 30.00 (RIQ=20). On the other hand, 33.2% (n=80) mentioned that they

pay for the consultation or service received and 13.28% (n=32) have missed their appointment or care due to monetary limitations. Finally, 82.57% (n=199) bought medicines for their treatment and 46.47% (n=112) expressed not having complied with taking such medicine due to economic precariousness. Table 3 shows the bivariate analysis of the accessibility of health services according to adherence.

Table 3. Descriptive and bivariate analysis of accessibility to health services according to adherence to antihypertensive treatment in adult patients with arterial hypertension treated at the Daniel Alcides Carrion National Hospital between September and December 2021.

			Adherence to ant	n-value ¹	
Characteristics		0/	treatm	p-value	
Characteristics	п	/0	Non-adherent (%) Adherent (%)		
			n=224 (92.94)	n=17 (7.06)	
Time delay from residence to hospital					0,624
0-40 min	182	75.52	170 (93.4)	12 (6.6)	
>40 min	59	24.48	54 (91.5)	5 (8.5)	
Means of transportation					<0,001
Walking or cycling	14	5.81	10 (71.4)	4 (28.6)	
Taxi or motorcycle taxi	31	12.86	26 (83.9)	5 (16.1)	
Bus	189	78.42	182 (96.3)	7 (3.7)	
Own car	5	2.07	5 (100.0)	-	
Other	2	0.83	1 (50.0)	1 (50.0)	
Care staff trained to provide care					0,435
Does not know	22	9.13	19 (86.4)	3 (13.6)	,
No	20	8.30	19 (95.0)	1 (50.0)	
Yes	199	82.57	186 (93.5)	13 (6.5)	
Had difficulty with administrative proce-					
dures					0,002
Does not know	1	0.41	1 (100 0)	-	
No	99	41.08	99 (100 0)	-	
Yes	141	58 51	124 (87.9)	17 (12 1)	
Kind of difficulty in requesting care		00.01	1=1(0,0)	17 (12.11)	0.010
Difficulty with dates and times and	90	37 34	78 (86 7)	12 (13 3)	0,010
availability of the service	20	07.01	70 (00.7)	12 (10.0)	
Lack of information difficulties with	22	913	20 (90 9)	2 (9 1)	
dates availability of the service		2.15	20 (90.9)	2 (9.1)	
None	88	36 5	88 (100 0)		
Others	22	12.28	20 (00.6)	2 (0 1)	
No answer	9	3 73	29 (90.0)	3 (9.4)	
Lack of information)	0.70) (100.0)	-	0.984
No.	010	00 70	108 (02 0)	1E(7.0)	0,904
No	215	00.30	196 (95.0)	13(7.0)	
Tes	20	11.62	26 (92.9)	2 (7.1)	0 792
Non-authorization of service	240	00 50	222 (02.0)		0,783
No	240	99.59	223 (92.9)	17 (7.1)	
res	1	0.41	1 (100.0)	-	-0.001
Difficulty of dates and times		10.10		1 (2 0)	<0,001
No	116	48.13	115 (99.1)	1 (0.9)	
Yes	125	51.87	109 (87.2)	16 (12.8)	
Personal financial aspects					0,017
No	239	99.17	223 (93.3)	16 (6.7)	
Yes	2	0.83	1 (50.0)	1 (50.0)	
Service availability					0,001
No	119	49.38	117 (98.3)	2 (1.7)	
Yes	122	50.62	107 (87.7)	15 (12.3)	
Additional procedures					0,494
No	235	97.51	218 (92.8)	17 (7.2)	
Yes	6	2.49	6 (100.0)	-	
Does not know					0,783
No	240	99.59	223 (92.9)	17 (7.1)	
Yes	1	0.41	1 (100.0)	-	
None					0,001

No	153	63.49	136 (88.9)	17 (11.1)	
Yes	88	36.51	88 (100.0)	-	
Other/which					0,631
No	238	98.76	221 (92.9)	17 (7.1)	
Yes	3	1.24	3 (100.0)	-	
They were last appointment was re-					0.072
quested					0,072
1-3 days	112	46.47	108 (96.4)	4 (3.6)	
4-6 days	23	9.54	22 (95.7)	1 (4.4)	
7-9 days	106	43.98	94 (88.7)	12 (11.3)	
Considers waiting time to be adequate					0,018
Does not know	1	0.41	1 (100.0)	-	
No	133	55.19	118 (88.7)	15 (11.3)	
Yes	107	44.40	105 (98.1)	2 (1.9)	
Waiting time on the day of appointment					0,014
≤60 min	121	50.21	115 (95.0)	6 (5.0)	
61-180 min	72	29.88	69 (95.8)	3 (4.2)	
>180 min	48	19.92	40 (83.3)	8 (16.7)	
Received timely care					0,009
Does not know	7	2.90	5 (71.4)	2 (28.6)	
No	94	39.00	84 (89.4)	10 (10.6)	
Yes	140	58.09	135 (96.4)	5 (3.6)	
Attending the consultation is a financial					0.042
loss					0,042
No	218	90.46	205 (94.0)	13 (6.0)	
Yes	23	9.54	19 (82.6)	4 (17.4)	
How much is the economic loss estimated	30 [20-40]	30 [20-40]	35 [25-55]		0,508
A family member keeps company to the					0.242
consultation					0,343
No	191	79.25	176 (92.2)	15 (7.9)	
Yes	50	20.75	48 (96.0)	2 (4.0)	
Amount lost by the person accompanying	30 [20-40]	27.5 [17.5-40]	45 [40-50]		0 120
to the consultation					0,130
Any payment for consultation					0,469
No	161	66.80	151 (93.8)	10 (6.2)	
Yes	80	33.20	73 (91.3)	7 (8.8)	
Did not attend due to lack of money					0,619
Does not know	1	0.41	1 (100.0)	-	
No	208	86.31	192 (92.3)	16 (7.79	
Yes	32	13.28	31 (96.9)	1 (3.1)	
Purchased medicines for treatment					0,049
No	42	17.43	42 (100.0)		
Yes	199	82.57	182 (91.5)		
Did not take the medicines due to lack of					0 290
money					0,290
No	129	53.53	122 (94.6)		
Yes	112	46.47	102 (91.1)		
Health services care have been denied in					<0.001
the last year					~0,001
Does not know	28	11.62	21 (75.0)		
No	194	80.50	184 (94.9)		
Yes	19	7.88	19 (100.0)		

¹ p-value estimated by chi-square test, with a significance level of p<0.05.

Regarding the acceptability of health services, it was found that 88.38 % (n=213) reported that they did not feel afraid of being treated at the hospital and 96.68 % (n=233) did not feel discriminated against or rejected because of their illness. Likewise, 93.78 % (n=226) considered that the doctor had sufficient knowledge for their recovery, while 82.16 % (n=198) trusted the health personnel in general. Finally, 16.6 % (n=40) rated it as excellent, while 2.9 % (n=7) rated the medical treatment as bad. Table 4 shows the bivariate analysis of the acceptability of health services according to adherence.

Table 4. Descriptive and bivariate analysis of the acceptability of health services according to adherence to antihypertensive treatment in adult patients with arterial hypertension treated at the Daniel Alcides Carrion National Hospital between September and December 2021.

			Adherence to ant	p-value ¹	
		2/	treatm		
Characteristics	n	%	Non-adherent (%) Adherent (%)		
			n=224 (92.94)	n=17 (7.06)	
Fear of being treated at the hospital					<0,001
Does not know	1	0.41	-	1 (100.0)	
No	213	88.38	202 (94.8)	11 (5.2)	
Yes	27	11.20	22 (81.5)	5 (18.5)	
Felt discriminated against or rejected be-					0,428
cause of the disease					
No	233	96.68	216 (92.7)	17 (7.3)	
Yes	8	3.32	8 (100.0)	-	
It is difficult for a neighbor or family					0,668
member to know about one's health					
No	220	91.29	204 (92.7)	16 (7.3)	
Yes	21	8.71	20 (95.2)	1 (4.8)	
Treatment will control hypertension					0,646
Does not know	1	0.41	1 (100.0)	-	
No	10	4.15	10 (100.0)	-	
Yes	230	95.44	213 (92.6)	17 (7.4)	
The physician will have sufficient					0.027
knowledge for the recovery					0,037
Does not know	2	0.83	1 (50.0)	1 (50.0)	
No	13	5.39	13 (100.0)	-	
Yes	226	93.78	210 (92.9)	16 (7.1)	
Trusts in health staff					0,012
Does not know	30	12.45	24 (80.0)	6 (20.0)	
No	13	5.39	12 (92.3)	1 (7.7)	
Yes	198	82.16	188 (95.0)	10 (5.1)	
Feeling about the physician's treatment					0,288
Bad	7	2.90	7 (100.0)	-	
Fair	20	8.30	17 (85.0)	3 (15.0)	
Good	174	72.20	161 (92.5)	13 (7.5)	
Excellent	40	16.60	39 (97.5)	1 (2.5)	

¹ p-value estimated by chi-square test, with a significance level of p<0.05.

It was found that 34.02% (n=82) rated the quality of care as fair or very poor, while 5.81% (n=14) rated it as excellent or very good. Likewise, the quality of treatment received was perceived as fair or very poor by 8.71% (n=21) and as excellent by 27.39% (n=66) of the respondents. In addition, 70.95% (n=171) reported that the staff answered their questions, 95.85% (n=231) had their disease explained to them and 97.51% (n=235) received an explanation of the indicated treatment. It was found that 92.95% (n=224) were satisfied with the explanation provided by the health staff. Table 5 shows the bivariate analysis of the variables according to adherence.

Table 5. Descriptive and bivariate analysis of contact with health services according to adherence to antihypertensive treatment in adult patients with arterial hypertension treated at the Daniel Alcides Carrión National Hospital between September and December 2021.

			Adherence to ant	p-value ¹	
		0/	treatm		
Characteristics	n	%	Non-adherent (%) Adherent (%)		
			n=224 (92.94)	n=17 (7.06)	
Quality of care					0,511
Fair or poor	82	34.02	75 (91.5)	7 (8.5)	
Good	145	60.17	135 (93.1)	10 (6.9)	
Excellent or very good	14	5.81	14 (100.0)	-	
Quality of treatment received					0,320
Fair or poor	21	8.71	19 (90.5)	2 (9.5)	
Good	154	63.90	146 (94.8)	8 (5.2)	
Excellent or very good	66	27.39	59 (89.4)	7 (10.6)	
Staff answered the concerns					0,572
Does not know	55	22.82	52 (94.6)	3 (5.5)	
No	15	6.22	13 (86.7)	2 (13.3)	
Yes	171	70.95	159 (93.0)	12 (7.0)	
Had any discomfort with the medication					0,598
No	186	77.18	172 (93.6)	14 (7.5)	
Yes	55	22.82	52 (94.6)	3 (5.5)	
Stopped taking the medication before					0.444
completing treatment					0,444
No	188	78.01	176 (93.6)	12 (6.4)	
Yes	53	21.99	48 (90.6)	5 (9.4)	
Health staff explained about the disease					0,374
No	10	4.15	10 (100.0)	-	
Yes	231	95.85	214 (92.6)	17 (7.4)	
Health staff explained about the treat-					0.404
ment					0,494
No	6	2.49	6 (100.0)	-	
Yes	235	97.51	218 (92.8)	17 (7.2)	
Satisfied with the explanation					0,500
Does not know	7	2.90	7 (100.0)	-	
No	10	4.15	10 (100.0)	-	
Yes	224	92.95	207 (92.4)	17 (7.6)	

¹ p-value estimated by chi-square test, with a significance level of p<0.05.

Multiple logistic regression analysis according to adherence to antihypertensive treatment in the study sample.

The multiple logistic regression model found an association between adherence to antihypertensive treatment and consultation costs (ORa: 1.9, CI 95% 1,7:2,2), not receiving care because the physician was not available (ORa: 2,8, CI 95% 1,5:3,2), and fear of receiving care at the hospital (ORa: 4,5 CI 95 % 2,7:6,8). Table 6 shows all the associations found.

Table 6. Logistic regression analysis according to adherence in adult patients with arterial hypertension seen at the Daniel Alcides Carrión National Hospital between September and December 2021.

Characteristics	Adjusted OR		CI 95%	p-value ¹
Expenses in the consultation	No	1.9	1.7 – 2.2	<0,001
-	Yes			
Considers the environment clean	No	1.4	1.2 - 1.8	0,001
	Yes			
Not receiving care because the physician was not	No	2.8	1.5 – 3.2	<0,001
present	Yes			
Difficulty with procedures	No	1.8	1.2 - 2.8	0,035
	Yes			
Difficulty with dates and schedules	No	3.7	2.3 - 5.5	0,040
	Yes			
Fear of being treated at the hospital	No	4.5	2.7 - 6.8	<0,001
	Yes			
Trusts in health staff	No	7.5	2.3 - 10.5	<0,001
	Yes			
Considers that the physician did not have enough	No	3.1	2.4 - 7.8	0,030
knowledge to treat	Yes			

¹ p-value estimated by chi-square test, with a significance level of p<0.05.

4. Discussion

In this study, non-adherence to antihypertensive treatment reached 92.94%, this predominance of non-adherence to treatment in hypertensive patients was also reported in a study on therapeutic adherence in patients with chronic diseases [22], where Bertoldo et al found that 38% of patients did not comply with treatment, highlighting hypertensive patients with 75% non-adherence. However, this high percentage found does not coincide with the general acceptance of therapeutic adherence which is between 50 and 70% [22] and differs from the 37.4 % adherence reported by Quintana et al [23] or the 43.9% reported by Martinez [24] using, in both cases, the same instrument.

Likewise, it differs from Peruvian studies where the Morisky-Green test was also used, such as that of Carhuallanqui et al, who found 37.9% adherence [25] and that of Fernández-Arias who found 57.4% adherence in hypertensive patients [11]. However, the low adherence rate coincides with that found by Rosas-Chávez [26] in an observational study, where they determined a 15% adherence rate, although it is still above the percentage found in the present study, this low adherence is a sample of the heterogeneity of this phenomenon in Peru, probably related to cultural, demographic and educational factors, considering that both studies were carried out in different hospitals in Lima and Callao.

On the other hand, in the United States, lack of adherence to antihypertensive treatment affects approximately 75% of patients, which implies that they do not achieve optimal blood pressure control. In addition, studies carried out in recent years show that about 50% of hypertensive patients are unable to comply with a hygienic-health regimen and to adhere correctly to pharmacological treatment, especially when these measures last for more than 1 year [27].

Likewise, the evidence reviewed suggests that sociodemographic characteristics such as gender and age, among others, seem to be related to adherence [18]. This does not coincide with the findings of this study, since none of the sociodemographic characteristics studied was significantly associated with adherence, with the exception of family income (p=0.004), where the results showed a greater number of adherent patients (9.5%) among those with an income of between 751 and 1500 dollars. Despite the above, the percentage remains low; and expenditure on medications (p=0.002) where 100% non-

adherence was found among those who do not spend on medications, probably due to the fact that those who spend on their health tend to take better care of themselves. The findings of Ruiz-Alejos et al [19] and Martínez et al [24] show that arterial hypertension predominates in the male gender, in contrast to this study, which found a predominance in the female sex (65.15%).

On the other hand, in order to study the reasons for this low adherence to antihypertensive treatment, Tanahashi suggested the need to focus attention on access to health services to identify the population that does not have access or has difficulty in doing so and to redirect actions towards them to improve primary care coverage [28]. This is all the more important because of the asymptomatic nature of hypertension and, therefore, in many cases it is detected as a finding in a routine examination and most patients are unaware that they suffer from hypertension [29], so early detection of hypertension is crucial in Peru and relies mainly on routine blood pressure control in patients who come for consultation. However, this is not consistent with what was found in this study, because although 82.99% of patients had their blood pressure checked at the time of consultation, it was not found that receiving such control was significantly associated with adherence (p=0.168). It also differs from what was reported by Gabert et al [20], in that study, which also refers to the scarcity or deterioration of resources and personnel to carry out an adequate diagnosis, as in the present study, since the unavailability of the physician to provide care (p<0.001), as well as the availability of the services (p=0.001), not knowing the location of some services such as the laboratory (p=0.024) and the hygienic state of the environments where care was received (p=0.004) were associated with therapeutic adherence.

In addition, adherence may also be compromised by the patient's confidence in receiving care and his or her relationship with the health care provider [30], demonstrating that fear of receiving care in the hospital is associated with adherence (p<0.001).

It is important to mention the importance of patient follow-up after the first visit to control the progression of the disease and reduce the possible risk factors that the patient presents, taking into account the cardiovascular risk, which should also be evaluated at the first visit. Carrying out the aforementioned can be complicated by the availability of patients who work or fulfill obligations that demand a large part of their day [31], this coincides with what was found in this study, since the timetable difficulty was associated with adherence (p<0.001) as well as the waiting time to receive an appointment (p=0.018) and to be seen on the scheduled day (p=0.014).

Other authors, such as Gabert [20] and Owolabi [32] raised the availability and accessibility of adequate medications as important barriers to the management of hypertension, similar to what has been found in other studies on access to treatment in other chronic diseases [32, 34], all of which coincides with the results of this study that identified as factors associated with adherence the means of transportation (p<0.001) and difficulty with administrative procedures (p=0.002). As consequence, in this study, not having received timely care was related to adherence (p=0.009).

Likewise, the family plays a fundamental role in compliance with the therapeutic regimen, providing support in seeking care and, in many cases, assuming a leadership role during treatment [23]. However, no significant association was found between therapeutic adherence and family or acquaintance support (p=0.428), This could be explained by the lack of specificity of the question in the Morisky-Green test, since it does not have a question directed to this point and the closest questions are marital status and a question related to the difficulty of a family member or neighbor knowing about the patient's health, which leaves little or no information available to study this possible relationship. The limitations of the present study include: 1) The study population included patients treated at the Hospital Nacional Daniel Alcides Carrion which, being a hospital in the Callao region, may not be representative of the whole country due to its sociodemographic characteristics, 2) The sampling was non-probabilistic, which limits the possibility of extrapolating and, therefore, generalizing the results since the representativeness of the population is not guaranteed. Despite these limitations, the present study provides a first scope of the influence of access to health services on adherence, which will contribute evidence for larger studies.

5. Conclusions

The adherence to antihypertensive treatment evaluated in our study sample is associated with family income, medicine expenses, availability of the physician for care, means of transportation, difficulty of dates and schedules, fear of being treated in the hospital, trust in health staff, availability of services, waiting time, and receiving timely care.

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