Sources of access to medication and its use in the rural area of Pelotas, Rio Grande do Sul, Brazil, in 2016: a cross-sectional population-based study*

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Abstract

Objective: To analyze the prevalence of medication use, sources of access, and associated factors among rural residents in Pelotas, RS, Brazil. **Methods:** This was a cross-sectional study conducted in 2016 with adults ≥18 years old. Participants reported on medication use and sources of access to medication in the month prior to the interview. Poisson regression was used. **Results:** Among the 1,519 respondents, 54.7% (95%CI 48.7;60.5) used some form of medication and 3.3% (95%CI 2.4;4.5) stopped taking necessary medication. Higher prevalence of use occurred in: women (PR=1.23 – 95%CI 1.12;1.34), the elderly (PR=2.36 – 95%CI 2.05;2.73), people with poorer self-perceived health (PR=1.29 – 95%CI 1.14;1.46) and people with a higher number of diseases (PR=2.37 – 95%CI 2.03;2.77). A total of 14.0% (95%CI 11.2;17.4) obtained medication exclusively from the Brazilian National Health System, prevalence of which was higher among those who self-reported themselves to be non-white and from lower economic classification. **Conclusion:** A low number stopped taking medication they needed to take. Use of free-of-charge medication was greater in groups with lower income.

Keywords: Health Surveys; Rural Areas; Rural Health; Pharmacoepidemiology; Pharmaceutical Services; Drug Utilization.

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Introduction

There are determinants of access to medication and its use, including health services, geographical access to these places and pharmacy service acceptability in the opinion of those who use them (service user expectations and characteristics of the products and the service).[1,2] The pattern of medication use also differs according to people's sociodemographic, cultural, behavioral and health characteristics.[3,4]

> *The use of medications differs according to sociodemographic, cultural, behavioral and health characteristics of individuals. Lower prevalence of drug use is observed in rural areas.*

Studies based on data from countries with contrasting socioeconomic situations have found lower prevalence of medication use in rural areas in comparison to urban areas.[5,6] Moreover, there is a connection between availability, accessibility, medication use and health results which, especially in low- and middle-income countries, still poses an important challenge for public health.[1,7]

Brazil has a pharmaceutical system intended to ensure that its population has universal and free-of-charge access to medication considered to be essential.[4,8] However, in many situations health service users need medications that are not available free of charge via the public health system, so that they have to pay for it, which may seriously compromise their income or interfere the continuity of the drug treatment.[9]

We found few studies that assessed medication use in rural areas of Brazil.[10,11] Limitations of a logistical and financial nature hinder studies being conducted in rural areas,[12] where there is also less availability of health services and pharmacies close to people's homes.[13] These factors can interfere in the pattern of medication use.

Apart from the scarcity of studies on this theme in rural areas, it is fundamental to gain knowledge of possible factors associated with medication use and sources from where medication is obtained. This knowledge can contribute to the establishment of priorities and planning and public policies planning, targeting the rural population.

The objective of this study was to analyze the prevalence of medication use, sources of access and associated factors among people living in the rural area of Pelotas, located in the state of Rio Grande do Sul, in Southern Brazil.

Methods

A cross-sectional population-based study was conducted in the rural area of Pelotas, RS, Brazil. The study is part of a broader research project on the health of the rural population.[12] The municipality of Pelotas has a population of around 340,000 inhabitants. Approximately 7% of those individuals live in the rural area of the municipality.[14] The rural area is comprised of eight districts, divided into 50 census tracts and has 14 primary healthcare centers.

To be eligible in this study, participants had to be 18 years old or over, routinely living in the rural area of Pelotas – i.e. living in a household which was their usual residence on the date of the interview; or temporarily absent for a period not greater than 12 months from that date. Individuals were excluded from the study if they had any cognitive/mental disabilities, unaided by helpers or family members, those hospitalized or institutionalized during the data collection process, as well as those who did not speak/understand Portuguese (part of the population has Pomeranian origin.).

The sample size was calculated aiming to meet the objectives of all research projects, whereby the largest size needed was 1,458 individuals for the 'tobacco use' outcome. The sample size was estimated using the OpenEpi statistical analysis program. The parameters used were 20% prevalence,[15] 95% confidence level, a 3 percentage point margin of error and a 2.0 design effect. A further 10% was added for possible losses/refusals and 15% to adjust for possible confounding factors.

The sampling process took place in two stages. Firstly, 24 census tracts were selected randomly in a number proportional to the number of households in each district. Thirty households were then selected in each census tract, all of which were identified in community groups (largest number of households close together) in each tract, summing up 720

households. Further details on the methodology can be found in a previous publication.[12]

Data collection took place by means of face-to-face interviews in each participant's household between January and June 2016. The questionnaire comprised sociodemographic and behavioral questions and questions on health. It was administered via the REDCap platform,[16] using Samsung Galaxy Tab E tablets.

The interviewers received training on administering the questionnaires which had been tested beforehand in a pilot study with 19 participants (not included in the sample) conducted in Arroio do Padre, formerly an area of Pelotas and transformed into a separate municipality in 1996, which also has rural characteristics.

Losses to the study were defined as residents not found after at least three attempts to make contact on different days and at different times. The field work was supervised by the researchers. Quality control was carried out with 10% of randomly selected respondents by telephone, by readministering a shorter version of the questionnaire (ten questions from the original questionnaire), with the aim of checking repeatability and data quality.

The dependent variables analyzed were 'use of medication', 'source of access to medication used' and 'non-use of necessary medication', all within the 30 days prior to the interview. First of all respondents were asked whether during the last month they had stopped taking medication they needed to take. The answer options to this question, which was read to the participants, were: yes; no; did not need to take medication in the last month. If the answer was 'did not need to take medication in the last month', the remaining questions about medication were not asked.

With regard to the 'source of access to medication used' outcome, the following question was asked:

"In the last month, where did you get the medication you took?"

The sources of access to medication were categorized into: (i) Brazilian National Health system (SUS), totally free of charge; (ii) private establishment, such as private sector pharmacies, upon payment; or (iii) mixed, i.e. both from the SUS and from private establishments or the *Farmácia Popular*. Analysis of association was based on dichotomization of this information, between 'SUS' (free-of-charge source) and 'private/mixed establishment', in order to be able to assess whether medication had been obtained totally free of charge or not.

The outcome variable 'use of medication in the last 30 days' was built based on the answers to the two preceding questions, about having stopped taking medication and sources of access to medication. Those who reported not needing to take medication in the last 30 days were considered not to be medication users, while those who indicated a source where they had got medication in the last 30 days were considered to be medication users.

The 'non-use of necessary medication' outcome was built based on a positive answer to the initial question, i.e. 'Yes, stopped taking medication that needed to take'. These respondents were asked why they did not take their medication and the name(s) of the medication not taken, later classified according to the World Health Organization (WHO) Anatomical Therapeutical Chemical classification system – ATC Level 1.[17] When respondents could not remember the name of the medication, they were asked to show the medication package or prescription to the interviewer.

The independent variables encompassed sociodemographic factors related to health and health services:

a) Sociodemographic factors
- Sex (male; female);
- Age (completed years: 18-39; 40-59; 60 or over);
- Self-reported skin color (White; non-white);
- Marital status (no partner; had a partner);
- Schooling (completed years of study: no schooling/incomplete elementary education; complete elementary education/incomplete high school education; complete high school education/incomplete higher education; complete higher education or above);
- Economic classification (A/B [wealthier]; C; D/E [poorer]), according to the *Associação Brasileira de Empresas de Pesquisa;*[18]
- Current work situation (not working; working).
b) Health-related factors
- Self-perceived health (very good/good; regular; poor/very poor);
- Number of chronic diseases present (none; one or two; three or more), obtained by asking the

following question, *"Has a doctor or a health professional ever told you that you have...?"* including cardiocirculatory system diseases, diabetes *mellitus*, cancer, among others.

c) Health service-related factors
- Registered with the Family Health Strategy (FHS), created by the Ministry of Health as a strategy to support Primary Health Care (yes; no);
- Perception of distance between household and nearest pharmacy (Far, but easy to access; far and hard to access; close and easy to access; close, but hard to access). As the proportion of individuals who considered that this distance was 'close, but hard to access' was very low (n=22; 1.5%), for the purposes of analysis, this variable was dichotomized into easy to access or hard to access, regardless of distance;
- Perception of distance between household and nearest Primary Healthcare Center (PHC) (Far, but easy to access; far and hard to access; close and easy to access; close, but hard to access).

The sample was described and the proportions and respective 95% confidence intervals (95%CI) of medication use and sources of access were presented according to independent variables. Poisson regression was used to obtain crude and adjusted prevalence ratios (PR) for these two outcomes. The adjusted analysis followed the three-layer hierarchical model built based on the literature.[2,4,10,11,19,20] The first level included sociodemographic variables; the second level contained the 'self-perceived health' and 'number of chronic diseases' variables; while the third and final level contained the variables related to health services, 'registered with the FHS', 'distance from home to pharmacy' and 'distance from home to the nearest PHC'. The variables were adjusted to those on the same level and those on the next level up; backward selection was used, whereby only those with a p-value <0.20 were kept in the model. The data were weighted according to the number of households sampled, in relation to the total number of permanent households in each district (*svy* command). A 5% significance level was used. The data were analyzed using the Stata 14.0 statistical package (Stata Corporation, College Station, USA).

The study was approved by the Federal University of Pelotas Faculty of Medicine Research Ethics Committee on December 11th 2015, number 1.363.979. Participants signed a Free and Informed Consent form before starting the interview.
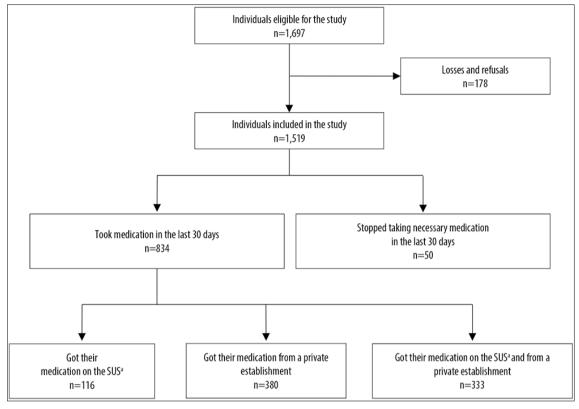
Results

A total of 1,697 individuals were considered eligible for this research. After losses and refusals (n=178), the final sample resulted in 1,519 (89.5%) individuals to be interviewed (Figure 1). The majority of losses and refusals were males and in the 18-24 age group (p<0.05).

Among the participants, 51.7% were females individuals aged 40-59 years old (39.2%), those self-reporting white skin color (85.1%), those who lived with a partner (70.8%), those who had no schooling/incomplete elementary education (66.1%), those belonging to economic classification C (53.7%) and those who had a job (59.5%). A total of 64.1% of respondents had very good/good self-perception of their health, 41.8% had no chronic diseases, 71.4% were registered with the FHS, 62.8% considered the distance between their home and the closest pharmacy to be easy to access and 74.3% considered the distance between their home and the closest PHC to be easy to access (Table 1).

Over half the participants (54.7% – 95%CI 48.7;60.5) had taken medication in the month prior to the interview. Prevalence of medication use was higher among women, individuals aged 60 or over, those with less schooling, those who did not work, those who had poor/very poor self-perceived health and those who had more chronic diseases (Table 1).

In the adjusted analysis, medication use was higher among women (PR: 1.23 - 95%CI 1.12;1.34), in older respondents (≥60 years old: PR=2.36 – 95%CI 2.05;2.73), in those with more chronic diseases (3 or more: PR=2.37 – 95%CI 2.03;2.77) and with regular and poor/very poor self-perceived health (PR= 1.29 – 95%CI: 1.14;1.46). The prevalence of medication use was lower among individuals who did not live with a partner (PR= 0.88 - 95%CI 0.80;0.98) and those who had a job (PR= 0.82 - 95%CI 0.71;0.94) (Table 2).

Among individuals who took medication, 14.0% (95%CI 11.2;17.4) reported that they were able to get their medication on the SUS, 45.8% (95%CI 40.3;51.4) from private establishments and 40.2% (95%CI 35.5;45.0) from mixed sources (SUS plus private establishment).

a) SUS: Brazilian National Health System.

Figure 1 – Selection process of interviewed individuals, rural area of Pelotas, Rio Grande do Sul, 2016

Table 1 – Description of the sample (n=1,519) and frequency of medication use (n=834) among people living in the rural area of Pelotas, Rio Grande do Sul, 2016

Variables	Total		Medication use	
	n	%	n	% (95%CIª)
Sex				
Male	734	48.3	349	47.2 (40.8;53.7)
Female	785	51.7	485	61.6 (54.9;67.8)
Age (years)				
18-39	515	34.0	166	32.0 (27.1;37.3)
40-59	593	39.2	332	55.7 (50.9;60.4)
≥60	411	26.8	336	81.9 (71.1;89.2)
Self-reported skin color				
White	1.296	85.1	714	54.9 (48.9;60.7)
Non-white	223	14.9	120	53.4 (41.4;65.0)
Lives with partner				
No	443	29.2	228	51.0 (44.6;57.3)
Yes	1.076	70.8	606	56.2 (49.4;62.7)

To be continue

Continuation

Table 1– Description of the sample (n=1,519) and frequency of medication use (n=834) among people living in the rural area of Pelotas, Rio Grande do Sul, 2016

Variables	Total		Medication use	
	n	%	n	% (95%CIª)
Schooling				
No schooling/incomplete elementary education	996	66.1	609	60.7 (52.2;68.7)
Complete elementary education/incomplete high school education	233	15.4	92	39.2 (31.0;48.1)
Complete high school education/incomplete higher education	213	14.0	89	41.9 (36.0;48.1)
Complete higher education or above	67	4.5	36	53.4 (42.4;64.0)
Economic classification				
A/B	301	20.0	170	56.5 (49.9;62.9)
C	814	53.7	436	53.4 (46.2;60.4)
D/E	388	26.3	221	56.3 (47.5;64.8)
Current work situation				
Not working	613	40.5	420	68.3 (62.0;74.0)
Working	906	59.5	414	45.3 (39.3;51.6)
Self-perceived health				
Very good/good	964	64.1	404	41.6 (36.0;47.5)
Regular	461	30.4	349	75.6 (64.2;84.3)
Poor/very poor	82	5.5	72	87.7 (78.7;93.2)
Number of chronic diseases				
None	631	41.8	162	25.6 (21.0;30.8)
1 - 2	614	40.2	426	69.2 (63.0;74.7)
3 or more	274	18.0	246	89.6 (72.5;96.6)
Registered with Family Health Strategy				
No	423	28.6	212	49.9 (37.5;62.3)
Yes	1.070	71.4	608	56.6 (52.2;60.9)
Distance from home to pharmacy				
Easy to access	941	62.8	497	52.4 (46.2;58.6)
Hard to access	563	37.2	325	57.8 (50.0;65.1)
Distance from home to nearest primary healthcare center				
Far, but easy to access	179	11.7	94	51.8 (42.7;60.8)
Far and hard to access	121	7.9	66	54.8 (45.4;63.8)
Close and easy to access	1.107	74.3	606	54.5 (48.3;60.5)
Close, but hard to access	92	6.1	56	61.0 (47.4;73.2)
Total	**1,519**	**100.0**	**834**	**54.7 (48.7;60.5)**

a) 95%CI: 95% confidence interval.

Table 2 – Crude and adjusted analysis of prevalence of medication use in relation to the independent variables, among a sample of adults (n=834) living in the rural area of Pelotas, Rio Grande do Sul, 2016

Variables	Medication use			
	Crude analysis		Adjusted analysis	
	PR[a] (95%CI[b])	p-value[c]	PRa (95%CI[b])	p-value[c]
Sex		<0.001		<0.001
Male	1.00		1.00	
Female	1.30 (1.18;1.45)		1.23 (1.12;1.34)	
Age (years)		<0.001[d]		<0.001d
18-39	1.00		1.00	
40-59	1.74 (1.54;1.97)		1.74 (1.54;1.97)	
≥60	2.56 (2.23;2.84)		2.36 (2.05;2.73)	
Self-reported skin color		0.800		0.483
White	1.00		1.00	
Non-white	0.97 (0.79;1.20)		1.07 (0.89;1.28)	
Schooling		<0.001[d]		0.623
No schooling/incomplete elementary	1.00		1.00	
Complete elementary/incomplete high school	0.65 (0.51;0.82)		0.92 (0.73;1.17)	
Complete high school/incomplete higher education	0.69 (0.60;0.80)		0.92 (0.80;1.07)	
Complete higher education or above	0.88 (0.70;1.11)		0.98 (0.75;1.27)	
Lives with partner		0.079		0.016
No	0.91 (0.81;1.01)		0.88 (0.80;0.98)	
Yes	1.00		1.00	
Economic classification		0.586		0.667
A/B	1.00		1.00	
C	0.94 (0.80;1.12)		0.94 (0.80;1.11)	
D/E	1.00 (0.83;1.20)		0.93 (0.80;1.09)	
Current work situation		<0.001		0.005
Not working	1.00		1.00	
Working	0.66 (0.59;0.75)		0.82 (0.71;0.94)	
Self-perceived health		<0.001d		<0.001
Very good/good	1.00		1.00	
Regular	1.82 (1.62;2.04)		1.29 (1.17;1.42)	
Poor/very poor	2.11 (1.85;2.39)		1.29 (1.14;1.46)	
Number of chronic diseases		<0.001[d]		<0.001[d]
None	1.00		1.00	
1 - 2	2.71 (2.31;3.16)		2.23 (1.92;2.58)	
3 or more	3.50 (2.98;4.12)		2.37 (2.03;2.77)	
Registered with Family Health Strategy		0.292		0.270
No	1.00		1.00	
Yes	1.13 (0.89;1.44)		1.15 (0.89;1.47)	

To be continue

Continuation

Table 2 – Crude and adjusted analysis of prevalence of medication use in relation to the independent variables, among a sample of adults (n=834) living in the rural area of Pelotas, Rio Grande do Sul, 2016

Variables	Medication use			
	Crude analysis		Adjusted analysis	
	PRᵃ (95%CIᵇ)	p-valueᶜ	PRa (95%CIᵇ)	p-valueᶜ
Distance from home to pharmacy		0.120		0.222
Easy to access	1.00		1.00	
Hard to access	1.10 (0.97;1.25)		1.06 (0.96;1.17)	
Distance from home to nearest primary healthcare center	0.384		0.459	0,459
Far, but easy to access	1.00		1.00	
Far and hard to access	1.06 (0.86;1.30)		0.98 (0.83;1.15)	
Close and easy to access	1.05 (0.90;1.22)		1.08 (0.95;1.23)	
Close, but hard to access	1.18 (0.98;1.42)		1.02 (0.86;1.21)	

a) PR: prevalence ratio.
b) 95%CI: 95% confidence interval.
c) Wald test for heterogeneity.
d) Wald linear trend test.

The highest percentage of medication provided by the SUS was found among individuals of non-white skin color (22.9%) and those belonging to economic classification D/E (20.8%) (Table 3).

Following adjustment, the prevalence of obtaining medication totally free of charge was higher among those of non-white skin color (PR= 1.82 - 95%CI 1.24;2.66) and was lower among those with regular self-perceived health (PR= 0.53 - 95%CI 0.35;0.80). The lower the economic classification, the greater the probability of getting medication free of charge (Table 4).

A total of 3.3% (95%CI 2.4;4.5) of the individuals in the sample (n=50) reported having stopped taking at least one type of medication in the last 30 days, and the main reasons reported for this were: unable to get it on the SUS or from the *Farmácia Popular* (n=26; 52.0%); own free will (n=15; 30.0%); prescription out of date (n=4; 8.0%); upon medical recommendation (n=5; 10%) (data not shown in tables).

Types of medication for the nervous system were those most frequently not taken (n=16) among necessary medicine, followed by types of medication for the cardiovascular system (n=10), those for the alimentary tract and the metabolism (n=7) and those for the musculoskeletal system (n=6). Although with less frequency, respondents also stopped taking medication for the blood and hematopoietic organs (n=3); for the genitourinary system and sex hormones (n=3); anti-infectives (n=2); antiparasitics, insecticides and repellents (n=1); and dermatological medication (n=2) (data not shown in tables). Some participants stopped taking a further two kinds of medication, which were unable to be classified as they were not found in the WHO/ATC.

Discussion

Over half the respondents had taken some kind of medication in the month prior to the interview. Use of medication was greater among women, older individuals, those with more chronic diseases and poorer self-perceived health; whilst it was less frequent among those who did not have a partner and those who were working. Approximately one in seven got their medication totally free of charge, prevalence of which was greater among males, those who self-reported non-white skin color, those belonging to lower economic classifications and those with good/very good self-perceived health. Few interviewees reported not having taken medication considered to be necessary in the 30 days prior to the interview and only half of these reported not taking medication because of difficulty in getting it on the SUS or via the *Farmácia Popular*.

Table 3 – Description of sources of access to medication taken in the last month among adults (n=829ᵃ) living in the rural area of Pelotas, Rio Grande do Sul, 2016

Variables	Sources of access to medication		
	SUSᵇ	Private establishment	Mixed (SUS and private establishment)
	(n=116)	(n=380)	(n=333)
	%(IC95%ᶜ)	%(IC95%ᶜ)	%(IC95%ᶜ)
Sex			
Male	17.3 (13.1;22.5)	49.3 (43.0;55.7)	33.3 (27.4;39.9)
Female	11.6 (8.5; 15.8)	43.3 (36.7; 50.2)	45.0 (40.0; 50.2)
Age (years)			
18-39	17.4 (12.0;24.6)	57.9 (48.0;67.2)	24.7 (18.3;32.4)
40-59	14.5 (11.4;18.2)	43.7 (38.0;49.6)	41.8 (36.1;47.8)
≥60	11.9 (8.4;16.5)	41.9 (34.4;49.9)	46.2 (38.5;54.1)
Self-reported skin color			
White	12.5 (9.8;15.8)	47.8 (42.2;53.5)	39.7 (34.5;45.0)
Non-white	22.9 (16.4;31.1)	33.9 (24.5;44.9)	43.2 (35.4;51.3)
Lives with partner			
No	15.5 (10.9;21.7)	40.3 (35.1;45.8)	44.1 (39.3;49.1)
Yes	13.4 (10.6;16.9)	47.9 (41.6;54.2)	38.7 (33.2;44.4)
Schooling			
No schooling/incomplete elementary	14.0 (10.9;17.9)	41.3 (35.1;47.7)	44.8 (38.8;50.9)
Complete elementary/incomplete high school	12.1 (5.8;23.3)	54.8 (40.5;68.4)	33.1 (21.8;46.8)
Complete high school /incomplete higher education	18.0 (10.2;29.9)	53.3 (42.4;64.0)	28.6 (18.6;41.4)
Complete higher education or above	9.2 (3.0;24.9)	79.1 (64.2;88.8)	11.7 (5.4;23.5)
Economic classification			
A/B	9.9 (6.0;15.9)	60.3 (53.3;67.0)	29.8 (22.3;38.7)
C	12.3 (9.1;16.5)	43.3 (36.0;50.9)	44.3 (37.6;51.3)
D/E	20.8 (15.3;27.7)	37.9 (30.8;45.7)	41.3 (35.6;47.1)
Current work situation			
Not working	12.4 (8.9;17.1)	36.5 (30.9;42.5)	51.1 (45.4;56.9)
Working	15.7 (12.3;19.7)	55.5 (49.5;61.3)	28.9 (23.4;35.1)
Self-perceived health			
Very good/good	17.2 (14.1;20.9)	50.3 (44.4;56.2)	32.5 (27.2;38.3)
Regular	10.1 (6.7;14.9)	42.9 (36.1;50.0)	47.0 (39.9;54.1)
Poor/very poor	13.2 (5.7;27.8)	35.0 (21.0;52.3)	51.8 (39.2;64.1)
Number of chronic diseases			
None	16.2 (10.6;24.1)	69.6 (59.0;78.5)	14.2 (8.3;23.1)
1 - 2	15.3 (12.0;19.2)	45.2 (39.2;51.4)	39.5 (33.7;45.7)
3 or more	10.3 (6.5;16.0)	31.1 (23.7;39.6)	58.6 (50.7;66.2)

To be continue

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Table 3 – Description of sources of access to medication taken in the last month among adults (n=829ª) living in the rural area of Pelotas, Rio Grande do Sul, 2016

Variables	Sources of access to medication		
	SUSᵇ	Private establishment	Mixed (SUS and private establishment)
	(n=116)	(n=380)	(n=333)
	%(IC95%ᶜ)	%(IC95%ᶜ)	%(IC95%ᶜ)
Registered with Family Health Strategy			
No	12.1 (7.8;18.3)	54.0 (46.5;61.4)	33.9 (30.1;37.9)
Yes	14.7 (11.6;18.4)	42.6 (36.6;48.9)	42.7 (36.6;49.0)
Distance from home to pharmacy			
Easy to access	15.0 (11.5;19.4)	45.4 (38.8;52.0)	39.6 (33.6;46.0)
Hard to access	12.7 (9.4;16.9)	46.4 (40.6;52.3)	40.9 (35.7;46.4)
Distance from home to nearest Primary Healthcare Center			
Far, but easy to access	10.7 (5.5;19.7)	49.7 (37.5;61.9)	39.6 (29.2;51.1)
Far and hard to access	12.4 (6.5;22.6)	52.7 (39.8;65.3)	34.9 (25.1;46.1)
Close and easy to access	15.0 (11.9;18.8)	43.7 (38.6;49.0)	41.2 (35.8;46.9)
Close, but hard to access	13.1 (7.3;22.3)	49.9 (32.2;67.7)	37.0 (23.4;53.1)
Total	**14.0 (11.2;17.4)**	**45.8 (40.3;51.4)**	**40.2 (35.5;45.0)**

a) The variable has 5 missing items.
b) SUS: Brazilian National Health System.
c) 95%CI: 95% confidence interval.

Table 4 – Crude and adjusted analysis of prevalence of obtaining only free of charge medication in relation to the independent variables among adults (n=829ª) living in the rural area of Pelotas, Rio Grande do Sul, 2016

Variables	Adjusted analysis			
	PRª (IC95%ᵇ)	p-valueᶜ	PRª (IC95%ᵇ)	p-valueᶜ
Sex		0.040		0.055
Male	1.00		1.00	
Female	0.67 (0.46;0.98)		0.68 (0.46;1.01)	
Age (years)		0.178		0.441
18-39	1.00		1.00	
40-59	0.83 (0.54;1.28)		0.84 (0.54;1.30)	
≥60	0.68 (0.45;1.05)		0.72 (0.43;1.20)	
Self-reported skin color		0.004		0.004
White	1.00		1.00	
Non-white	1.83 (1.24;2.71)		1.82 (1.24;2.66)	
Schooling		0.612		0.197
No schooling/incomplete elementary	1.00		1.00	
Complete elementary/incomplete high school	0.86 (0.41;1.81)		0.82 (0.39;1.74)	
Complete high school /incomplete higher education	1.29 (0.70;2.39)		1.65 (0.91;2.97)	
Complete higher education or above	0.66 (0.23;1.88)		1.09 (0.33;3.64)	

Continuation

Table 4 – Crude and adjusted analysis of prevalence of obtaining only free of charge medication in relation to the independent variables among adults (n=829ᵃ) living in the rural area of Pelotas, Rio Grande do Sul, 2016

Variables	Adjusted analysis			
	PRᵃ (IC95%ᵇ)	p-valueᶜ	PRᵃ (IC95%ᵇ)	p-valueᶜ
Lives with partner		0.405		0.777
No	1.15 (0.81;1.64)		1.05 (0.73;1.52)	
Yes	1.00		1.00	
Economic classification		0.010e		0.004e
A/B	1.00		1.00	
C	1.25 (0.71;2.19)		1.34 (0.76;2.37)	
D/E	2.11 (1.21;3.70)		2.48 (1.30;4.76)	
Current work situation		0.176		0.192
Not working	1.00		1.00	
Working	1.26 (0.89;1.78)		1.30 (0.87;1.94)	
Self-perceived health		0.053		0.013
Very good/good	1.00		1.00	
Regular	0.59 (0.38;0.91)		0.53 (0.35;0.80)	
Poor/very poor	0.77 (0.38;1.56)		0.69 (0.33;1.44)	
Number of chronic diseases		0.153		0.254
None	1.00		1.00	
1 - 2	0.94 (0.58;1.53)		0.99 (0.67;1.47)	
3 or more	0.63 (0.37;1.10)		0.68 (0.39;1.20)	
Registered with Family Health Strategy		0.391		0.368
No	1.00		1.00	
Yes	1.21 (0.77;1.92)		1.21 (0.79;1.84)	
Distance from home to pharmacy		0.318		0.312
Easy to access	1.00		1.00	
Hard to access	0.84 (0.60;1.19)		0.83 (0.57;1.20)	
Distance from home to nearest primary healthcare center	0.777		0.952	0,952
Far, but easy to access	1.00		1.00	
Far and hard to access	1.16 (0.54;2.50)		1.08 (0.53;2.20)	
Close and easy to access	1.41 (0.70;2.84)		1.14 (0.61;2.13)	
Close, but hard to access	1.22 (0.55;2.72)		0.96 (0.46;1.99)	

a) The variable has 5 missing items.
b) PR: prevalence ratio.
c) 95%CI: 95% confidence interval.
d) Wald test for heterogeneity.
e) Wald linear trend test.

This study had limitations. The questionnaire used was not validated and, specifically, the indirect way in which the information on use of medication was collected, based on questions about not taking medication and sources for getting medication, may have led to underestimated prevalence of medication use, thus making comparisons difficult.

Another limitation lies on the possibility of a selection bias that occurs when residences that are easier to access are chosen. In these cases, prevalence of medication use could be overestimated, while failure to use necessary medication could be underestimated. Moreover, losses and refusals were higher among younger people and males, while the literature indicates that women and older individuals are those who most take medication.[9] Another possible limitation of this study is memory bias: the recall period for the questions was the last 30 days before the interview, and participants may have forgotten whether they took the medication or not. Finally, the cross-sectional nature of the study does not allow temporality of events to be analyzed, making them susceptible to reverse causality bias in some associations (e.g.: use of medication and self-perceived health).

Estimated prevalence of medication use in this study (54.7%) was lower when compared to that found by another study also conducted in Pelotas, around ten years earlier (2002), although that study was conducted in the urban area of Pelotas and had a 15-day recall period: 65.9%.[19] Research conducted with individuals aged 35-70 years old, between 2003 and 2009, analyzed use of medication to prevent cardiovascular diseases in urban and rural areas of four Latin American countries – Argentina, Brazil, Chile and Colombia –, where in general lower prevalence of medication use was found in rural areas in comparison with urban areas.[5]

According to a literature review conducted by Gomes et al.,[20] only one of the 14 studies included assessed use of medication by adults living in an urban area in the last 30 days and they found a prevalence of 70%. Data from a study of the 2015 National Survey on Access, Use and Rational Medication Use Promotion (urban area) found 76.2% prevalence of medication use in the 30 days prior to the survey.[4]

There are some hypotheses for the disagreement between these studies' prevalence. Prevalence of medication use in the urban area of Pelotas was higher because it relates to a period around a decade earlier than the study in the rural area;[19] furthermore, the awarness regarding rational use of medication has increased in recent years, and the use of antimicrobial products has also decreased due to greater health control.[21] Another hypothesis to be considered is that possible reduced access to health services in rural areas would mean less diagnosis and fewer medication prescriptions;[22] less access to medication could be explained by the few pharmacies located in rural area, compared to urban ones as well as the need to travel further to get medication. Finally, there is yet another hypothesis, namely that of prevalence of medication use in rural areas being lower in rural areas compared to urban areas as a natural result of healthier lifestyles in the countryside in relation to lifestyles in cities.[23,24]

Higher prevalence of medication use by women, older people, those with poorer self-perceived health and those with a greater number of chronic diseases corroborates the literature.[2-4] Having found lower prevalence of medication use among those who did not have a partner raises the hypothesis of partners providing more attention and care, thus leading to someone with a partner using health services more and thus increasing the chances of diagnosis of health problems requiring medication. However, other studies did not find these differences related to marital status.[19,25] Lower prevalence found among those who worked may be associated with the fact that in order to be working they would tend to be in better health ("the healthy worker effect"),[26] whereas the fact of not working, associated with illness or a health condition, would lead to greater need to take medication.

Prevalence of medication use was higher among women. It has already been documented in the literature that women are more concerned about their health, have greater perception of signs and symptoms of diseases and, consequently, attend health services more frequently,[27,28] which may explain their greater use of medication as a result of greater probability of disease diagnosis.

Regarding the sources of access to medication, the results found are in consonant with the findings of the 2008 National Household Sample Survey (PNAD), conducted with individuals who had medication prescribed via the public health system. A study that

analyzed the PNAD 2008 data found that less than half the sample got their medication free of charge (via the public system), and that this number was higher among those with lower schooling and income, of black skin color and living in households registered with the FHS;[11] whereas greater access to medication purchased in the private sector was found among the wealthier, those with more schooling and of white skin color. It is important to note that in the case of that study, there were no differences in prevalence of access to medication, regardless of living in urban or rural areas.[11]

Use and sources of medication in Campinas, SP, were investigated according to sociodemographic variables. That population-based study was conducted in 2008 and included people who lived in the urban area aged 20 years old or more. Prevalence of medication use during the three days before the survey was 57.2%, which was close to the rate found by our study, although its recall period was shorter. In Campinas, prevalence of getting medication on SUS was 30%, almost double of what was found in other studies in Pelotas,[29] which also found higher prevalence of medication obtained via SUS among individuals with lower income. These results reflect the importance of health service coverage to meet the needs of more vulnerable populations.

The present study did not find association between (i) use of medication or getting medication free of charge and (ii) the variables related to health services, such as being registered with the FHS and the distance between home and the nearest pharmacy or PHC. An investigation with national representativeness, although conducted exclusively in urban areas, did not find important differences regarding geographical accessibility of medication provided by the SUS, private pharmacies or the *Farmácia Popular*.[2] A reasonable explanation for that finding is that around two thirds of the sample of the present study was registered with the FHS and few participants rated the distance between their homes and services as being 'hard to access'. However, it is appropriate to highlight the results of other studies, in which over 60% of those interviewed were registered with the FHS and were found to have greater access to medication.[11,30]

The frequency of individuals who stopped taking necessary medication was low. As they were from a rural area, greater prevalence was to be expected, considered the inequities found in access to health services.[9] This finding may reflect the low percentage of individuals without access to medication, especially when the reason for not taking it was not having been able to get it on the SUS. Corroborating this finding, the National Survey on Access, Use and Promotion of Rational Use of Medicines revealed that 94.3% of participants had total access to medications.[2] It is likely that facilitated access to medication is related to increased primary healthcare center coverage, along with the existence of government programs intended to provide universal and free-of-charge access.

Use of medication in rural areas in Brazil is still little explored, hence why we recommend future studies on this theme, in order to better understand the regional health characteristics. The findings of this study are particularly important for the design of specific public policies and strategies targeting the rural population. We highlight the importance of equity in healthcare for more vulnerable subgroups. Even though this study demonstrated that individuals belonging to lower economic classifications got their medication free of charge, nevertheless prevalence was low.

Authors' contributions

Bertoldi AD, Silveira MPT, Machado AKF, Xavier MO and Martins RC took part in the concept and planning of the study, data interpretation and drafting the article. Machado AKF, Xavier MO and Martins RC took part in data acquisition. Machado AKF and Martins RC performed the statistical analyses. All the authors contributed to the preliminary versions of the manuscript, critically reviewed its intellectual contents, approved the final version and are responsible for all aspects thereof.

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