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Artigo Original

Uso de antibiótico por automedicação: identificação dos fatores de risco e análise do estilo de vida da população brasileira.

Self-medication with antibiotics: identification of risk factors and analysis of the brazilian population's lifestyle.

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RESUMO

Objetivos: Avaliar a prevalência de adultos e idosos da atenção primária a saúde que fazem uso de antibióticos sem prescrição e as possíveis associações entre os fatores de risco da prática de automedicação e o estilo de vida dos indivíduos. **Materiais e Métodos:**Trata-se de um estudo epidemiológico, transversal e quantitativo, realizado na Atenção Primária em saúde no Brasil. Foram utilizados para coleta dos dados um inquérito semi-estruturado, e o questionário "Estilo de Vida Fantástico". Para estatística foram empregadas a análise bivariada, regressão logística binomial, e o teste não paramético de Mann-Whitney. **Resultados:** Dos 537 participantes, 40,6% já fizeram uso de antibiótico sem prescrição nos últimos 12 meses. Verificaram-se associações entre a variável dependente e presença de dor atualmente (OR=2,390 IC95% 1,414-4,041); estoque domiciliar(OR=2,124 0 IC95% 1,122-4,021) e uso de medicamentos por recomendação (OR=1,722 IC95% 1,127-2,631). Além disso, o grupo de indivíduos que fizeram uso de antibiótico sem prescrição no último ano apresentaram os menores valores em todos os domínios avaliados pelo 'Estilo de Vida Fantástico", e apresentaram as maiores proporções no score final "Regular e Precisa melhorar". **Conclusão:** Expressiva parte dos usuários da atenção primária à saúde no Brasil fizeram uso de antibióticos sem prescrição. Portanto, torna-se necessário, melhor orientação para o uso dos antibióticos, e maior incentivo para o desenvolvimento de hábitos e estilo de vida saudável.

Palavras-chave:Automedicação;Farmacoresistência bacteriana; Estilo de Vida.

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ABSTRACT

Objectives: To assess the prevalence of adults and the elderly in primary healthcare who use antibiotics without prescription and the possible associations between risk factors of self-medication and the lifestyle of individuals. **Material and Methods:** This is a quantitative, epidemiological, cross-sectional study carried out in the Brazilian primary healthcare system. We used a semi-structured questionnaire and the Fantastic Lifestyle Checklist. We carried out a bivariate analysis, a binomial logistic regression, and the Mann-Whitney nonparametric test. **Results:** Out of the total sample (537 participants), 40.6%

used antibiotics without medical prescription in the last 12 months. The dependent variable was associated with the presence of pain (OR=2.390, CI95, 1.414-4.041); storage of leftover antibiotics in the home (OR=2.124 CI95, 1.122-4.021); and use of medicines on someone's recommendation (OR=1.722, CI95, 1.127-2.631). The group of individuals who used antibiotics without prescription in the last year had the lowest values in all domains assessed by the Fantastic Lifestyle Checklist and had the highest proportions in the final score of "Fair" and "Needs improvement". **Conclusions:** A significant proportion of primary health care users in Brazil used antibiotics without medical prescription. Therefore, the population should receive better guidance on the use of antibiotics and greater incentive to develop healthy habits and lifestyle.

Key words: Self-medication; Antibiotic Resistance; Life Style.

INTRODUCTION

Self-medication with antibiotics has promoted considerable debate in the scientific community and health management. Misuse of antibiotics lead to treatment failures, drug interaction, toxicity, and selection of bacterial strains with more resistance to antibiotics[1,2]. This situation needs to be considered and discussed. It not only compromise individuals' security but also affects the whole collective context: self-medication with antibiotics increases morbidity levels, drug-resistance diseases, the need for more expensive drugs, and the healthcare spending[1,3.4.5].

According to the United Nations report, around 700,000 people die every year due to antimicrobial drug-resistant diseases, which could add up to 10 million deaths each year worldwide by 2050[6]. According to the World Health Organization's Report on Surveillance of Antibiotic Consumption, 50% of antibiotics are used incorrectly. Mostly they are used to treat diseases that are not caused by a bacterial infection, are the wrong choice of antibiotics, are administered with an inadequate dose, and do not have a prescription[7].

Self-medication with antibiotics is especially problematic in developing countries because they have high rates of infectious disease and, consequently, the highest numbers of purchase of antibiotics without medical prescription[8]. The recurrent misuse of antibiotics masks symptoms of poorly treated diseases, culminating in the selection of multidrug-resistant bacterial strains. It reduces the availability of antibiotics to treat diseases and affects all the conjunctures of global public health[9,10]. The analysis of risk factors helps create strategies and policies to prevent the misuse of antibiotics. Individuals who take antibiotics without prescription may have particular risky behaviors and lifestyles, so identifying them is essential to promote health and develop healthy, conscientious life behaviors[4,11].

In the last decades, research studies have examined how lifestyle affects the health-disease process, which has been one of the main study objects of epidemiological investigations[12]. According to WHO, the particularities of a healthy or unhealthy lifestyle should be portrayed and outweighed because they are associated with 60% of the factors that determine individual health and quality of life[13]. Lifestyle is a set of identifiable habits and behaviors based on values, opportunities, and personal choices, which can change throughout life[14]. Behaviors acquired by means of personal decisions, such as unhealthy eating habits, smoking, physical inactivity, alcohol consumption, and drug abuse, can negatively affect an individual's health[12,15,16].

All health interventions should approach the representativeness of lifestyle and its components because of their active role in healthcare. Health interventions are present in the treatment of chronic diseases, in the development of prevention-based public policies, and in the individual and collective empowerment, which ensures active participation in health promotion[17]. Identifying lifestyle patterns is essential to promote changes when (i) considering a broad concept of health and (ii) understanding that healthy practices can become behavior patterns of individuals and communities.

The consolidated, highly prevalent self-medication practice in Brazil, and the population's dependence on the public health system led us to our research goal. This study aimed to assess the prevalence of adults and the elderly in primary healthcare who use antibiotics without prescription and the possible associations between risk factors of self-medication and the lifestyle of individuals.

METHODS

Study characterization

This is a cross-sectional, epidemiological study conducted from January through November 2019. This study was conducted in a medium-sized city in the state of Sao Paulo, Brazil, located 522 km away from the state capital, with an estimated population of 197,016 inhabitants.

Our study population included adult and elderly users of the Brazilian Unified Health System - Sistema Único de Saúde (SUS). They required healthcare in 19 primary healthcare (APS) units in the city. Due to the high number of individuals registered in the study region, we calculated the sample size considering a proportion of 50% of adult and elderly people who self-medicate, with a 5% accuracy and a 95% confidence interval. We added 20% (77) to the sample size to correct any losses. Thus, 461 individuals participated in the study. The inclusion criteria were adult and elderly individuals of both sexes, users of the public health system, who agreed to participate in the study, and signed the free and informed consent form. The exclusion criteria were individuals younger than 18 years, disabled individuals, and individuals who did not have cognitive abilities to answer the questionnaire.

Data collection

Before data collection, we applied a pre-test to 10% of the sample (n=46), which was not included in the study results. This pre-test confirmed the feasibility of applying the questionnaire.

We selected users randomly and casually. A trained researcher conducted the survey and interviewed the participants individually in a reserved room in the primary health care units. We collected data alternately so that individuals from different scenarios could participate, and the study sample was more representative. To ensure greater adherence to the study, we scheduled data collection on days and periods of great movement in the healthcare units.

We applied two assessment instruments. This first one is a semi-structured survey exclusively developed for this study. It has sensible and inferential variables that identify individuals' profile and analyzes risk factors related to the misuse of antibiotics.

The second one is the Fantastic Lifestyle Checklist, which was developed by Wilson and Ciliska[18] and translated by Rodriguez-Añes[19]. This self-administered checklist helps us analyze individuals' behavior in the past month and indicates which components of their lifestyle may influence their health.

The Fantastic Lifestyle Checklist comprises 25 questions, distributed in nine domains, identified with the acronym Fantastic: Family and Friends; Activity; Nutrition; Tobacco & Toxics; Alcohol; Sleep, Seatbelts, Stress, Safe Sex; Type of Behavior; Insight; and Career. Twenty-three questions have a Likert-type scale with scores ranging from 0 to 4, where the higher the score, the healthier the lifestyle. The other two questions are dichotomous: the score is zero for the first option, and 4 for the last one. The sum of all points results in a total score that classifies individuals' lifestyle in five categories: Excellent (85 to 100 points), Very good (70 to 84 points), Good (55 to 69 points), Fair (35 to 54 points), and Needs improvement (0 to 34 points). The lower the score, the greater the negative influence of the individual's lifestyle on his/her health, so the greater the need for change[19].

Statistical analysis

We aimed to verify existing associations between the dependent variable and the socio-educational profile, medical history, and risk factors for self-medication. So, we carried out a bivariate analysis using Person's chi-square test, Fisher's exact test, and the likelihood ratio test, with a p-value <0.050.

Next, we carried out a binomial logistic regression analysis with crude and adjusted estimates of odds ratio (OR), with a p-value <0.100. We also used the enter method for variable inclusion and processing. The confidence interval was adjusted to 95%, and results were demonstrated as ORs.

Regarding the comparative analysis between the dependent variable and age and lifestyle (scores), we initially applied the Kolmogorov-Smirnov normality test. As data did not follow a normal distribution, we used the Mann-Whitney nonparametric test considering a significance level of 5%. We analyzed data using the Statistical Package for the Social Sciences (SPSS for Windows, version 22.0, Chicago, IL).

Ethical and legal aspects

This research was approved by the Ethics and Research Committee (Protocol no. CAAE: 02372318.6.0000.5420) and it complied with all ethical principles for research with human beings according to the Resolution no. 466/2012 of the Brazilian National Health Council, which is in accordance with the Declaration of Helsinki and the Nuremberg Code.

RESULTS

Our study sample comprised 537 adult and elderly users of the Brazilian SUS. Most participants were female (84.4%), with an average of 41.08 years, married (52.1%), employed (45.4%), with a monthly family income of one minimum wage (41.2%). (Table 1) The percentage of participants who self-medicated with antibiotics in the last 12 months was 40.6% (218). Most of them stored leftover drugs in the home (45.4%), received them from friends/family (40.6%), or bought them without a medical prescription (13.8%).

Table 2 shows statistically significant associations between individuals who self-medicated with antibiotics and the following variables: presence of pain (p=0.003); self-medication in the last 15 days (p=0.000); medicines stored in the home (p=0.000); use of a medicine by mistake (p=0.033); and reasons for self-medication with antibiotics: medicines stored in the home (p=0.000) and internet/TV advertisement (p=0.007).

More than half of participants took medicines on someone's recommendation (p=0.000) and also recommended some medicines to others (p=0.007).

Table 1. Frequency distribution and bivariate analysis of social and educational factors and dependent variable.

Variables	Have you ever used antibiotics without medical prescription?						p-value
	No		Yes		Total		
	n	%	n	%	n	%	
Sex							
Male	45	14.1	39	17.9	84	15.6	0.236*
Female	274	85.9	179	82.1	453	84.4	
Age group							
18 to 35 years old	132	41.4	92	42.2	224	41.7	0.592*
36 to 59 years old	144	45.1	103	47.2	247	46.0	
60 years old or older	43	13.5	23	10.6	66	12.3	
Skin color							
White	264	82.8	175	80.3	439	81.8	
Black	15	4.7	14	6.4	29	5.4	0.791*
Brown	30	9.4	23	10.6	53	9.9	
Yellow	10	3.1	6	2.8	16	3.0	
Marital status							
Single	77	24.1	48	22.0	125	23.3	
Married	157	49.2	123	56.4	280	52.1	0.543*
Widow/Widower	11	3.4	5	2.3	16	3.0	
Divorced	35	11.0	19	8.7	54	10.1	
Cohabitation	39	12.2	23	10.6	62	11.5	

Variables	Have you ever used antibiotics without medical prescription?						p-value
	No		Yes		Total		
	n	%	n	%	n	%	
Profession							
Self-employed	24	7.5	19	8.7	43	8.0	0.697*
Employed	147	46.1	97	44.5	244	45.4	
Unemployed	49	15.4	37	17.0	86	16.0	
Housekeeper	57	17.9	38	17.4	95	17.7	
Student	17	5.3	6	2.8	23	4.3	
Retired	25	7.8	21	9.6	46	8.6	
Schooling							
Incomplete Elementary Education	36	11.3	29	13.3	65	12.1	0.532*
Complete Elementary Education	14	4.4	11	5.0	25	4.7	
Incomplete High School	55	17.2	42	19.3	97	18.1	
Complete High School	142	44.5	88	40.4	230	42.8	
Incomplete Higher Education	35	11.0	16	7.3	51	9.5	
Complete Higher Education	37	11.6	32	14.7	69	12.8	
Monthly family income							
Up to R$ 998.00	135	42.3	86	39.4	221	41.2	0.901*
Up to R$ 1,996.00	91	28.5	68	31.2	159	29.6	
More than R$ 1,996.00	66	20.7	45	20.6	111	20.7	
He/she does not know	27	8.5	19	8.7	46	8.6	

* Chi-Square test

Table 2. Frequency distribution and bivariate analysis of risk factors for self-medication and dependent variable.

Variables	Have you ever taken antibiotics without medical prescription?						p-value
	No		Yes		Total		
	n	%	n	%	n	%	
Are you under medical treatment now?							
No	175	54.9	121	55.5	296	55.1	0.883*
Yes	144	45.1	97	44.5	241	44.9	

Variables	Have you ever taken antibiotics without medical prescription?						p-value
	No		Yes		Total		
	n	%	n	%	n	%	
He/she has some disease							
Depression	17	5.3	15	6.9	32	6.0	0.456*
Allergy	17	5.3	7	3.2	24	4.5	0.243*
Migraine	9	2.8	10	4.6	19	3.5	0.277*
Arthritis/Arthrosis	13	4.1	5	2.3	18	3.4	0.260*
Heart problems	10	3.1	4	1.8	14	2.6	0.353*
Asthma	2	0.6	5	2.3	7	1.3	0.095*
Kidney diseases	2	0.6	2	0.9	4	0.7	1.000**
Anemia	2	0.6	0	0.0	2	0.4	0.517**
Are you currently feeling pain?							
No	277	86.8	168	77.1	445	82.9	0.003*
Yes	42	13.2	50	22.9	92	17.1	
Did you self-medicate in the last 15 days?							
No	185	58.0	92	42.2	277	51.6	0.000*
Yes	134	42.0	126	57.8	260	48.4	-
[a] *If so, with which medicine?*							
Antibiotics	3	2.2	9	7.1	12	4.6	0.056*
Anti-inflammatory drugs	24	17.9	27	21.4	51	19.6	
Painkillers	93	69.4	85	67.5	178	68.5	
Other	14	10.4	5	4.0	19	7.3	
Do you store medicines in the home?							
No	66	20.7	20	9.2	86		0.000*
Yes	253	79.3	198	90.8	451		
Have you ever taken any medicine by mistake?							
No	291	91.2	186	85.3	477		0.033*
Yes	28	8.8	32	14.7	60		
Have you ever used medicines on someone's recommendation?							
No	191	59.9	85	39.0	276		0.000*
Yes	128	40.1	133	61.0	261		

Variables	Have you ever taken antibiotics without medical prescription?						p-value
	No		Yes		Total		
	n	%	n	%	n	%	
[a] *Which medicine?*							
Painkillers	72	56.3	67	50.4	139		0.030***
Anti-inflammatory drugs	35	27.3	30	22.6	65		
Antibiotics	2	1.6	13	9.8	15		
Other	19	14.8	23	17.3	42		
Have you ever recommend any medicine to someone?							
No	230	72.1	133	61.0	363		0.007*
Yes	89	27.9	85	39.0	174		
Is a medical/dentist prescription important?							
No	59	18.5	44	20.2	103		0.626*
Yes	260	81.5	174	79.8	434		
What are the reasons for taking medicines without medical prescription?							
Personal knowledge	173	54.2	101	46.3	274		0.072*
Medicines stored in the home	65	20.4	79	36.2	144		0.000*
Family's recommendation	55	17.2	31	14.2	86		0.349*
Friends' recommendation	48	15.0	22	10.1	70		0.094*
TV/Internet Advertisement	42	13.2	13	6.0	55		0.007*
Other	24	7.5	16	7.3	40		0.936*

* Chi-Square test; ** Fisher's exact test; *** Likelihood ratio; [a] Variable subsequent to the previous one.

In the multivariate analysis (Table 3), individuals who are currently experiencing pain have 2.390 times greater chance of having taken antibiotics without medical prescription in the last 12 months. Storing medicines in the home is a risk factor for self-medication. Those who do it have a 2.124 times greater chance of having taken antibiotics without prescription in the last year. Those who used medicines on someone's recommendation or influence had a 1.722 times greater chance of having taken antibiotics without medical prescription in the previous year.

Regarding lifestyle (Table 4), the group that self-medicated with antibiotics had a higher percentage of the final scores "Fair" and "Needs improvement" than individuals in the adverse group (p = 0.000).

The results of the comparative analysis between the dependent variable and the Fantastic Lifestyle Checklist domains (Table 5) showed statistically significant differences in all domains of the assessment instrument. The group of individuals who did not self-medicate with antibiotics had higher scores than the group that self-medicated with antibiotics in the last 12 months.

Table 3. Crude and adjusted multivariate analysis of the associations between the dependent variable and risk factors for self-medication with antibiotics

Variables	Logistic regression			
	OR_{Crude} (CI 95%)	p-value	$OR_{Adjusted}$ (CI 95%)	p-value
He/She has some disease: Asthma				
No	-	-	-	-
Yes	3.721 (0.715-19.354)	0.118	3.108 (0.507-19.045)	0.220
He/She has some disease: Hypertension				
No	-	-	-	-
Yes	1.427 (0.943-2.159)	0.092	1.099 (0.676-1.786)	0.703
Have you ever taken any medicine by mistake?				
No	-	-	-	-
Yes	1.788 (1.042-3.067)	0.035	1.441 (0.767-2.706)	0.257
Are you currently feeling any pain?				
No	-	-	-	-
Yes	1.963 (1.248-3.087)	0.004	2.390 (1.414-4.041)	0.001
Do you store medicines in the home?				
No	-	-	-	-
Yes	2.583 (1.514-4.404)	0.000	2.124 (1.122-4.021)	0.021
Have you ever taken any medicine on someone's recommendation?				
No	-	-	-	-
Yes	2.335 (1.641-3.321)	0.000	1.722 (1.127-2.631)	0.012
Have you ever recommended any medicine to someone else?				
No	-	-	-	-
Yes	1.652 (1.145-2.381)	0.007	1.128 (0.715-1.779)	0.605
Reason for self-medication: Friends	Q18B			
No	1.578 (0.922-2.700)	0.096	1.062 (0.551-2.048)	0.857
Yes	-	-	-	-

Variables	Logistic regression			
	OR_{Crude} (CI 95%)	p-value	$OR_{Adjusted}$ (CI 95%)	p-value
Reasons for self-medication: Personal knowledge				
No	1.373 (0.972-1.939)	0.072	1.287 (0.782-2.118)	0.320
Yes	-	-	-	-
Reasons for self-medication: TV/Internet advertisement				
No	2.391 (1.251-4.570)	0.008	1.857 (0.844-4.085)	0.124
Yes	-	-	-	-
Reasons for self-medication: medicines stored in the home				
No	-	-	-	-
Yes	2.221 (1.507-3.273)	0.000	1.407 (0.797-2.484)	0.239

Table 4. Frequency distribution and bivariate analysis between the Fantastic Lifestyle Checklist scores and the dependent variable

Lifestyle	Have you ever taken antibiotics without medical prescription?				p-value
	No		Yes		
	n	%	n	%	
Excellent	37	11.6	1	0.5	0.000*
Very good	230	72.1	10	4.6	
Good	43	13.5	77	35.3	
Fair / Needs improvement	9	2.8	130	59.6	
Total	**319**	**100.0**	**218**	**100.0**	**-**

Table 5. Comparative analysis between the Fantastic Lifestyle Checklist domains and the dependent variable

Domains	Have you ever self-medicated with antibiotics?	Descriptive statistics				Mann-Whitney
		n	Median	Mean	Standard Deviation	p-value
Family and friends	No	319	6.00	5.71	1.06	0.000
	Yes	218	4.00	3.72	1.19	
Activity	No	319	4.00	3.82	1.58	0.000
	Yes	218	1.00	1.36	1.42	

Domains	Have you ever self-medicated with antibiotics?	Descriptive statistics				Mann-Whitney
		n	Median	Mean	Standard Deviation	p-value
Nutrition	No	319	8.00	7.76	1.92	0.000
	Yes	218	5.00	4.76	1.82	
Tobacco & toxics	No	319	14.00	13.27	1.36	0.000
	Yes	218	10.00	10.13	2.21	
Alcohol	No	319	12.00	11.00	1.72	0.000
	Yes	218	8.00	7.81	3.14	
Sleep, seatbelt, stress, safe sex	No	319	17.00	16.94	1.99	0.000
	Yes	218	12.00	11.78	3.29	
Type of behavior	No	319	8.00	7.85	0.53	0.000
	Yes	218	7.00	6.45	1.57	
Insight	No	319	6.00	6.89	2.49	0.000
	Yes	218	3.00	3.65	2.43	
Career	No	319	3.00	2.90	0.57	0.000
	Yes	218	2.00	2.12	0.78	
Total score	No	319	78.00	76.13	8.29	0.000
	Yes	218	52.00	51.78	10.93	

DISCUSSION

This study identified relevant associations between self-medication with antibiotics and risk factors for self-medication. A high percentage (40.6%) of users of the Brazilian public health systems self-medicated with antibiotics in the last 12 months. Studies developed in other countries in different scenarios have shown a disparity in the prevalence of self-medication with antibiotics: USA 5%[20], Mozambique 20.9%[21], Serbia 27.2%[22], Poland 38%[23], Lebanon 46%[10], Japan 46%[24], 53% Argentina[25], and Kosovo 58.7%[26].

This result (40.6%) confirms systemic reviews' outcomes: in low- and middle-income countries, 38.8% [9] of the population use antibiotics without prescription. Globally, this statistic is 39%[8]. Torres et al., states that several factors can influence self-medication with antibiotics, including sociocultural factors, access to health services, economic conditions, prescription error, and lack of inspection and surveillance on drug purchasing[4]. Besides leading to direct consequences for individuals' health, self-medication affects the whole collective conjecture. According to WHO, antimicrobial resistance is a worldwide disquieting condition, which may lead to a post-antibiotic era. All medical and technological achievements developed so far would setback, consequently incipient infections would be fatal[27, 28].

In Brazil, after the outbreak of hospital infections caused by the bacterium Klebsiella *Pneumoniae Carbapenemase,* the national health authorities gave more attention to the magnitude of antimicrobial resistance and recognized the need to implement surveillance measures in the sale of antibiotics in drugstores[29]. The regulation RD 44/2010 stipulated that drugstores can only sell antibiotics upon medical/dental prescription, with retention of the duplicate, which should later be registered in the National Controlled Product Management System, for monitoring and surveillance purposes[30,31].

Even ten years after the adoption of this regulation, we found out that individuals have still

recklessly taken antibiotics, especially when they have painful symptoms. Jamhour et al., found similar results: individuals self-medicated with antibiotics to treat cough, malaise, colds, sore throat, and inflammations[10]. Their systematic review showed that 50.9% (95% CI 31.1-70.6) of the study sample believed antibiotics were therapeutically similar to anti-inflammatory drugs, and 49.7% (95% CI 39,6-59,8) did not know that antibiotics were not useful/indicated to treat colds and flu. For this reason, campaigns to educate the population and guidance by health professionals are essential to raise awareness about the use of antimicrobials[32].

Our study also found statistically significant associations that justify the cyclical nature of poor health practices. Most participants (p=0.012) self-medicated with antibiotics on family's and friends' recommendation, and they recommended some medicines to others (p = 0.007). Information exchange on self-diagnosis between people in the same social cycle reveals this situation. Due to similar medical histories, these individuals promote the misuse of antibiotics[21,33].

Ocan et al., confirmed this fact: a great percentage of individuals who self-medicated did that on family's and friend's recommendation[9]. Almohammed et al., found that 37% of the individuals who had already taken antibiotics without prescription also recklessly provided or recommended antibiotics to others[34].

The storage of leftover medicines in the home was alarming in our study and a risk factor for the practice of self-medication with antibiotics. Other studies found similar results, ranging between 41.2%[9] and 46.5%[22] of participants who stored medicines in the home.

In most cases, leftover antibiotics reveal patients' failure to complete their treatment in the appropriate period, which may have two reasons: self-perception of pain symptom relief, or belief that the medicine is ineffective[34]. Leftover antibiotics are also associated with the purchase of an exceeding number of drugs compared to the medical or dentist prescription[35]. Therefore, storing antibiotics in the home-which may even have expired--promotes self-medication and generates adverse effects, such as antibiotic resistance, toxicity, and drug interactions[22,36].

In the lifestyle analysis, the final score of the assessment instrument revealed that the participants who self-medicated with antibiotics had the most negative impacts. The misuse of medicines is a characteristic of an unhealthy lifestyle, which can affect one's health and quality of life[37]. Thus, the identification and recognition of the set of habits and behaviors of individuals and populations must be considered an essential tool to develop intervention strategies and guarantee the consolidation health promotion[12].

The Fantastic Lifestyle Checklist showed that the group of participants who did not self-medicate with antibiotics in the last 12 months had the greatest positive percentages in all the domains: Family and Friends; Activity; Nutrition; Tobacco & Toxics; Alcohol; Sleep, Seatbelt, Stress, Safe Sex; Type of Behavior; Insight; and Career. In this sense, health behavior is not an isolated event. Most of times, factors that lead to a negative or positive lifestyle act simultaneously and with synergy. Broadening our understanding about the representativeness of lifestyle and the analysis of all its elements helps us redefine the perception of self-care in health[38].

The early recognition of a positive or negative lifestyle allows the prediction of its consequences during life. For this reason, approaches and interventions regarding the conditions and factors that build lifestyle patterns should be made in advance, in a comprehensive and holistic manner, and not only individually[39]. For example, Porto et al., found that individuals should have health habits and behavior on a constant and regular basis throughout life to improve quality of life and decrease the rates of comorbidities and the need to use medicines[40].

The great challenge is to change the practices and values that individuals attribute to their behaviors and lifestyle[41]. Individuals may resist to redefine their habits due to lack of interest, but also due to lack of opportunity. Social determinants and environment conditions influence individuals to adapt their behavior to what is socially established[13]. In this context, health education is an alternative to change habits and behaviors to prevent and control the risks of an unhealthy lifestyle. Health education explores and discusses issues that help individuals develop decision-making skills to improve their health level in an autonomous and responsible manner[42].

We applied the Fantastic Lifestyle Checklist to analyze the health behaviors and habits of individuals who self-medicate with antibiotics. This validated, reliable instrument allows the safe and practical identification of risk factors involved in behavior patterns. This type of instrument is highly recommended for epidemiological studies with population-based approaches. It is a quick, low-cost, objective tool that allows the participation of large number of individuals and has a good acceptance by volunteers[19,43].

Study limitations include the fact that this is a cross-sectional epidemiological survey, so it is not possible to infer the cause and effect of events. In addition, as we applied two surveys, the recall of past practices and actions may have been a confounding factor. Study participants may have had doubts and fears when interviewed.

CONCLUSION

A significant part of adult and elderly users of the public health system in Brazil has already taken antibiotics without prescription. This disquieting result proves that even after ten years of the adoption of surveillance measures, the sale of antibiotics still presents some challenges. Concerning the risk factors, the variables presence of pain, use of antibiotics on someone's recommendation, and storage of medicines in the home had positive associations with self-medication with antibiotics in the last 12 months. Concerning the lifestyle analysis, individuals who took antibiotics without prescription in the last 12 months showed the statistically lowest values in the domains evaluated in the Fantastic Lifestyle Checklist and had the highest percentage of "Fair" and "Needs improvement" as their final score.

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