



Comparison of the sales profile of azithromycin before and during the COVID-19 pandemic in the inland of Bahia

Comparação do perfil de venda da azitromicina antes e durante a pandemia do COVID-19 no interior da Bahia

Comparación del perfil de venta de Azitromicina antes y durante la pandemia de COVID-19 en el interior de Bahia

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ABSTRACT

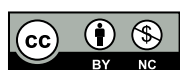
Objective: to characterize the profile of azithromycin sales during the COVID-19 pandemic and compare this profile with the previous year in a municipality in the interior of Bahia. **Methods:** This is a cross-sectional study with an analytical descriptive design. The sample data were extracted from the National Controlled Products Management System of the National Health Surveillance Agency database, municipality of Jequié, years 2019, 2020, and 2021. Pearson's Chi-square test was used to compare the proportions of categorical variables. The relationship between continuous variables was carried out using the simple linear regression model. A significance level of 0.05 was adopted. **Results:** It was found that the coated tablet was the best-selling in all years, especially in 2020, representing 89% of sales; the 18-59 age group reached the highest frequency in 2020 with 73.5%. The prescribers class council was predominantly the Regional Council of Medicine, which had a total of 92.7% of prescriptions in 2019, 91.4% in 2020, and 92.2% in 2021. There was a statistical association between pharmaceutical form and gender. A correlation was observed between the quantity of azithromycin sold and the number of confirmed cases of COVID-19 ($r=0.931$, $p<0.001$, $R^2=0.867$). **Conclusion:** There was an increase in the sale of the antimicrobial azithromycin, with a correlation between the quantity sold and the number of confirmed cases of COVID-19, linked to encouraging the irrational use of medicines, which reinforces the need to include the pharmacist as an agent essential in health promotion and health education actions.

Descriptors: COVID-19; Azithromycin; Behind-the-Counter Drugs; Drug Utilization.

RESUMO

Objetivo: Caracterizar o perfil de venda da azitromicina durante a pandemia da COVID-19 e comparar esse perfil com o ano anterior em um município no interior da Bahia. **Métodos:** Trata-se de um estudo transversal com delineamento descritivo analítico. Os dados da amostra foram extraídos da base de dados do Sistema Nacional de Gerenciamento de Produtos Controlados da Agência Nacional de Vigilância Sanitária, município de Jequié, anos de 2019, 2020 e 2021. O teste Qui-quadrado de Pearson foi usado para comparar as proporções das variáveis categóricas. A relação entre variáveis contínuas foi realizada por meio do modelo de Regressão linear simples. Adotou-se um nível de significância de 0,05. **Resultados:** Verificou-se que o comprimido revestido foi o mais vendido em todos os anos, sobretudo em 2020, representando 89% das vendas; a faixa etária de 18-59 anos alcançou maior frequência em 2020, com 73,5%. O conselho de classe do prescritor foi, predominantemente, o Conselho Regional de Medicina que teve um total de 92,7% das prescrições no ano de 2019, 91,4% em 2020 e 92,2% em 2021. Verificou-se associação estatística entre a forma farmacêutica e o sexo. Observou-se correlação entre quantidade vendida de azitromicina e número de casos confirmados de COVID-19 ($r=0,931$, $p<0,001$, $R^2=0,867$). **Conclusão:** Verificou-se aumento na venda do antimicrobiano Azitromicina, com correlação entre a quantidade vendida e o número de casos confirmados de COVID-19, ligada ao incentivo do uso irracional de medicamentos, o que reforça a necessidade de incluir o farmacêutico como um agente essencial na promoção da saúde e ações de educação em saúde.

Descritores: COVID-19; Azitromicina; Medicamentos de venda assistida; Uso de medicamentos.



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Received on: 07/05/2022
Approved on: 12/15/2023

RESUMEN

Objetivo: Caracterizar el perfil de venta de Azitromicina durante la pandemia de Covid-19 y comparar ese perfil con el año anterior en un municipio en el interior de Bahía. **Métodos:** Se trata de un estudio transversal con diseño descriptivo analítico. Los datos de la muestra fueron extraídos de la base de datos del Sistema Nacional de Gestión de Productos Controlados de la Agencia Nacional de Vigilancia Sanitaria, municipio de Jequié, años de 2019, 2020 y 2021. Fue utilizado el test Qui-cuadrado para comparar las proporciones de las variables categóricas. La relación entre variables continuas fue realizada por medio del modelo de regresión lineal simple. Se adoptó un nivel de significancia de 0,05. **Resultados:** Se verificó que el comprimido recubierto fue el más vendido en todos los años, sobre todo en 2020, representando 89% de las ventas; la franja etaria de 18-59 años alcanzó mayor frecuencia en 2020 con 73,5%. El consejo de clase del prescriptor fue, predominantemente, el Consejo Regional de Medicina que tuvo un total de 92,7% de las prescripciones en el año de 2019, 91,4% en 2020 y 92,2% en 2021. Fue verificada asociación estadística entre la forma farmacéutica y el sexo. Fue observada correlación entre cantidad vendida de Azitromicina y número de casos confirmados de COVID-19 ($r=0,931$, $p<0,001$, $R^2=0,867$). **Conclusión:** Fue identificado un aumento en la venta del antimicrobiano Azitromicina, con correlación entre la cantidad vendida y el número de casos confirmados de COVID-19, vinculado al incentivo del uso irracional de medicamentos, lo que refuerza la necesidad de incluir el fármaco como un agente esencial en la promoción de la salud y acciones de educación en salud.

Descriptores: COVID-19; Azitromicina; Medicamentos con supervisión farmacéutica; Utilización de medicamentos.

INTRODUCTION

COVID-19, caused by the Sars-Cov-2 virus, was declared by the World Health Organization (WHO) as a new pandemic in 2020. This infection encouraged a time of many changes, apprehension, and uncertainty, due to the large number of hospitalizations and deaths observed and reported throughout the media⁽¹⁾; so, the commitment to developing pharmacological alternatives for the therapeutic handling of COVID-19 and its immunization was intensified by researchers⁽²⁾.

Since the new medicines' development involves several processes, several studies were carried out with various drugs duly tested and approved for other therapeutic indications to verify their effectiveness in preventing or treating the disease⁽³⁾. Drug repositioning was an alternative widely explored during the pandemic due to its safety and viability, but, at that time, it did not generate any treatment with antiviral efficacy against COVID-19, making vaccines the safest option to promote an increase in contamination, protecting the health of the population⁽²⁻³⁾.

During this period, relevant changes were noted in the profile of medication consumption across the country, driven mainly by the propagation of information without a scientific basis by authorities, the media, and health professionals, resulting in a collective stimulus to the irrational/irresponsible use of medication. At this time, the idea of a possible early treatment emerged, which consisted of a drug therapy without scientific evidence to prove its use in the disease, without the minimum scientific requirements for safety, efficacy, or effectiveness⁽⁴⁾.

Given this scenario, an important and challenging issue was brought to light, which has long become a source of constant concern: the indiscriminate and irrational use of medications⁽⁴⁾. This use is considered a habit that leads to several risks and consequences, with the occurrence of undesirable effects, adverse events, and masking of evolutionary diseases that impact patient safety, in addition to costs for users and the health system⁽²⁾, making it necessary, therefore, the use health education to inform and raise awareness among the population about the risk of irrational use of medications.

Within the therapy proposed as "early treatment", much was said about the use of antibacterial drugs for this purpose. There was a great demand for these medications, so the consumption of azithromycin increased notably, as it stood out as one of the most prescribed medications by medical professionals⁽⁶⁾.

Azithromycin is a medication belonging to the group of macrolides, a class of antibiotics indicated for various infectious diseases of the respiratory tract. It may also have other relevant effects, such as immunomodulatory activity (through the reduction of cytokines in response to some stimuli), activity on leukocyte movement (adhesion and migration), in addition to activity on mucus, which ranges from increased elimination to inhibition of its production, described in several in vivo and in vitro studies⁽⁷⁾.

Within the pandemic context, these would be some justifications proposed to list azithromycin as one of the alternatives for use against the virus; however, many studies have demonstrated the ineffectiveness results of this medication. Mainly because the drug does not play a relevant role in preventing or developing the disease, and above all, it does not bring any benefit to patients hospitalized with the severe form of COVID-19⁽⁸⁾.

Excessive and irrational consumption of azithromycin can promote the accentuated growth of bacterial resistance since abusive use is the main factor related to this risk^(1,4-6). This resistance represents a serious global public health problem due to its major consequences, such as high costs for health systems, high morbidity and mortality rates, and the limited development of new molecules with antimicrobial function. Therefore, its prescription and use must be done appropriately, according to individual needs, only in the presence of proven bacterial infection, and use must be carried out following appropriate guidelines^(2-3,5-6).

In this context, the present study aims to characterize the profile of azithromycin consumption during the COVID-19 pandemic and compare this consumption with the previous year in a municipality in the interior of Bahia.

METHODS

It is a cross-sectional study with an analytical descriptive design. The sample data referred to the municipality of Jequié, located in the Southwest region of Bahia State, precisely in the Médio Rio das Contas region. Its estimated population is 156,277 inhabitants and a territorial area of 2,969,039 km². The city of Jequié stands out for offering several specialized health services, including for surrounding cities.

The research sample was composed of presentations of the azithromycin medication, released as output notifications in the National Controlled Products Management System (SNGPC), extracted from the open database on the sale of industrialized antimicrobial medication from the National Health Surveillance Agency (ANVISA).

The municipality has approximately 25 private non-manufacturing pharmacies in operation, in which industrialized antimicrobial medicines must be dispensed by a technician or under their supervision upon presentation of the medical prescription in two copies. Although the medication is dispensed in Basic Health Units and by the Family Health Strategy, it was not possible to count this dispensation since the release in the SNGPC is not mandatory in the public service; this municipality was selected because it is a reference for 26 municipalities in the Sul Jequié Regional Health Base.

Among the medications used during the pandemic to treat or prevent COVID-19, with off-label use, a concept referring to medications already on the market and used with an indication different from that described in the leaflet approved by the regulatory agency, the selection of azithromycin was based:

1. Because it was a strong candidate for treating the disease among the different types of antibiotics available.
2. Because it has been frequently cited in several studies, papers, and articles and is present in the "COVID kit" (medications used and dispensed for the prevention and treatment of COVID-19 in Brazil⁽⁹⁾, often associated with hydroxychloroquine;
3. Because the records corresponding to the years that were intended to be analyzed are present in this database, while other medications, which were also used for prevention or treatment, were kept under special control at the SNGPC, only from the year 2020;
4. The ease of acquiring a prescription;
5. For your availability;
6. Due to the high demand by the population;
7. Because it has a high impact on microbial resistance, among the other medicines contained in the "COVID kit"⁽⁹⁾, with a high impact on public health.

The output notifications released in the SNGPC (referring to the private system) of all pharmaceutical presentations of the azithromycin drug were analyzed for the period that included the beginning of the pandemic in Brazil in March 2020 until September 2021; last month in which the data were available for access, compared to the year before the pandemic (2019), in the municipality of study, to obtain the consumption profile through notifications of sales of the industrially produced antimicrobial.

The exclusion criterion was the type of prescribing professional, so notifications from the Regional Council of Veterinary Medicine (CRMV) were excluded from the study, as they involved animal use.

The variables evaluated were: year (2019, 2020, and 2021), month (January to December 2019, March 2020 to September 2021), prescriber's advice (Conselho Regional de Medicina, CRM, or Conselho Regional de Odontologia, CRO), description of the pharmaceutical presentation, pharmaceutical form, quantity sold each year, patient age group, gender and the number of confirmed cases of COVID-19 in the municipality.

The monthly number of COVID cases in the municipality was taken from the public database through the Brazilian health information website on COVID-19, from the government of the state of Rio de Janeiro (RJ), and from a national database of COVID data⁽¹⁰⁾.

The data were stored and organized in Microsoft Office Excel version 2013 spreadsheets according to the established variables. These data were analyzed using the Statistical Package for the Social Science (SPSS) software version 2020 and presented through tables and/or graphs using descriptive statistics (absolute and relative frequencies), mean, and standard deviation.

The association between the variables age group and pharmaceutical form was analyzed using Pearson's Chi-square, and the relationship between the dependent variable (quantity sold) and the independent one (number of COVID-19 cases) was carried out using Regression analysis by a simple linear model, considering the significance level $p < 0,05$.

The work was prepared based on secondary data extracted from the ANVISA database so that it was not necessary to be submitted for approval by the Ethics and Research Committee (CEP).

RESULTS

14,823 exit notifications from the SNGPC were evaluated, referring to azithromycin sold by private pharmacies in Jequié.

It was observed that the most commercialized pharmaceutical form was the coated tablet, with 69.7% (751) in 2019, 89.7% (5968) in 2020, and 87.5% (6202) in 2021, followed by powder for oral suspension with 23.6% (254), 10.0% (668) and 12.5% (890), respectively, as shown in Table 1. The age group that most purchased this medicine was 18-59 years old, reaching a value of 65.2% (751), 73.5% (4880) and 72.4% (5120) in 2019, 2020 and 2021, respectively.

The professionals who prescribed the most were linked to the CRM, which in 2019 was responsible for 92.7% (999) of prescriptions; in 2020, 91.4% (6078), and 92.2% (6538) in 2021.

The pharmaceutical presentation that achieved the highest consumption, based on sales notification, was the 500 mg coated tablet, which in 2019 corresponded to 68.1% (734) of units sold, 88.9% (5916) in 2020 and 86.3% (6124) in 2021, followed by oral suspension powder presentation 40 mg/mL.

Concerning gender, it was found that females prevailed over males in all years observed. Thus, the number of sales made to women corresponded to 50.4% (542) in 2019, 50.4% (3347) in 2020 and 54.3% (3837) in 2021.

Table I – Frequency of variables related to the azithromycin sales profile, recorded in the National Controlled Products Management System database. Jequié, BA, Brazil, 2019-2021.

Variables	Year n (%)		
	2019 (n=1078)	2020 (n=6653)	2021 (n=7092)
Pharmaceutical form			
Coated tablet	751 (69.7)	5968 (89.7)	6202 (87.5)
Capsule	73 (6.8)	17 (0.3)	-
Suspension powder	254 (23.6)	668 (10.0)	890 (12.5)
Age range (years)			
0-17	239 (22.2)	751 (11.3)	967 (13.7)
18-59	702 (65.2)	4880 (73.5)	5120 (72.4)
≥60	135 (12.5)	1012 (15.2)	985 (13.9)
Registration with the Class Council			
CRM	999 (92.7)	6078 (91.4)	6538 (92.2)
CRO	79 (7.3)	575 (8.6)	554 (7.8)
Gender			
Male	534 (49.6)	3296 (49.6)	3235 (45.7)
Female	542 (50.4)	3347(50.4)	3837 (54.3)

Source: Prepared by the authors. CRM: Regional Council of Medicine. CRO: Regional Dental Council.

The average monthly quantity of commercial azithromycin sold was 89.8 (SD= ±19.4), 665.3 (SD=±421.3) and 788 (SD=±263.0) in 2019, 2020 and 2021, respectively. The sales peaks per year were in July 2019, July 2020, and February 2021, with 11.5% (124), 23.4% (1533), and 15.7% (1119) of total sales for the year, respectively, Figure 1.

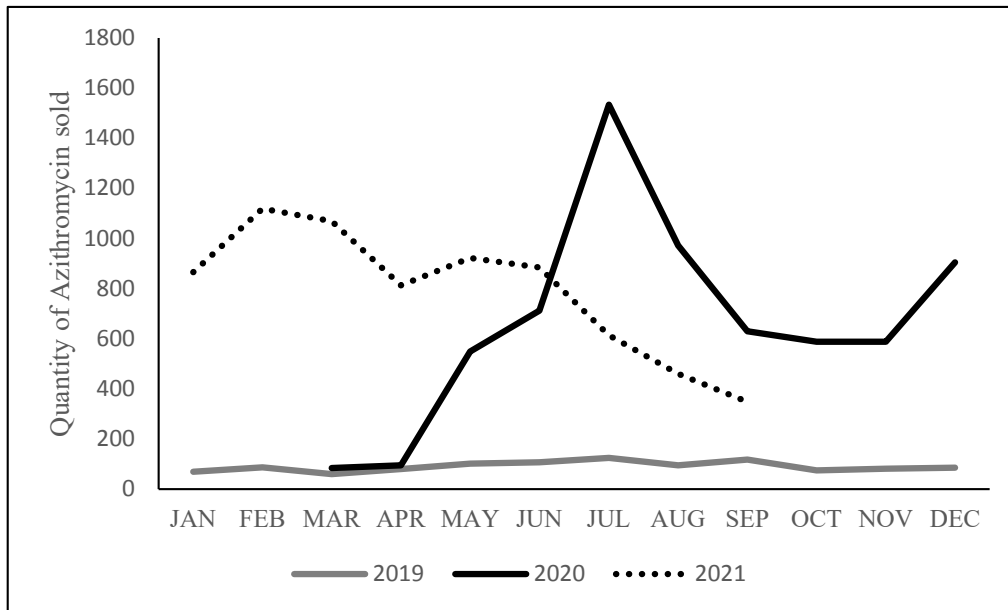


Figure 1 – Comparison between the quantity of industrialized azithromycin sold during 2019 (Jan-Dec), 2020 (Mar-Dec) and 2021 (Jan-Sep). Jequié, Bahia, Brazil, 2019-2021. Source: Prepared by the authors.

There was a direct linear relationship between the amount of azithromycin sold and the number of COVID-19 cases, with a strong correlation ($r = 0.931$, $R^2 = 0.867$, $p < 0.001$).

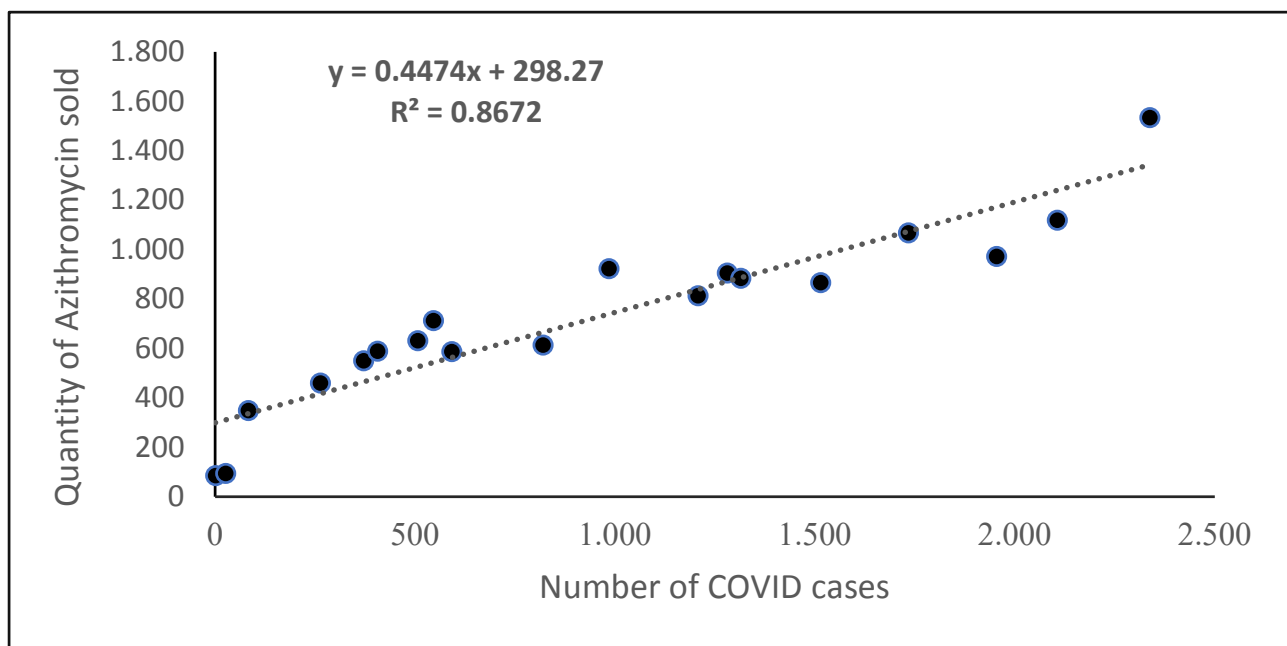


Figure 2 – Simple linear regression between quantity of azithromycin sold and number of confirmed cases of COVID-19. Jequié, B.A. Brazil, Jan/2019 to Sep/2021.

Source: Prepared by the authors. Simple linear regression. significance level $p < 0.05$.

There was a statistical association between the type of pharmaceutical form and age group ($p = < 0.0001$), in which there was a higher sale of azithromycin tablets in the 18-59 age group, with an increase in this proportion in 2020 and 2021, according to Table 2.

In the years relating to the pandemic, there was an increase in these ranges in the sale of tablets and powders for oral suspension.

Table II – Association between pharmaceutical form and age group. sales of industrialized azithromycin, the database of the National Controlled Products Management System, Jequié. B.A. Brazil. 2019-2021.

Year	Age range (years)	Pharmaceutical form			*p-value
		Pill	Capsule	Powder for oral suspension	
2019	0-17	46 (19.2)	7 (2.9)	186 (77.8)	<0.0001
	18-59	590 (84.0)	52 (7.4)	60 (8.5)	
	≥60	113 (83.7)	14 (10.4)	8 (5.9)	
2020	0-17	310 (41.3)	0 (0.0)	441 (58.7)	<0.0001
	18-59	4671 (95.7)	15 (0.3)	194 (4.0)	
	≥60	977 (96.5)	2 (0.2)	33 (3.3)	
2021	0-17	337 (34.9)	-	630 (65.1)	<0.0001
	18-59	4870 (95.1)	-	250 (4.9)	
	≥60	975 (99.0)	-	10 (1.0)	

Source: Prepared by the authors, *Pearson chi-square, significance level $p < 0.05$.

DISCUSSION

The pandemic caused relevant changes to medication sales across the country, causing the consumption pattern to undergo a considerable change. Similarly, the main data obtained in the present study, concerning the acquisition of azithromycin at an outpatient level, demonstrate that there was a crucial change in consumption, being correlated with the increase in the number of confirmed cases of COVID-19 in the city from Jequié⁽⁵⁾.

Among the pharmaceutical forms of industrialized azithromycin, the coated tablet was the most purchased every year, with a considerable increase in the years following the new coronavirus pandemic. It may be linked to the fact that the majority of the consumer population was probably made up of adults aged 30 to 49, the age group most affected by COVID-19 in that city⁽¹¹⁾.

The greater frequency of this pharmaceutical form may also be related to the numerous advantages already proven concerning the characteristics, as the lowest cost among other pharmaceutical forms for oral use and convenience and/or guarantee of conservation, to avoid compromising its efficacy and safety, as well as ensuring the administration of the precise dose⁽¹²⁾.

The second most sold pharmaceutical form was the oral suspension, preferably used for the pediatric population as it is the most suitable for those unable to swallow tablets. Furthermore, other aspects guarantee several benefits such as rapid absorption, linked to the fact that its particles are smaller compared to solid medications, faster dissolution speed in the gastrointestinal tract; the possibility of producing liquid medications with an insoluble active ingredient, as well as the ability to mask the taste, a relevant item when dealing with children⁽¹³⁾.

Concerning the age group, it was found that the most prevalent ages in all years were between 18 and 59 years old. This data is explained by the fact that the new pandemic had a strong impact on this age group, especially due to changes in lifestyle and behavioral experiences that brought health risks⁽¹⁴⁾.

Most of the prescriptions were made by doctors, as they are legally qualified professionals for this exercise. One of the main reasons for off-label prescription during the pandemic was the urgency in finding solutions to the challenges encountered in treating the disease⁽¹⁵⁾. The inclusion of antibacterial drugs in suspected or confirmed cases of COVID-19 was also carried out due to the possibility of bacterial co-infection that would subsequently have to be treated with the medication, as well as the similarities between the symptoms of viral infection and bacterial infection⁽¹⁶⁾.

On the other hand, there was a greater number of azithromycin prescriptions made by dentists. In a survey, it was observed that dentists' first choice is amoxicillin, which is used in several clinical situations, but they usually prescribe cephalosporin, clarithromycin, or azithromycin in cases where the patient is allergic to penicillins⁽¹⁷⁾. It was assessed in another study that among these professionals there is a preference for broad-spectrum antimicrobials such as penicillins, cephalosporins, and macrolides rather than narrow-spectrum ones; an evident growth was also observed in 2020, which suggests inappropriate use, probably due to the encouragement to use azithromycin⁽¹⁸⁾.

In England, a study revealed that restrictions imposed by the COVID-19 pandemic increased the use of dental antibiotics. It was due to restricted access during the initial months of the pandemic, interrupting the services provided

and compromising oral health care⁽¹⁹⁾. In the place of study, we can suggest that the difficulty in accessing medical appointments may have generated a greater demand from dental professionals or self-prescription for family and friends due to social isolation or since some health services have had operating restrictions.

In this scenario, it can be observed that there was large-scale decision-making based on studies with different types of biases, which often had a small sample size, low security, and methodological quality that meant they did not have sufficient proven scientific evidence to evaluate this effectiveness⁽²⁰⁾, through the influence of biased information or even the mass and rapid consumption of fake news by the population and health professionals.

As for gender, there was not a large variation between them; however, during the three years analyzed, females were the most prevalent in purchasing the medication. Considerations about the female sex can be made by conjecturing that the responsibility for the home and family care is often attributed to women. Therefore, there is greater concern on their part regarding the possibility of contamination. Therefore, there is better care with prevention or treatment through behavioral or pharmacological measures with self-medication. It can be seen as an element of self-care, which, due to historical and cultural aspects related to gender, relates care and health promotion to the female sex. It can also be justified by the higher tendency that women have to visit health establishments, like pharmacies⁽²¹⁾.

In the evaluation of sales notifications done in the municipality in question, a significant increase in the output of azithromycin was found between the years studied, and several factors may have contributed to this increase. A survey evaluated the outpatient consumption of antimicrobials in Brazil during the years 2017-2019 and 2020 and found that the consumption of macrolide antibiotics maintained its position of stability between the years 2017 and 2019, with a high increase in 2020, influenced by consumption of azithromycin, which stood out as one of the best-selling products during that year⁽¹⁷⁾.

In an additional analysis of the sale of medications for COVID-19 in Brazil, it was observed that in 2020, azithromycin sales remained prevalent in the main Brazilian regions. When comparing sales between the pre-pandemic and pandemic periods for each region, there were a total of 94,274 more units of boxes or bottles in 2020 than in 2019. The Northeast and Central-West regions showed an increase in sales⁽²²⁾.

Medications are technologies used in the provision of health care; however, irrational use is a huge challenge faced by health systems around the world, a serious public health problem, as it generates risks to the health of the population, wastes financial resources, or even increases expenses⁽²³⁾.

Thus, the results of several studies show that, among the different types of antimicrobials, azithromycin was the most sold in the country. A survey from Minas Gerais on the increase in the use of antibiotics during the pandemic pointed to azithromycin as the most used among users of the survey⁽⁶⁾. This consumption occurred mainly due to the high number of prescriptions related to the "COVID kit", currently defended by public policies⁽⁹⁾.

Unlike other countries, the pandemic scenario in Brazil became chaotic due to the lack of implementation of effective public policies that would help combat the pandemic, as well as the attitudes taken to combat the virus, which were completely irresponsible toward the entire population. In the certainty that some medications would prevent or have some effect against the disease, these policies advocated the use of substances without any scientific evidence and that these medications could act against the coronavirus, bringing serious health risks, as well as worsening the clinical picture of the disease⁽²⁴⁾.

Concerning the number of units sold during the months of the years evaluated, the identified data showed that the highest sales notification occurred in July 2020. During this period, the number of cases increased considerably from previous months in that city, demonstrating that the increase in azithromycin sales in the municipality showed a tendency to follow the number of confirmed cases⁽¹¹⁾.

The association between age group and pharmaceutical form can be explained by the fact that, depending on the age group, there is a preference or suitability in the consumption of a certain pharmaceutical form. Concerning the greater consumption of tablets by the 18-59 age group, adults, this may be linked to the presence of advantages that the tablet presented, as previously described.

Regarding the age group between 0-17 years, which uses liquid pharmaceutical form more frequently, it was observed in a study that oral suspension increased sharply during the years of the pandemic, suggesting that children had viral or bacterial infections of the respiratory tract during this period, which could be confused with COVID-19⁽²⁵⁻²⁶⁾.

Although several studies attest to the ineffectiveness of the medications that make up the "COVID-kit" in the treatment and prevention of the disease, azithromycin was prescribed on a large scale during the pandemic period as a prophylactic form of complications induced by the infection, resulting in the population in general to adopt the use of this medication in an uncontrolled manner^(1,5-6,27).

It is undeniable that the emergence of the new coronavirus pandemic favored growth in the demand for and use of this medication. Although it has ANVISA control through the SNGPC, it is known that there is still illegal obtaining and use without proper guidance from a health professional on the correct and rational use of this antimicrobial, as well as inappropriate and irrational prescription^(1,5-6,27).

This guidance must occur through a therapeutic relationship, objectively and empathetically, considering the particularities and needs of each person. Thus, based on the pharmacotherapeutic evaluation of the prescription, information should be provided about how the treatment will occur, duration, quantity, possible adverse reactions, and drug interactions, in addition to making them aware of not interrupting the treatment before the deadline, as well as how do not use or distribute leftovers from treatment to other people⁽²⁸⁾.

Given this, the data found in the research demonstrate that indiscriminate use of the medication could represent a serious public health problem, as it is linked to the increased probability of microbial resistance cases that could be seen in a short period⁽²⁹⁾.

Microbial resistance is characterized by events in which bacteria develop the ability to resist or fail to respond as expected to antibiotics. These microorganisms acquire this capacity as a natural form of defense and adaptation, which can be enhanced by the irrational use of antimicrobial drugs⁽³⁰⁾.

This resistance has been responsible for impacts in a series of dimensions, such as economic, social, and environmental, resulting in high treatment costs, extended hospital stays, and, especially in the high mortality among these patients, issues that could be avoided through educational strategies for the rational use of medications, promoting adequate care, as well as an improvement in the population's quality of life⁽³¹⁾.

Despite the literature reporting a low occurrence of bacterial co-infection associated with coronavirus infection, there was a vast prescription of this therapeutic class unnecessarily⁽⁹⁾. Therefore, the National Commission for the Incorporation of Technologies into the SUS (CONITEC) recommends that its use only be carried out if there is a suspicion of being affected by a bacterial infection⁽³²⁾.

During the pandemic, community pharmacies played a relevant role in the community. It is an establishment made up of trained professionals who contribute to the health and well-being of the population, serving as a provider of essential services during the pandemic and being, during this period, the first place that patients sought treatment, as well as guidance on any symptoms manifested. Throughout the pandemic period, much was demanded of the pharmaceutical sector, both due to the high demand for medicines and the need to provide pharmaceutical services, duties that contributed to less spread of the virus, as well as to the rational use of medication⁽³³⁾.

In this context, the pharmacist's duties are to care for the patient's health and well-being and, in the face of excessive use of antibiotics, it is his responsibility to meet the patient's needs, dispensing correctly, in addition to guiding him on how to use it in the right way, possible side effects and consequences of their abusive use, thus promoting rational use of these medications⁽³²⁻³⁴⁾.

The main limitations found in this work were related to the restriction and incompleteness of the information contained in the ANVISA database, the absence of data on medication dispensing in the public sector, as well as the fact that access became limited until the period of September 2021, making it impossible to use data after the period of greatest health emergency regarding COVID-19, so that a better comparison could be made with the consumption profile of the pandemic scenario.

Given the increase in microbial resistance to drugs, a global public health problem, it is imperative to evaluate the consumption of antimicrobial drugs, generating data to evaluate the impact of this consumption on resistance, as well as demonstrating the consumption profile. Thus, the correlation between the quantity sold and the increase in the number of cases demonstrates a change in behavior in the consumption of various products, including medications.

This irrational use of medications can cause serious health and life-threatening problems, such as adverse reactions to medications, masking of various pathologies, errors in dosage and administration, and there may also be a risk of dependence and abuse. In this case, and when it comes to antibiotics, the long-term consequences may be bacterial resistance and reduced effectiveness in subsequent treatments⁽³⁵⁾.

CONCLUSION

Based on the data found in this study, it was possible to observe a large increase in sales of industrialized azithromycin during the pandemic period in the city of Jequié, compared to 2019. This change in consumption profile seems to be related to the high number of people infected by the virus, and, above all, to the news related to methodologically biased studies, that sought to find a solution to COVID-19 and which were widely divulged by the

media, networks social groups and authorities, providing misinformation to a large portion of the population, which was encouraged to purchase different types of medicines indiscriminately and irrationally.

Because of this, the need to seek the rational use of medicines is highlighted, considering that the indiscriminate use of the medicine analyzed can generate possible side effects, in addition to being able to favor the rise of bacterial resistance, considered a serious public health problem. In this way, the pharmacist constitutes an important agent for promoting and guiding the safe and rational use of these medicines to promote the health of the population.

ACKNOWLEDGMENTS AND CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest concerning this article.

CONTRIBUTIONS

Larissa Félix dos Santos, Gisele da Silveira Lemos, and Nara Jacqueline Souza dos Santos contributed to the preparation and design of the research; and the collection, analysis, and interpretation of data; in writing and reviewing the manuscript.

FINANCING SOURCE

There was no funding.

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How to cite: Larissa FS, Lemos GS, Santos NJS. Comparison of the sales profile of azithromycin before and during the COVID-19 pandemic in the inland of Bahia. *Rev Bras Promoç Saúde*. 2023;36:13933.
