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THE USE OF ANTIMICROBIALS: KNOWLEDGE AND PERCEPTION OF THE POPULATION OF A REGION IN THE STATE OF SANTA CATARINA, SOUTHERN BRAZIL

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Abstract: The problem of antimicrobial-resistant microorganisms has rapidly affected the whole world, as the ineffectiveness of these medications makes it difficult to control infections. In addition to the correct selection and dosage of antibiotics, it is very important that the patient is aware of the need to fully comply with the prescribed treatment, time required, correct dosages and schedules and not to use agents that interfere with the treatment. Thus, the objective of this work was to evaluate the perception and attitudes of a population in the extreme west of Santa Catarina regarding the use of antimicrobials. 503 questionnaires with open and closed questions were applied in several cities in the Far West of Santa Catarina, for the older population, of both sexes and residents of rural and urban areas. The results showed that 62% of respondents have already purchased antibiotics without a prescription, with 7% indicating that this happens frequently. It was observed that 84% of respondents received pharmacological instructions and that they used antimicrobials until the end of treatment. 76% of people use antimicrobials only when prescribed by a doctor. Of the farmers, 33% use antimicrobials on their properties, whether in crops or to treat their animals. On the other hand, 28% of the population would be in favor of an antimicrobial over-the-counter law without a prescription. The results allow us to conclude that although most people are aware of the problems that the incorrect use of antibiotics can cause, the use of this pharmacological class is still a problem and a good portion of the interviewees have limited knowledge and information.
Keywords: Bacterial resistance, antimicrobials, population.

INTRODUCTION

Bacterial resistance to antibiotics is one of the main public health problems worldwide, as it has worrying clinical and economic consequences (Spernovasilis et al., 2020). The development of this resistance is a natural phenomenon resulting from the selective pressure exerted by the use of antimicrobials, but which has undergone a very accelerated expansion due to the inappropriate use of these drugs, with a very clear correlation between a higher consumption of antibiotics and higher levels of resistance. (Loureiro et al., 2016).

Other factors may contribute to the increase in antimicrobial resistance, such as the existence of high levels of non-adherence to therapy by patients, as they often take different doses than prescribed, combined with a high level of self-medication. once often part of the population uses antibiotics from previous treatments or obtained from the pharmacy without a medical prescription (Da Silva et al., 2020).

The practice of inappropriate use of antimicrobials is often associated with cultural factors, beliefs and lack of knowledge about the effectiveness and use of antimicrobials, which can be seen when it is observed that a large part of the population is unaware of the importance of the correct use of these drugs (Fiol et al. al., 2010).

Education is a key strategy in antimicrobial administration programs, on the other hand, information is directed primarily at healthcare professionals such as nurses, pharmacists and physicians, rather than at patients. Therefore, there is a need to improve educational programs and campaigns to educate the population about the appropriate use of antibiotics and the risks of resistance to these drugs, as well as to disseminate this information in order to improve antibiotic therapy and combat resistance (Alghamdi et

al, 2020).

The general population is unaware of the problem of antimicrobial-resistant microorganisms and therefore having data on the population's knowledge of antimicrobials is essential to find ways to try to reverse this aggravating problem of microbial multi-resistance. For these awareness activities to be effective, it is important to know the population's perception of antimicrobials, so it is possible to suggest strategies to reduce the inappropriate use of antimicrobials and consequently contribute to the control of multiresistant microorganisms. Thus, the objective of this work was to evaluate the perception of the population of the extreme west of Santa Catarina regarding the use of antimicrobials, considering that data on this subject are scarce, highlighting that this was the first work in the state of Santa Catarina. and can be used as a tool for developing guidance programs for health professionals as well as the population.

MATERIAL AND METHODS

STUDY PROJECT

A descriptive, quali-quantitative and cross-sectional study was carried out to investigate the perception and practices of the population residing in eleven cities in the extreme west region of Santa Catarina, southern Brazil (figure 1). This study was approved by the Research Ethics Committee of Universidade do Oeste de Santa Catarina - UNOESC.

Participants were informed about the purpose of the study and provided verbal consent. The ethics committee approved this consent because it was a knowledge-based study and did not involve any participant's personal information/identity.

DATA COLLECTION TO INVESTIGATE THE KNOWLEDGE AND PERCEPTION OF THE POPULATION REGARDING ANTIMICROBIALS

To assess the population's level of knowledge and perception regarding antimicrobials, a questionnaire was used, with multiple-choice questions, applied to the general population with topics that include the purchase of antimicrobials, the use of these drugs and basic knowledge about these substances (table 1).

The questionnaire was applied by email using the googleforms tool and was also applied manually to those people who did not have access to these technologies.

A total of 503 people were interviewed and the investigation was carried out at random and the only choice criterion was the age of the participants, which must be people over 18 years old.

RESULTS AND DISCUSSION

The study involved people aged between 18 and 92, 220 men and 283 women. Of these, 479 people (95%) had no training in the health area. The others (24 interviewees) worked in the health area (nursing (5), beautician (1), pharmacist (6), physiotherapist (3), dentist (2), and 1 professional from each of the following professions holistic therapy, firefighter, microbiologist, psychotherapist, dental assistant and pharmacy assistant).

The results showed that the majority (62%) of the participants had already used antimicrobials without a prescription, that is, people self-medication is still a frequent habit of the population. On the other hand, 93% say that they do not use antimicrobials in a preventive way and this ends up being important, as it is perceived that people are aware of the use of these drugs (Table 2).

Self-medication, especially with antibiotics,

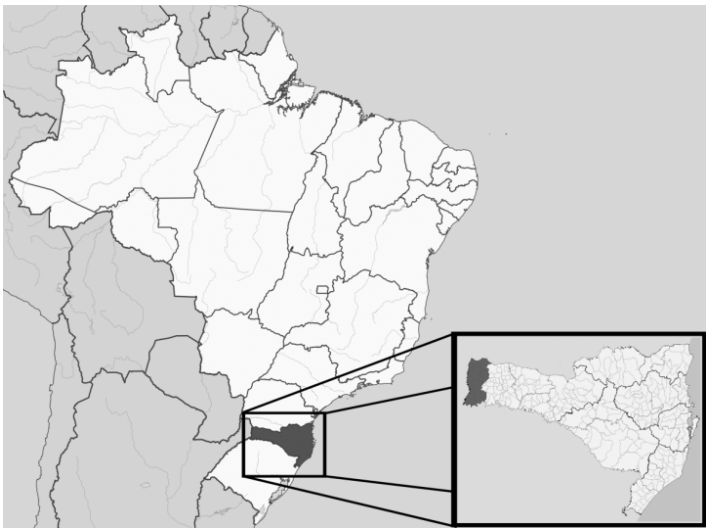


Figure 1: Map of Santa Catarina with emphasis on the extreme west region, where this study was carried out.

Age:
Gender:( ) Female ( ) Male
City:
1- Do you work as a healthcare professional?
( ) Yes ( ) No
2- If in this case your answer is yes to the previous question, in which area of health do you work?
3- Were there situations in which you deemed it necessary for your well-being to purchase antimicrobials without a prescription?
( ) Yes ( ) No
4- Do you use antimicrobials frequently for preventive reasons?
( ) Yes ( ) No
5- If the answer is yes, is this custom done by all members of your family?
( ) Yes ( ) No, just a custom of mine ( ) of most of the family
6- During the purchase of antibiotics, did the pharmacist who sells or delivers these drugs guide you on how to use the antibiotic, such as schedules or time when it will be necessary to follow the treatment?
( ) Yes ( ) No ( ) Sometimes
7- In this case according to your opinion, check how you use the drug?
( ) until the end of the treatment prescribed by the doctor, even if you no longer experience any symptoms of the infection.
( ) just until the symptoms disappear, as I don't see the need to continue with the treatment because I'm already cured.
( ) the person gives up because they often feel sick with stomach pain, diarrhea, nausea, etc.
8- If you are a farmer or own a farm, do you use any type of antimicrobial (antibiotic, fungicide) for your agricultural or livestock activities, whether using pesticides, animal feed, or preventive treatments for the herd?
( ) Yes ( ) No ( ) I'm not a farmer
9- If a law is passed regarding the over-the-counter sale of antimicrobials in any commercial establishment, where a medical prescription is not required for a legal sale of the drug, would you be in favor of this law?
( ) Yes ( ) No
10- When do you use antibiotics or antifungals?
( ) The person suffers an injury and fears an infection.
( ) The person has some uncomfortable symptoms, such as allergies, diarrhea, or severe pain in some part of the body.
( ) the person suffers from a bad cold or flu.

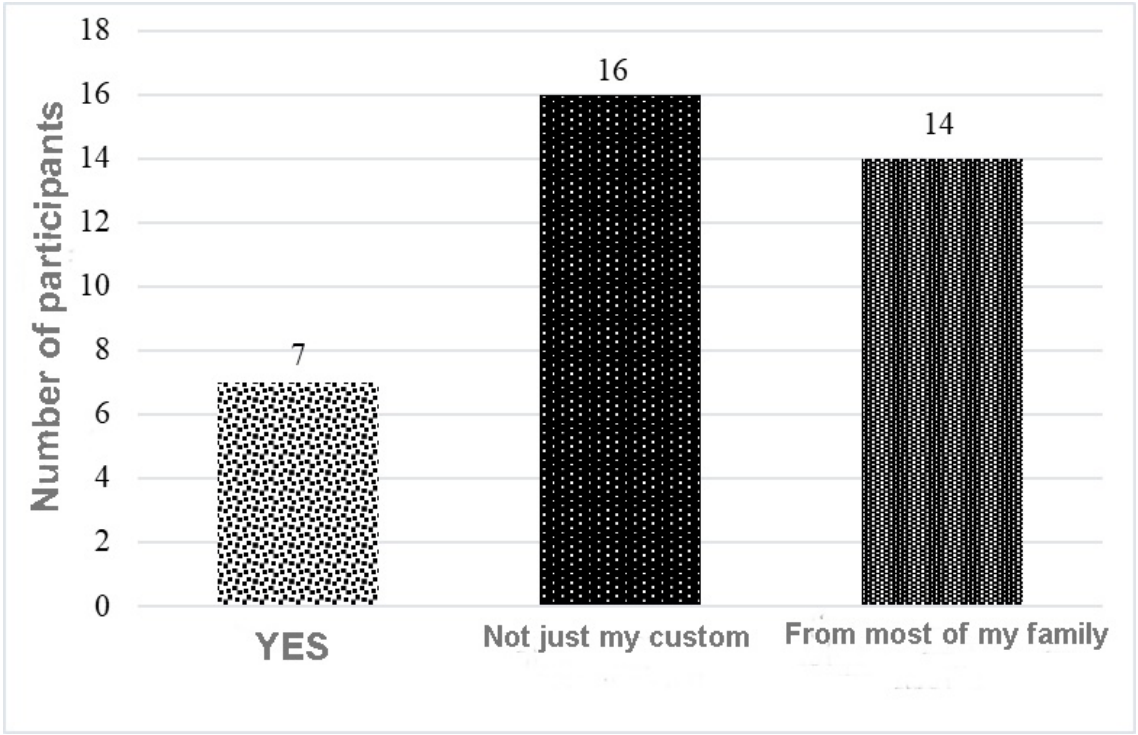
( ) for prevention reasons making frequent use of antibiotics.

( ) only when there is a medical prescription.

Table 1: Questionnaire used to assess the population's level of knowledge regarding antimicrobials

Questions	Yes	No	Sometimes
Were there situations in which you felt it was necessary for your well-being to buy antimicrobials (antifungals, antivirals, antibiotics, etc.) without a prescription?	312(62%)	191(38%)	0
Do you make frequent use of antimicrobials (antifungals, antivirals, antibiotics, etc.), for preventive reasons?	37(7%)	466(93%)	0
During the purchase of antibiotics, the pharmacist selling or delivering Did these medications guide you on how to use the antibiotic, such as the times of ingestion or application, how long will it be necessary to follow the treatment?	421(84%)	19(4%)	63(13%)
If any law is passed regarding the over-the-counter sale of antimicrobials in any commercial establishment, where a medical prescription is not required for a legal sale of the drug, would you be in favor of this law?	142(28%)	361(72%)	0

Table 2: Habits of the population in relation to the use of antimicrobials.



Graphic 1: Data referring to people who make preventive consumption of antimicrobials in the extreme west region of Santa Catarina, Southern Brazil.

is a very common factor in underdeveloped countries, where legislation, quality of life and financial factors are predominant for this practice, whereas in North American, North European and Australia countries this practice no longer exists, which shows that with interest and effort on the part of the population and especially government officials and health professionals, this worrying scenario can be reversed (SERVIA-DOPAZO; FIGUEIRAS, 2018).

According to Batista et al. (2020), the main reasons that lead to the purchase and dispensing of antibiotics without a prescription are the lack of interest on the part of pharmacies to avoid this practice, whether for profit purposes, not to displease their customers, or even on the part of the general population that is unaware of the seriousness of the problem of antimicrobial resistance.

According to Sakeena, Bennett, and McLachlan (2018), some factors observed in their study were important for people to self-medicate with antimicrobials. These researchers highlighted that the lack of patience to carry out a medical consultation influenced people to make a quick decision to solve their health problems, for example, self-medication with antimicrobials, high wages of workers also led people to self-medication due to the high power purchasing these for purchases, and in some cases it was observed that people with a high degree of knowledge about antimicrobials, such as nurses or university dentistry students, made frequent use of these drugs even knowing all the risks.

According to research by Batista et al. (2020) the most dispensed antimicrobials without a prescription in underdeveloped countries were azithromycin, ciprofloxacin and amoxicillin-clavulanic acid, which has promoted the development of resistance by bacteria such as: *Streptococcus pneumoniae, Acinetobacter baumannii, Campylobacter jejuni, Enterococcus faecalis*. In addition, it was observed that the main diseases that lead to the practice of self-medication with antibiotics were respiratory system problems, such as sore throat, upper respiratory tract infections, cold, bronchitis, cough, flu, diarrhea and urinary tract infections.

Another important factor highlighted by Arkbar et al. (2021) is that community pharmacists must play a crucial role in the development and execution of antimicrobial administration programs, correctly orienting the population regarding the use of these drugs.

Our results revealed that the majority (84%) of respondents stated that the pharmacist provides information and guidelines for the use of antimicrobials (Table 2). These data are important because they demonstrate that the interviewees are guided by pharmacists, professionals who provide care when dispensing these drugs.

Unlike these data, Molina et al. (2020) revealed that in their studies in Florianópolis, where several pharmacists were interviewed, the lack of pharmaceutical care is almost predominant in that city, as many report that they have a bad work environment due to the proximity of service counters, which makes it difficult to individualized and particular service to the population. In addition, pharmacists feel forced to abandon any dispensing advice for patients, due to the very high number of people that these professionals serve daily, and this pressure and also the charge of the pharmacy leadership itself so that the maximum number of customers is served, something predominant for the lack of pharmaceutical care.

These data from Molina et al. (2020) can somehow explain the positive result found in the response of respondents about the pharmaceutical care provided by pharmacists in our region, in which most cities are small

with a lower customer demand, which consequently facilitates service. and passing information from pharmacists to people.

Our data showed that only 37 (7%) of people consume antimicrobials preventively (Table 2). Of these, in 43% of cases it is done only by the person, but in 38% it is done by other family members (Graphic 1).

The data from Graphic 1 indicate that people who do self-measurement also transmit this custom to other family members, and this is something that has already been observed in other studies such as the one carried out by Torres et al. (2019), who highlighted that in countries with a high frequency of self-medication, the encouragement of family members was one of the reasons that led to this practice, in addition to other factors such as poverty, low level of education, high cost of medical consultations or even difficulties of infrastructure.

These data are worrying, as antimicrobials have no effects when ingested preventively and this habit can contribute to the adaptation of microorganisms and consequently the development of resistance mechanisms for these drugs (PARKER, 2016).

A key item of antimicrobial treatment information involves complete completion of the prescribed course of treatment, and our study found that 422 people (84%) say they follow their treatment to completion as recommended by their physician and pharmacist (Graphic 2).

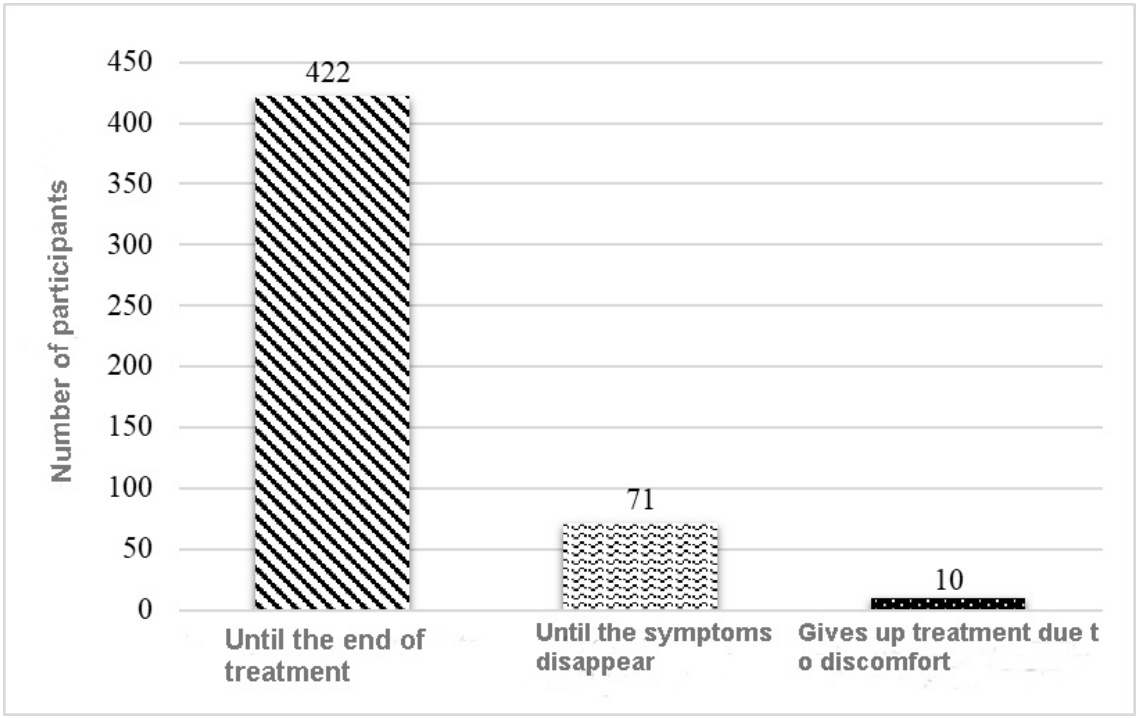
Similar to our data, Fiol et al. (2010) in Sorocaba-SP, the adherence of users of different public pharmacies was 81.6%, corroborating Sakena's idea; Bennett; Mclachlan (2018) demonstrating that pharmacists are important health professionals in dispensing these drugs, as they highlight the importance of maintaining treatment until the end of the medical prescription and not when clinical symptoms disappear.

Several factors are reported in the literature as responsible for the increase in antimicrobial-resistant strains of microorganisms, including the use of these substances in agriculture (Malagón-Rojas et al., 2020). Our results showed that 167 farmers (representing 33% of respondents) use antimicrobials on their properties, whether in the use of pesticides, animal feed, or preventive treatments for the herd.

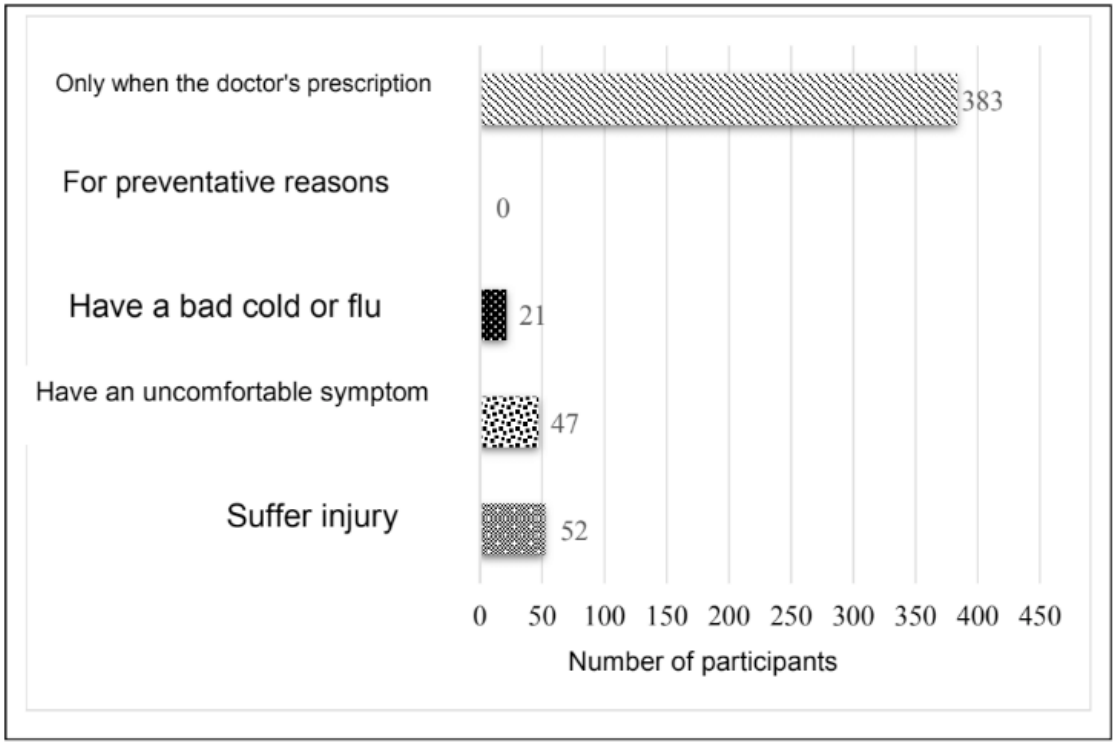
According to Manyi-Loh et al. (2018), in underdeveloped countries in which the legislation on the use of antimicrobials is very weak or non-existent, there is a practice of applying antibiotics in agricultural activities, such as in agriculture, where animals are exposed to doses of these drugs with great frequency and almost always with no real need for this, these animals can pass on resistant strains of bacteria either through the meat consumed by humans or through the feces that remain on the soil, which results in bacteria resistant to various types of antibiotics.

This practice has been happening on increasing scales in BRICS countries (Brazil, India, China, Russia and South Africa), the high demand these countries receive to export these products contributes to the fact that the practice of treating animals with antibiotics only grow, and without the existence of stricter laws that limit the purchase of these foods, this will mean an increasing problem in the problem of resistant bacteria (MANYI-LOH et al., 2018)

Regarding a possible legislation that allows the acquisition of antimicrobials without a medical prescription, 28% of respondents are in favor (Table 2), a result that corroborates the idea of Batista et al. (2020) who stated that the population often treats these types of medications as if they were any other medication without having a real notion of the problem of bacterial resistance. (BATISTA et al., 2020)



Graphic 2: Data on how people use antimicrobials.



Graphic 3: The reason why respondents use antimicrobials.

According to research carried out by Sakeena, Bennett and McLachlan (2018), in 28 underdeveloped countries around the world it is possible to buy antimicrobials without a prescription, and in Brazil, for example, in 2005, 107 pharmacies were interviewed and in 74% of these were able to acquire amoxicillin without a prescription. On the other hand, from the publication of RDC 20/2011, this sale started to be controlled and through our results we can see that it is being fulfilled by the majority (72%) of the population (Table 2).

Another important finding in our study is that the majority (76%) of people stated that they only use antimicrobials when there is a medical prescription (Graphic 3).

These results are very important, as they demonstrate that the population interviewed is aware of the basic use of antimicrobials, corroborating the idea of Pereira, Silva and Galvão (2018), that the use of these drugs must only be carried out with a medical prescription.

One of the possible limitations of our study can be attributed to the fact that before the participants answered the questionnaire, they were informed that it was part of a research carried out by a student of the pharmacy course. Therefore, it is possible that our results may have a placebo effect, that is, because it is a pharmacy course work, people tended to answer what they know and not what they do.

CONCLUSION

The results obtained in this work allow us to conclude that the population interviewed in the extreme west region of Santa Catarina showed awareness of the use of antimicrobials, especially when asked about the purchase of these drugs without a prescription and the importance of pharmaceutical care in dispensing these drugs.

On the other hand, our data indicate that 27% of respondents are in favor of selling antimicrobials without a prescription and 24% ingesting antibiotics without a prescription, which shows that this portion of the population still needs to be made aware, as they do not fully understand the problem. of antimicrobial-resistant microorganisms, and even though most respondents are disciplined and follow the guidelines of pharmacists and doctors when using antimicrobials, the small percentages that do not have this behavior represent a great risk to everyone's collective health.

In view of this, it is suggested that actions be carried out that demonstrate and disseminate to the population the seriousness of this problem, which is antimicrobial resistance, through lectures, dissemination in media such as social networks, television and radio, distribution of pamphlets, increase control of sale of antimicrobials without medical prescription with stricter inspections or even follow the actions developed in developed countries.

REFERENCES

Batista, Ana Daniela *et al*. Antibiotic Dispensation without a Prescription Worldwide: a systematic review. **Antibiotics**, [S.L.], v. 9, n. 11, p. 786, 7 nov. 2020.

Brasil, Agência Nacional de Vigilância Sanitária. **Resolução de Diretoria Colegiada - RDC** nº 20, de 05 de maio de 2011. Brasília: Diário Oficial da União; 2011. Disponível em:<https://anvisa.gov.br/sngpc/documentos2012/rdc%2020%202011.pdf ?

Da Silva, Rafael Almeida et al. Resistência a Antimicrobianos: a formulação da resposta no âmbito da saúde global. **Saúde em Debate**, v. 44, p. 607-623, 2020.

Fair, Richard J.; TOR, Yitzhak. Antibiotics and Bacterial Resistance in the 21st Century. **Perspectives In Medicinal Chemistry**, [s.l.], v. 6, p.327-345, jan. 2014.

Fiol, Fernando de Sá Del et al. Nível de informação do paciente sobre o uso de antibióticos. **Revista Brasileira de Ciências Farmacêuticas [online].** v. 46, n. 3, p. 437-444. 2010.

Kapoor, Garima; SAIGAL, Saurabh; ELONGAVAN, Ashok. Action and resistance mechanisms of antibiotics: A guide for clinicians. **Journal Of Anaesthesiology Clinical Pharmacology**, [s.l.], v. 33, n. 3, p.300-345, 2017.

Loureiro, Rui João, Fátima Roque, António Teixeira Rodrigues, Maria Teresa Herdeiro, Elmano Ramalheira, O uso de antibióticos e as resistências bacterianas: breves notas sobre a sua evolução, **Revista Portuguesa de Saúde Pública**, v. 34, n. 1, 2016, p. 77-84.

Malagón-Rojas, Jeadran N et al. From environment to clinic: the role of pesticides in antimicrobial resistance. **Revista Panamericana de Salud Pública**, [S.L.], v. 44, p. 1, 23 set. 2020.

Manyi-loh, Christy et al. Antibiotic Use in Agriculture and Its Consequential Resistance in Environmental Sources: potential public health implications. **Molecules**, [S.L.], v. 23, n. 4, p. 795, 30 mar. 2018.

Molina, Leandro Ribeiro et al. Ética e assistência farmacêutica na atenção básica: desafios cotidianos. **Revista Bioética**, [S.L.], v. 28, n. 2, p. 365-375, jun. 2020.

Parker, Nina et al. **Microbiology**. Houston, Texas: Openstax, 2016. 31 p. 31 v. Disponível em: https://openstax.org/books/microbiology/pages/1-introduction. Acesso em: 1 nov. 2016.

Pereira, Jéssica Quintão; Silva, Marcus Tolentino; Galvão, Taís Freire. Use of antibiotics by adults: a population-based cross-sectional study. **São Paulo Medical Journal**, [S.L.], v. 136, n. 5, p. 407-413, out. 2018.

Sakeena, M.H.F.; Bennett, Alexandra A.; Mclachlan, Andrew J.. Non-prescription sales of antimicrobial agents at community pharmacies in developing countries: a systematic review. **International Journal Of Antimicrobial Agents**, [S.L.], v. 52, n. 6, p. 771-782, dez. 2018.

Servia-dopazo, Miguel; Figueiras, Adolfo. Determinants of antibiotic dispensing without prescription: a systematic review. **Journal Of Antimicrobial Chemotherapy**, [S.L.], v. 73, n. 12, p. 3244-3253, 22 ago. 2018.

Spernovasilis, N; Lerodiakonou D; Milioni A; Markaki, L; Kofteridis DP; Tsioutis C. Assessing the knowledge, attitudes and perceptions of junior doctors on antimicrobial use and antimicrobial resistance in Greece. **Journal of Global Antimicrobial Resistance,** v. 21, 2020, p. 296–302.

Saleh Alghamdi, Ilhem Berrou, Zoe Aslanpour, Eshtyag Bajnaid, Abdulhakim Alzahrani, Nada Atef Shebl, Perceptions regarding antimicrobial use and resistance among adult hospital patients in Saudi Arabian Ministry of Health (MOH) hospitals, **Saudi Pharmaceutical Journal**, v.28, n. 12, 2020.

Torres, N.F. et al. Evidence of factors influencing self-medication with antibiotics in low and middle-income countries: a systematic scoping review. **Public Health**, [S.L.], v. 168, p. 92-101, mar. 2019.

Zunaira Akbar, Zikria Saleem, Arooj Shaukat, Muhammad Junaid Farrukh, Perception and practices of community pharmacists towards antimicrobial stewardship in Lahore, Pakistan, **Journal of Global Antimicrobial Resistance,** v. 25, 2021, p.157-161.