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# The excessive use of antibiotics in the pandemic period and the possible increase in bacterial resistance: integrative revision

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**Abstract:** Through the pandemic scenario of Covid-19, declared by the World Health Organization (WHO), the support of the use of masks, alcohol and hand hygiene, became essential measures for combat. Under so many uncertainties and the fear of the population, it began to enter a serious emotional state, in which the irrational use of medications and self-medication increased, trying to protect itself from the lethality of such a disease, where the widespread practice of antibiotics should be discouraged, in which its use can lead to higher rates of bacterial resistance. The present study aimed to present discussions about the indiscriminate use of antibiotics and the evolution of resistance, based on the analysis in national scientific publications. The same was carried out between July and August 2021. The following databases were used: Scientific Electronic Library Online

(SciELO), Latin American and Caribbean Literature on Health Sciences (LILACS) and US National Library of Medicine (PUBMED). The search in the database was performed using the following key words: Bacterial resistance; Antibiotics; Public health; COVID-19. The study identified that bacterial resistance results in indiscriminate use, which will always be a very serious public health record, however, in order to have minimal control in the face of this global problem, and recent, in the face of the pandemic of the new coronavirus, it is increasingly necessary that professionals are aware of this evil and increasingly responsible.

**Keywords:** Bacterial resistance. Antibiotics. Public health. COVID-19

## 1. Introduction

In December 2019, coronavirus, popularly known as COVID-19, emerged in the world from Wuhan, China, which is a virus characterized by a respiratory syndrome, where it has caused thousands of deaths worldwide. And through the pandemic scenario declared by the World Health Organization (WHO), the support of the use of masks, alcohol and hand hygiene, became essential measures for combat (SADIO *et al.*, 2021).

Under so many uncertainties and fear, the population began to enter a serious emotional state, in which the irrational use of medications and self-medication increased, trying to protect against the lethality of such a disease, where the widespread practice of antibiotics should be discouraged, in which its use can lead to higher rates of bacterial resistance, affecting the volume of diseases and deaths, mainly during the COVID-19 pandemic (WHO, 2020; GARCIA *et al.*, 2021).

According to the WHO, the worldwide phenomenon of bacterial resistance is as dangerous as a pandemic, in view of this, the pandemic of the new coronavirus had an immense impact, where the uncontrolled use of antibiotics worsened, bringing a great concern to public health (SOUZA *et al.*, 2021; MAKOWSKA *et al.*, 2020). And when it comes to the excessive use of antibiotics, the widespread use of antibiotics should be discouraged, since its application can lead to higher rates of bacterial resistance, which will impact the volume of diseases and deaths during the pandemic of covid-19 and beyond (SILVA *et al.*, 2021).

Thus, Silva (2017) elucidates that the indiscriminate use of antibiotics can alter the resistance of bacteria that cause diseases, which can make the drug ineffective in its fight, besides hindering treatment, affecting other bacteria that help the body to function properly. Rocha (2014), explains that the fact that bacteria become resistant to antibiotics is normal, being expected in medical treatments, but the indiscriminate use of these antibiotics can accelerate the time it takes for these microorganisms to become resistant and possibly stop responding to treatment.

Thus, the study, linked to the theme, the excessive use of antibiotics in the pandemic period, proceeded to the guide question: What factors influence the population to use antibiotics indiscriminately? During the preparation of the study, was thought of the possible justification, where it aims to propose an approach on the excessive use of antibiotics in the pandemic period, thus observing the factors that have a decisive influence on this reality, such as the possible increase in bacterial resistance.

That said, the study aims to present discussions about the indiscriminate use of antibiotics and the evolution of resistance, based on the analysis in national scientific publications.

## 2. Methodology

This is a bibliographic study described as a study that constitutes a broader review methodology, which allows the inclusion of theoretical literature, as well as studies with different methodological approaches - quantitative and qualitative. The study was developed through a process of analysis and synthesis, following the integrative review format (CROSSETTI, 2012).

The studies included in this type of review are analyzed in an integrated way in connection with its objectives, methods and materials, providing those who read it, the analysis of previous knowledge on the probed theme (POMPEO; ROSSI; GALVÃO, 2009).

The research was based on the following steps: specification of the methods of selection of the studies; data extraction procedure; analysis and evaluation of the studies included in the systematic review; data extraction and presentation of the review/synthesis of knowledge produced and published (JBI, 2011).

The sample consisted of scientific articles deposited in the following electronic databases of scientific publications: Scientific Electronic Library Online (SciELO), Latin American and Caribbean Literature on Health Sciences (LILACS) and US National Library of Medicine (PUBMED). And the search in the database was performed using the following keywords: Bacterial resistance; Antibiotics; Public health; COVID-19.

The inclusion criteria adopted for this research were: articles freely indexed in full, in Portuguese and published between the years 2020 and 2021. Exclusion criteria were: articles that do not bring relevance for research study, editorial and Anais publications of scientific congresses, such as in other formats such as master's and/or doctorate dissertation, articles not available in the integra, in foreign language and that did not coincide with the theme addressed. The initial selection was made based on the titles and abstracts.

The data analysis period was between July and August 2021 and was organized and categorized into frames, through the Microsoft Word program, for descriptive analysis.

## 3. Results and Discussion

At the intersection of the four terms (Bacterial resistance; Antibiotics; Public health; COVID-19), using 3 databases, SciELO, Lilacs and PUBMED, in all, 18 publications were obtained, of which 10 studies were in English and Spanish, and 8 in Portuguese. Among these 18, 7 were selected to make up the analysis and categorization proposed in this study. Thus, 11 studies were evaluated and excluded because they do not present a theme consistent with the one addressed in this study.

**Table 1.** Theme of the studies (Bacterial resistance; Antibiotics; Public health; COVID-19).

Thematic studies (Bacterial resistance; Antibiotics; Public health; COVID-19).	No.
Bacterial resistance	2
Antibiotics	2
Public health	1
COVID-19	2
Total	7

Source: Prepared by the researcher with data collected.

From this evaluation of the publications, the following articles were obtained for discussion:

**Table 2.** Articles selected to make up the study

Origin	Article title	Authors	Year
01 Ibero-American Journal of Humanity.	Bacterial resistance by indiscriminate use of antibiotics: a public health issue.	OLIVEIRA, M.; PEREIRA, K. D. S.; ZAMBERLAM, C.R.	2020
02 Context - sick.	Bacterial resistance against the background of hospital infection.	SANTOS, N.Q.	2020
03 Cad. Public health.	Self-medication and indiscriminate use of medications during the COVID-19 pandemic.	MELO <i>et al.</i>	2021
04 Study. av.	Medicines and treatments for Covid-19.	FERREIRA, L. L. G.; ANDRICOPULO, A.D.	2020
05 Rev. Oxford Brazil	Antibiotic therapy for covid-19 without evidence of bacterial infection. Rapid systematic review.	STEIN <i>et al.</i>	2020
06 Periodic UNIFAP	Bacterial resistance to antibiotics and Public Health: a brief literature review.	COSTA, A. L. P.; JUNIOR, A.C. S. S.	2020
07 Research Society and Development	Implications of antibiotic use	SILVA <i>et al.</i>	2021

	during the COVID-19 pandemic.		
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Source: Prepared by the researcher with data collected.

After data collection and careful reading of documents, it was possible to verify that antibiotics are used in various ways that can be considered as irrational. In view of this, it is understood that other authors corrode with each other, even if several recent initiatives have been developed and are in force for the combat and weakening of bacterial resistance (SANTOS, 2020; FERREIRA & ANDRICOPULO, 2020).

The new virus is a respiratory disease that causes pneumonia, where cases of co-infection with other viruses and also with bacteria have been described, thus leading to a worsening of the patient's condition. Antibiotics have several functions in COVID-19, so many doctors prescribe the same drugs to patients, as the symptoms are similar to bacterial pneumonia. Antibiotics used preventively increase bacterial resistance, thus leading to higher mortality (STEIN *et al.*, 2020; COSTA & JUNIOR, 2020).

Given the large numbers of drugstores and pharmacies, the inspection becomes a little more complex in the establishments, demonstrating in research that RDC 20/11 controls the sale of antibiotics, however, after 5 years of its publication the results do not prove to be as effective, where the control of prescriptions is not equally supervised (OLIVEIRA; PEREIRA, ZAMBERLAM, 2020). Based on this understanding, it can be noted that public and legal measures should be much more rigorous, considering that they open gaps for indiscriminate use to continue existing and hindering the confrontation in question (MELO *et al.*, 2021).

It is necessary to clearly define the overall impact of bacterial resistance problem on mortality, morbidity and health costs, which is a global problem, where if national measures are taken in a minority of countries, the fatal effect will be very small. The economic impact of bacterial resistance affects differently the actors of the antimicrobial use/supply process (SILVA *et al.*, 2021).

In view of the studies evaluated, there is no evidence that the research scans corroborate the way of demonstrating that the severity of the problem is of a global level, where a broad and effective multidisciplinary work is required. Also emphasizing that health professionals keep up to date and know how to make a targeted conduct, ensuring the effectiveness in public health by uniting their efforts so that attention and assistance occur so that the proposal occurs.

## 4. Conclusions

Bacterial resistance results in indiscriminate use, which will always be a very serious public health record, however, for there to be minimal control in the face of this global problem, and recent, in the face of the pandemic of the new coronavirus, it is increasingly necessary that professionals are aware of this evil and increasingly responsible.

It can be concluded that there is an urgency regarding

the responsible and active action of health professionals, considering that they are indispensable in the treatment of the patient, preventing them from performing the use of antibiotics in an inappropriate and exaggerated way, giving them awareness that it is not an individual problem, but public health in global reach.

Finally, with the present study, it is concluded that there is much to be done so that this dog does not occur or is minimized. Therefore, there is a lot of studies and research to be carried out to understand what can be done scientifically and biologically about the numerous bacteria, which are capable and increasingly prepared to cope with bacterial resistance by the indiscriminate use of antibiotics.

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