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Antimicrobial management in Ceará: evaluation and description

Gerenciamento de antimicrobianos no Ceará: avaliação e descrição

Gestión de antimicrobianos en Ceará: evaluación y descripción

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ABSTRACT

This study aimed to evaluate the implementation of the Antimicrobial Management Program in hospital units of Ceará State, classifying its implementation level and identifying strengths and weaknesses to guide improvement actions. It is a descriptive, cross-sectional, and quantitative study that included all state hospitals that responded to the National Assessment conducted by ANVISA. Data analysis was performed using electronic spreadsheets (*Microsoft Excel*®), classifying services according to compliance with essential components. Among the 11 hospitals evaluated, nine reported having the program implemented; 44.4% (n=4) were classified as advanced, 44.4% (n=4) as intermediate, and 11.1% (n=1) as basic, with no records of inadequate levels. Despite the progress observed, relevant challenges persist for program consolidation, requiring differentiated technical, educational, and governmental support strategies, as well as complementary studies to assess the program in the hospital context of Ceará.

Keywords: *Drug Resistance Microbial; Antimicrobial Management; Hospitals Public; Program Evaluation.*

RESUMO

O estudo teve como objetivo avaliar a implementação do Programa de Gerenciamento de Antimicrobianos nas unidades hospitalares do Estado do Ceará, classificando seu nível de implementação e identificando pontos fortes e fragilidades para subsidiar ações de melhoria. Trata-se de pesquisa descritiva, de corte transversal e abordagem quantitativa, que incluiu todas as unidades hospitalares estaduais que responderam à Avaliação Nacional da ANVISA. As análises

foram conduzidas em planilhas eletrônicas (Microsoft Excel®), classificando os serviços segundo sua conformidade com os componentes essenciais. Dos 11 hospitais avaliados, nove declararam possuir o programa implementado; 44,4% (n=4) foram classificados como avançados, 44,4% (n=4) como intermediários e 11,1% (n=1) como básico, sem registros de nível inadequado. Apesar dos avanços observados, ainda persistem desafios relevantes para a consolidação do programa, demandando estratégias diferenciadas de apoio técnico, pedagógico e governamental, além de estudos complementares que avaliem o programa no contexto hospitalar cearense.

Descritores: *Resistência Microbiana a Medicamentos; Gestão de Antimicrobianos; Hospitais Públicos; Avaliação de Programas e Projetos de Saúde.*

RESUMEN

El estudio tuvo como objetivo evaluar la implementación del Programa de Gestión de Antimicrobianos en las unidades hospitalarias del Estado de Ceará, clasificando su nivel de implementación e identificando fortalezas y debilidades para orientar acciones de mejora. Se trata de una investigación descriptiva, transversal y de enfoque cuantitativo, que incluyó los hospitales estatales que respondieron a la Evaluación Nacional de la ANVISA. Los análisis se realizaron mediante hojas de cálculo electrónicas (*Microsoft Excel*®), clasificando los servicios según su conformidad con los componentes esenciales. De los 11 hospitales evaluados, nueve informaron tener el programa implementado; el 44,4% (n=4) fue clasificado como avanzado, el 44,4% (n=4) como intermedio y el 11,1% (n=1) como básico, sin niveles inadecuados. Apesar de los avances, persisten desafíos para la consolidación del programa, que requiere estrategias diferenciadas, además de estudios complementarios en el contexto hospitalario de Ceará.

Descriptores: *Farmacorresistencia Microbiana; Programas de Optimización del Uso de los Antimicrobianos; Hospitales Públicos; Evaluación de Programas y Proyectos de Salud.*

INTRODUCTION

Antimicrobial resistance (AMR) to antimicrobial agents has emerged as one of the most significant challenges to global public health. International projections indicate that by 2050, AMR may be responsible for up to 10 million deaths annually[1]. In response to this challenge, *Antimicrobial Management Programs* (AMPs) were developed, referred to in Brazil as the Programa de Gerenciamento de Antimicrobianos (PGA). In the Brazilian context, the National Health Surveillance Agency (Agência Nacional de Vigilância Sanitária – ANVISA) recommends the implementation of AMPs as an essential strategy to promote the safe and rational use of antimicrobials, as well as to prevent the selection and spread of resistant microorganisms. Furthermore, aiming to assess the national landscape of AMP implementation in Brazilian hospitals, ANVISA conducts the National Assessment of Antimicrobial Management in Health Services[2].

Within this context, the Government of the State of Ceará, through the State Health Secretariat (Secretaria da Saúde – SESA/CE), instituted the Antimicrobial Management Program and its respective Technical Committee by means of ordinance No. 1876/2023, published in the Official Gazette, later updated by ordinance No. 100/2024. This initiative represents a strategy aimed at strengthening clinical management, focusing on the monitoring, control, and rational use of antimicrobials in order to address AMR within hospital care settings[3,4].

Therefore, the present study is justified by the need to obtain an overview of the implementation of AMPs in hospitals within the state health care network, with the purpose of supporting institutional improvement actions. Its relevance lies in demonstrating the degree of alignment of these programs with best practices in antimicrobial management[5,6,7]. Accordingly, this study aims to evaluate the implementation of Antimicrobial Management Programs in reference hospital units in the State of Ceará, as well as to classify their level of implementation.

METHODS

This is a descriptive, cross-sectional study with a quantitative approach, based on the documentary analysis of secondary data. The study population comprised public state hospitals within the state health care network. The sample consisted of 11 reference hospitals that voluntarily participated in the National Assessment of Antimicrobial Management Programs (AMPs) conducted by the National Health Surveillance Agency (Agência Nacional de Vigilância Sanitária – ANVISA) between December 2024 and February 2025, and that provided complete and validated responses.

Public hospital units linked to the State Health Secretariat of Ceará (Secretaria da Saúde – SESA/CE) with complete and validated responses were included, while those with incomplete or non-validated responses were excluded.

Of the 11 hospitals evaluated, 9 reported having an Antimicrobial Management Program implemented, constituting the group analyzed regarding the level of program consolidation.

Data were accessed through institutional sharing from the State Health Surveillance authority to ANVISA's *SharePoint* environment, following prior authorization. The information was organized in an electronic spreadsheet (*Microsoft Excel*®), and only responses from hospitals belonging to the state hospital network were selected for analysis. The evaluation considered the essential components of the Antimicrobial Management Program established in the national guideline, with score attribution for classification of the level of consolidation, encompassing the following domains: leadership support; definition of responsibilities; education; actions to improve antimicrobial use; and monitoring and dissemination of results.

Table 1 – Maximum score assigned to each essential component.

Leadership support	170
Definition of responsibilities	160
Education	100
Actions to improve antimicrobial use	370
Monitoring	80
Dissemination of results	120

Source: ANVISA, 2023.

Table 2 – Classification of hospitals with an AMP implemented.

Group 01	(0-239) Inadequate	No AMP has been developed or implemented, or the implementation of essential elements is deficient.
Group 02	(240-509) Basic	The essential elements of the program are established with some strategic actions; however, they are not sufficiently implemented.
Group 03	(510-724) Intermediate	Most essential aspects of the program are adequately implemented, including strategic actions. The institution should continue to improve the scope and quality of implementation.

Group 04	(725-1000) Advanced	Strategic actions related to the essential components are fully implemented, and complementary actions are also in place.

Source: ANVISA, 2023.

The study was submitted to the Research Ethics Committee (Comitê de Ética em Pesquisa – CEP) of the Ceará School of Public Health *Paulo Marcelo Martins Rodrigues*, located in Fortaleza, Ceará, Brazil, through the Plataforma Brasil system. Ethical approval was granted under opinion No. 7.762.619 and Certificate of Presentation for Ethical Consideration (CAAE) No. 90081325.4.0000.5037 (Appendix I). Data collection was carried out only after approval of the Project by the ethics committee. The study was conducted in accordance with ethical principles and guidelines established by Resolution No. 466/2012 of the Brazilian National Health Council.

RESULTS

A total of 11 reference hospitals from the state health care network that participated in the National Assessment were analyzed (Table 2). Of these, 64% (n=7) were located in Fortaleza, while 36% (n=4) were situated in other municipalities within the state. It is important to note that all hospitals are classified as high-complexity units.

Table 3 – List of hospitals of the Ceará State Health Secretariat (SESA/CE) that participated in the National Assessment of the AMP.

01	Hospital Geral de Fortaleza
02	Hospital de Messejana Dr. Carlos Alberto Studart Gomes
03	Hospital Infantil Albert Sabin
04	Hospital São José de Doenças Infecciosas
05	Hospital Geral Dr. César Cals de Oliveira
06	Hospital Estadual Leonardo Da Vinci
07	Hospital Geral Dr. Waldemar Alcântara
08	Hospital Regional Norte
09	Hospital Regional do Vale do Jaguaribe
10	Hospital Regional do Sertão Central
11	Hospital Regional do Cariri

Source: Authors' own elaboration, 2025.

Among the 11 hospitals that responded to the assessment, all reported having an established Hospital Infection Control Committee (Comissão de Controle de Infecção Hospitalar – CCIH). In addition, all institutions reported having access to microbiology laboratory support, with 45% (n=5) operating in-house laboratories, while 55% (n=6) relied on outsourced laboratory services. Accordingly, the total scores obtained by the hospitals, based on compliance with the essential components, were consolidated in Table 4.

Table 4 – Total score obtained by each hospital of the Ceará State Health Secretariat (SESA/CE) in the assessment of AMP implementation and classification of implementation level.

Hospitals	Total Score	Implementation Level
Hospital 1	835	Advanced
Hospital 2	727.5	Advanced
Hospital 3	780	Advanced
Hospital 4	795	Advanced
Hospital 5	655	Intermediate
Hospital 6	532.5	Intermediate
Hospital 7	592.5	Intermediate
Hospital 8	580	Intermediate
Hospital 9	485	Basic

Source: Authors' own elaboration, 2025.

No hospital that responded to the assessment was classified at the inadequate level.

DISCUSSION

The participation of all hospitals within the state health care network in the national assessment represents a positive finding as an action to prevent antimicrobial resistance and to promote appropriate management of antimicrobial use. This is further reinforced by the finding that all hospitals have an established Hospital Infection Control Committee (Comissão de Controle de Infecção Hospitalar – CCIH), which constitutes the foundation for surveillance, prevention, and control of healthcare-associated infections (HAIs), in addition to demonstrating compliance with current legislation[8]. Moreover, the CCIH acts as a strategic ally in supporting Antimicrobial Management Programs, as both share common objectives in preventing antimicrobial resistance[2]. Another important

finding was that all hospitals reported having access to microbiology laboratory support, either through in-house or outsourced laboratories. Access to microbiology services is essential to support clinical decision-making, guide institutional protocols, and provide local epidemiological data[9].

Regarding the implementation of AMP, most hospitals within the state network reported having an implemented program, indicating a relevant advancement in relation to the recommendations of ANVISA, the Brazilian Ministry of Health, and the World Health Organization[2,10,11]. However, the identification of hospitals that still lack an implemented program highlights a significant gap, even after the publication of the ordinance that institutionalized the AMP and its respective technical committee in the State of Ceará. This finding underscores the need for specific strategies involving support, awareness-raising, and investment to ensure full compliance across all institutions[3,4].

The analysis of total scores obtained through compliance with the essential components demonstrated meaningful progress within the state hospital network. There was a predominance of hospitals classified at the advanced and intermediate levels. Although this scenario is positive, it also reveals gaps related to the quality of implemented actions, a finding that is consistent with studies conducted within the national context[12].

These results point to the need for differentiated strategies, including technical, educational, and governmental support. Hospitals classified at the advanced level may serve as reference centers and multipliers of good practices for other institutions, supported by stronger engagement of state-level management to expand and consolidate AMP and to foster a culture of antimicrobial management, similar to initiatives implemented in France[13].

It is well established that there is no single model for an AMP, as its implementation requires flexibility according to the type of care provided by health services. In this regard, the essential components offer an adaptable framework that health services can use to guide their efforts to optimize antimicrobial use[14].

Some limitations were identified in this study. The analysis was based on self-reported information provided by the institutions, which may introduce response bias. Additionally, structural differences among hospitals such as variations in size and level of care complexity, may directly influence program implementation capacity, and these variables were not stratified in detail. Finally, the cross-sectional nature of data collection reflects a single point in time, preventing assessment of the evolution or sustainability of implemented actions.

FINAL CONSIDERATIONS

The present study made it possible to outline a specific situational overview of the level of implementation of Antimicrobial Management Programs (AMPs) in reference hospitals within the state health care network. The findings revealed a predominance of hospitals classified at the intermediate and advanced

implementation levels, indicating progress in the institutionalization of these programs in alignment with national and international guidelines.

These results reinforce the need for differentiated strengthening strategies by state-level management that take into account the implementation stage of each hospital. Such strategies should expand the coordinating and supportive role of state management, ensuring the effectiveness of public policies and resource allocation, professional training, and the standardization of clinical protocols and practices according to the state's health care context. In addition, the development of information systems that support the continuous strengthening of AMP is essential in order to mitigate the impacts of antimicrobial resistance within the state.

Recognizing the limitations of this study, further research is recommended to explore the clinical effectiveness and economic impacts of Antimicrobial Management Programs in the state context.

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