

**SELF-REPORT OF NURSES' ANTIMICROBIAL STEWARDSHIP PRACTICES****PRÁTICAS AUTORREFERIDAS DE ENFERMEIROS SOBRE GERENCIAMENTO DE ANTIMICROBIANOS****PRÁCTICAS AUTOINFORMADAS DE LOS ENFERMEROS SOBRE EL MANEJO DE ANTIMICROBIANOS**

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**ABSTRACT**

**Objective:** to investigate nurses' self-reported practices about the Antimicrobial Stewardship Program (ASP). **Methods:** cross-sectional, descriptive study, carried out from March to April 2021, with 40 nurses from a private institution of higher education in the city of São Paulo. Data were collected using a structured instrument and analyzed by descriptive statistics. **Results:** Among the 14 practices expected by nurses in the ASP, participants reported applying eight (57.1%) frequently: giving antibiotics at the correct dose and time, collecting laboratory samples for culture before starting antibiotics, assessing allergy history, initiating specific precautions, performing medication reconciliation, educating patients/family members about antibiotic use, monitoring the occurrence of adverse events, and participating in decision making about a patient's suitability to receive intravenous antibiotics in outpatient settings. **Conclusion:** nurses partially practice the activities established in the ASP. It is necessary to advance in the approach of this theme in educational sessions and during graduation so that the activities are effectively incorporated into the professional practice of nurses.

**Descriptors:** Nurse; Antimicrobials; Antimicrobial Stewardship Program; Antimicrobial resistance.

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## RESUMO

**Objetivo:** investigar as práticas autorreferidas de enfermeiros no Programa de Gerenciamento de Antimicrobianos (ASP). **Método:** estudo transversal, descritivo realizado no período de março a abril de 2021, com 40 enfermeiros de uma instituição privada de ensino superior da cidade de São Paulo. Os dados foram coletados por meio de instrumento estruturado e analisados por estatística descritiva. **Resultados:** Dentre as 14 práticas de enfermagem esperadas nos ASP, os participantes referiram aplicar oito (57,1%) delas frequentemente: administrar antibiótico na dose e horário corretos, coletar amostras laboratoriais para cultura antes do início do antibiótico, checar o histórico de alergia, instituir precauções específicas, fazer a reconciliação medicamentosa, educar os pacientes/ familiares sobre o uso de antibióticos, monitorar a ocorrência de eventos adversos e participar da tomada de decisão sobre a adequação do paciente para receber antibiótico endovenoso em serviço ambulatorial.

**Conclusão:** os enfermeiros praticam parcialmente as atividades previstas nos ASP. Faz-se necessário avançar na abordagem dessa temática em sessões educacionais e durante a graduação para que as atividades sejam efetivamente incorporadas na prática profissional do enfermeiro.

**Descritores:** Enfermeiro; Antimicrobianos; Programa de Gerenciamento do uso de antimicrobianos; Resistência antimicrobiana.

## RESUMEN

**Objetivo:** investigar las prácticas autoinformadas de los enfermeros sobre el Programa para Optimizar el Uso de Antimicrobianos (PROA). **Métodos:** Estudio transversal, descriptivo, realizado de marzo a abril de 2021, con 40 enfermeros de una institución privada de enseñanza superior de la ciudad de San Pablo. Los datos se recolectaron por medio de un instrumento estructurado y se analizaron mediante estadísticas descriptivas. **Resultados:** De las 14 prácticas de enfermería esperadas en el PROA, los participantes informaron que realizan ocho (57,1%) con frecuencia: administrar el antibiótico en la dosis y el horario correctos, recolectar muestras de laboratorio para cultivo antes de iniciar el antibiótico, comprobar los antecedentes de alergia, adoptar precauciones específicas, realizar la conciliación de medicación, educar a los pacientes/familiares sobre el uso de los antibióticos, monitorear la aparición de eventos adversos y participar en la toma de decisiones sobre la posibilidad de que el paciente reciba antibióticos intravenosos en el servicio ambulatorio. **Conclusión:** Los enfermeros realizan parcialmente las actividades previstas en los PROA. Es necesario avanzar en el abordaje de este tema en las sesiones educativas y durante el cursado de la carrera para que los enfermeros incorporen efectivamente las actividades en la práctica profesional.

**Descriptores:** Enfermero. Antimicrobianos. Programa para optimizar el uso de antimicrobianos. Resistencia antimicrobiana.

## INTRODUCTION

Antimicrobials revolutionized health sciences and changed the course of history. However, its emergence occurred in parallel with the development of microbial

resistance that in recent years has threatened the therapeutic success of such drugs.<sup>1</sup>

A meta-analysis focusing on bacterial co-infections in patients hospitalized for Covid-19 found that despite

an overall low rate (6.9% (95% CI 4.3%-9.5%) of bacterial infections, more than 70%

of patients received antibiotics, most of which were broad-spectrum agents such as fluoroquinolones and third-generation cephalosporins.<sup>2</sup>

The World Health Organization (WHO) classifies bacterial resistance as a "threat to global security". The misuse of antibiotics is defined as the unnecessary use, without prescription, self-medication and irregular dosing, with interrupted or sharing of antibiotics being the main reason for the increase in resistance rates.<sup>3</sup> Thus, in response to this scenario, the "Antimicrobial Use Management Programs" (AMP) were created.

The objective of the ASP is to optimize the use of antimicrobials through coordinated and interdisciplinary actions, aimed at guaranteeing the therapeutic effect, reducing adverse effects and avoiding the selection of multidrug-resistant microorganisms.<sup>4</sup>

As much as the ASP contemplates interdisciplinary actions and research indicates that nurses can influence the appropriate use of antimicrobials and improve health outcomes, their participation in this program is still limited.<sup>5-8</sup>

Little is known about the extent of nurses' knowledge of antimicrobials, patterns of resistance; and how they predict their roles in the ASP.<sup>6</sup> Additionally, few national studies have proposed to investigate

this topic, suggesting that the involvement of nurses needs to be further explored.<sup>9-10</sup>

Considering that nurses form the largest group of health professionals and that they are key elements in the medication administration process,<sup>11</sup> involving them in the ASP can optimize the prescription and use of antimicrobials. Thus, this study aimed to investigate the nurses' self-reported practices in the ASP.

## METHOD

Descriptive study carried out from March to May 2021, in a private higher education institution, located in the city of São Paulo - Brazil. The study included nurses enrolled in the postgraduate courses of the aforementioned institution: nursing in critical care; cardiology nursing; nursing in clinical and surgical care. The inclusion criteria were: being enrolled in one of the postgraduate courses mentioned, having active e-mail and working as a nurse. Nurses who did not answer the instrument within the stipulated period were excluded.

The convenience sample consisted of 40 nurses who met the inclusion criteria from March to May 2021.

For data collection, a self-administered electronic instrument was developed based on literature related to the ASP principles.<sup>1,5-6</sup> The instrument included

seven demographic questions (gender, age, place of training, postgraduate course in progress, time of professional experience, sector of work, nature of the institution, opinion on the participation of nurses in interventions aimed at improving the use of antimicrobials) and 14 questions related to the nurses' practices in the ASP. Questions related to the ASP were made available on a Likert scale with five response options (1- never, 2- rarely, 3- occasionally, 4- often, 5- always).

The instrument was validated in terms of face and content by a panel made up of five experts. It was also submitted to a pilot study with five nurses to verify its suitability, which legitimized its employability. After the necessary adjustments, the questionnaire was made available via Google forms.

The nurses were contacted via email by one of the researchers. After receiving information about the research, they were invited to participate in the study by signing the Free and Informed Consent Term (FICT). If the participant refused to participate, the process was automatically terminated, but if he/she accepted, he/she was directed to the access link to the data collection instrument.

Participants had a period of three weeks to answer the instrument.

Data were analyzed using descriptive statistics, frequencies, percentages, means, medians and presented in the form of tables.

The study was approved by the Research Ethics Committee of the reference institution of the study through protocol 4660909.

## RESULTS

Of the 40 nurses who participated in the study, thirty-one (77.5%) were women, with a mean age of 31.57 years (min 23 years; max 45 years), trained in a private higher education institution. Regarding the postgraduate course, most were studying "Adult care in the Intensive Care Unit (ICU)", followed by "cardiology/hemodynamics". Most participants reported less than 5 years of professional experience (29/40, 72.5%), and the most frequent workplaces were ICU and Emergency. As for the nature of the workplace, the majority (23/40, 27.5%) reported working in public hospitals. Twenty-three (57.5%) participants considered it important to involve nurses in interventions aimed at improving the use of antimicrobials (Table 1).

**Table 1.** Demographic data of study participants (n=40). Sao Paulo-SP. Brazil. 2021

Variable	n(%)
<b>Gender</b>	
Female	31 (77.5)
Male	9 (22.5)
<b>Training place</b>	
Private institution	38 (95.0)
Public institution	2 (5.0)
<b>Postgraduate course in progress</b>	
Adult care in the ICU*	22 (55.0)
Cardiology/hemodynamics	16 (40.0)
Clinical and Surgical	2 (5.0)
<b>Professional experience time</b>	
< 2 years	16 (40.0)
2-5 years	13 (32.5)
> 5 years	11 (27.5)
<b>Work sector</b>	
ICU	12 (30.0)
Emergency	12 (30.0)
Inpatient unit	8 (20.0)
Others (eg. outpatient clinic, dialysis, Primary Care)	8 (20.0)
<b>Nature of the institution</b>	
Public hospital	23 (57.5)
Private Hospital	13 (32.5)
Teaching hospital	4 (10.0)
<b>Do you think nurses should be involved in interventions aimed at improving the use of antimicrobials?</b>	
Yes	23 (57.5)
No	17 (42.5)

**note:**\* ICU=Intensive Care Unit, \*\*ASP= Antimicrobial Management program

Among the practices frequently/always performed by nurses were: administering antibiotics at the correct dose and time, collecting laboratory samples for culture before starting the antibiotic, checking the client's allergy history and instituting specific precautions. Practices occasionally performed were: reviewing the results of cultures and discussing the antibiotic de-escalation with the prescriber, monitoring the end date of antimicrobial therapy, and collaborating

with the transition of the antibiotic administration route. Finally, practices reported as rarely or never performed were: checking the information regarding the indication and duration of the antibiotic in the client's medical record, collaborate so that antibiotic prescription meets local/national recommendation guidelines and ensure that surgical prophylaxis is prescribed for the appropriate duration (Table 2).

**Table 2.** Self-reported practices of nurses participating in the study (n=40) according to planned activities in Antibiotic Management Programs. Sao Paulo-SP, Brazil. 2021.

Activities	Never and rarely n (%)	Occasionally n (%)	Often and always n (%)
Administer the antibiotic at the appropriate dose, time and time of infusion.	0	2 (5.0)	38 (95.0)
Collect laboratory specimens for culture prior to antibiotic initiation.	1 (2.5)	2 (5.0)	37 (92.5)
Check the client's drug allergy history.	3 (7.5)	1 (2.5)	36 (90.0)
Institute specific precautions for patients colonized/infected by multidrug-resistant microorganisms.	1 (2.5)	3 (7.5)	36 (90.0)
Perform medication reconciliation.	1 (2.5)	4 (10.0)	35 (87.5)
Educate patients/family members about the use of antibiotics.	3 (7.5)	4 (10.0)	33 (82.5)
Monitor the occurrence of adverse events.	3 (7.5)	5 (12.5)	32 (80.0)
Participate in decision-making about the patient's suitability to receive intravenous antibiotics in an outpatient service.	5 (12.5)	12 (30.0)	23 (57.5)
Monitor the end date of antimicrobial therapy.	2 (5.0)	28 (70.0)	10 (25.0)
Collaborate with the transition from intravenous to oral route of antibiotic administration.	6 (15.0)	24 (60.0)	10 (25.0)
Check the record of information regarding the indication and duration of the antibiotic in the client's medical record.	33 (82.5)	5 (12.5)	2 (5.0)
Ensure surgical prophylaxis is prescribed for the appropriate duration.	33 (82.5)	5 (12.5)	2 (5.0)
Collaborate so that the antibiotic prescription meets the local/national recommendation guides.	32 (80.0)	7 (17.5)	1 (2.5)
Check culture results, sensitivity profile and discuss antibiotic de-escalation with the prescriber.	4 (10.0)	35 (87.5)	1 (2.5)

## DISCUSSION

To our knowledge, this is the first national study to assess nurses' self-reported practices in the ASP.

The activities performed by nurses are essential to reduce antimicrobial resistance. Nurses are the protagonists of the medication administration process.<sup>11</sup> They are involved in the preparation, administration and monitoring of their effects on patients. In addition, they are

central communicators, care coordinators, promoters of Health care-associated infections (HCAIs) prevention measures and the subsequent need to use antimicrobials.<sup>12-13</sup>

Most participants reported working in critical units, which are characterized by serving a profile of patients with complex diagnoses that often require the use of antimicrobials. According to the literature,

the role of nurses in optimizing the use of antimicrobials in these units is essential.<sup>5</sup>

Similar to a previous study, nurses expect to be involved in the ASP.<sup>5</sup> This finding is curious, as it demonstrates the nurses' lack of knowledge about their role in the ASP, since many of the activities planned are part of their daily lives. It is worth mentioning that the fact that nurses partially apply the practices provided for in the ASP compromises the success of the program. A study showed that there is a triangular relationship between multidrug-resistant microorganisms, inappropriate use of antimicrobials and mortality, especially in highly exposed patients, such as ICUs.<sup>14</sup>

Additionally, keeping patients safe before, during and after the antibiotic administration process is one of the nurse's responsibilities.<sup>13</sup>

For nurses' participation in the ASP to be effective, it is necessary to offer education on the subject at graduation, continuing and permanent education, and offer managerial support.<sup>3,14-15</sup>

From the educational perspective, two aspects stand out. The first aspect refers to integrating the theme of microbial resistance in the curricula of undergraduate and graduate nursing courses.<sup>15-16</sup> Thus, it is believed that nurses will be more prepared and confident to play their role in the ASP in the labor market.<sup>6</sup> The second aspect

concerns the approach to the topic in continuing education sessions, considering that health services provide a unique learning environment, as they reflect both the direct relevance and applicability of ASP activities in nurses' daily clinical practice.<sup>16</sup>

Regarding the managerial perspective, the creation of a favorable work environment and adequate working conditions are fundamental for nurses' performance in the ASP. Nurses' engagement in the ASP will be greater when their participation is formalized and supported by nursing leaders and professionals from other disciplines, such as physicians, pharmacists, microbiologists, among others.<sup>5</sup> An Australian study reveals that the most effective changes happen when adequate knowledge is available and strong managerial support is generated throughout the organization.<sup>16</sup>

Ultimately, reducing bacterial resistance requires a joint effort from all sectors of society. It is imperative to involve patients, professionals, health institutions, educational institutions and government agencies in these actions.<sup>17</sup>

The results of this research must be interpreted considering certain limitations. First, the use of a data collection instrument may have induced the production of socially acceptable responses. Second, because it was conducted in a single location, the



results cannot be generalized; however, they contribute to the advancement of knowledge on the subject and the urgent need to include this topic in continuing education sessions and in undergraduate nursing courses.

## CONCLUSIONS

The nursing actions provided for in the ASP are partially practiced by the study participants. To reverse this result, it is essential to insert the theme in continuing education sessions and in the curricula of undergraduate courses, in order to equip nurses to perform their role in the ASP, promoting comprehensive and safe patient care.

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