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Research Article

STRATEGIES FOR BETTER ANTIBIOTIC USE IN PEDIATRICS FROM DIRECT IMPLEMENTATION

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ABSTRACT

On a worldwide scale, antimicrobial resistance (AMR) is a key factor in causing illness and death. To solve this challenge, it is necessary to follow responsible antibiotic usage which is a main priority for many major medical organizations. Antibiotic stewardship programs (ASPs) have been proven to assist with this objective. The goal of the study was to review the status of ASPs in pediatric care within different healthcare systems which forms the basis for improving antibiotic use in kids. A group of pediatric healthcare leaders was sent a web-based questionnaire. The survey aimed to understand if there are pediatric ASPs in hospitals when children are admitted and in outpatient settings. It investigated the people handling these programs as well as the specific steps they took to control the use of antibiotics. Out of the 41 who were invited, 27 responded to the survey (66%). The majority of respondents reported providing ASPs to inpatients (74%) and a lower proportion served outpatients (48%) and these ASPs were organized quite differently depending on the setting. It was found that clinical guidance for pediatric infections were widely accessible. Nearly all cases dealt with neonatal infections (96%), followed by pneumonia (93%), urinary tract infections (89%), infections occurring around surgeries (82%) and soft tissue infections (70%). Ministries of education, individual colleges and universities and organizations on the local or regional level were all found to house ASPs (63%, 41% and less than 15% respectively). The team of ASPs mainly consists of pediatricians trained in infectious diseases, who participated at a high rate (62%), as well as microbiologists (58%). Some of the activities reported by pediatric ASPs were educational projects (85%), developing ways to monitor and record antibiotic use and resistance (70% and 67%), ongoing audits (44%), needing approval before prescribing certain antibiotics (44%) and assessing treatments after they were prescribed (33%). Pediatric antibiotic stewardship programs exist in many areas, often in different forms and procedures. The differences are caused by the different resources, types of healthcare and laws in each area. Then, it is important to back continuing and joint initiatives for developing universal ASPs in pediatric healthcare. Linking policy with guidelines will improve the way antibiotics are used and help manage antimicrobial resistance.

Keywords :- Fighting drug-resistant infections, correct antibiotic use, pediatric health services, handling infections in children, diseases in children, too much reliance on antibiotics and ensuring proper treatment in children.

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INTRODUCTION

Clinicians now effectively manage bacterial infections which has reduced the illnesses and deaths associated with these diseases, all thanks to the antibiotics created. But the fast increase in antibiotic-resistant bacteria could outsmart these important advances in medicine. It is estimated by recent global data that over 4.95 million people die each year due to the effects of antimicrobial resistance (AMR) and AMR itself is responsible for over 1.27 million deaths.

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Studies have found gaps in knowledge and actions among health professionals concerning antibiotic use which shows the need for better approaches to support responsible use of these medicines (1).

According to the World Health Organization (WHO), AMR is considered a top public health concern for people all over the world. The concern has grown among people after warnings about a return to when bacterial infections are uncurable. Much of this crisis happens when doctors overuse or misuse antibiotics, prompting organisms to quickly resist treatment. If antibiotics are used often, they may upset the normal microorganisms in our body which opens us to obesity, diabetes and inflammatory bowel conditions. Besides, inappropriate use of antimicrobials damages the environment, harms ecosystems, reduces biodiversity and could threaten future health and the wellbeing of our planet. Antibiotic stewardship is when medical professionals continuously and work together to make sure antimicrobial drugs are used properly (2,3). Doctors should give out antibiotics only if needed, pick the ideal drug and provide it at the right dosage, time and duration. ASPs in pediatrics unite various teams and supplies educational details to direct how antimicrobial drugs should be given to children. Programs like this exist in individual hospitals, in nation-wide healthcare networks and through cooperation among nations. Studies and systematic reviews have shown how pediatric ASPs are set up, carried out and what their results are in various healthcare environments (4,5,6). Many initiatives to develop such programs are being recorded, but most studies have been limited to single healthcare environments. Overall assessments are insufficient and a clear view of pediatric ASP in different settings is still developing. The purpose of the current study was to study the features of ASPs for children, both at hospitals and in the community(7,8). The goal was to learn about their staff and planning processes which could inform better and more unified choices in antimicrobial stewardship for children.

METHODS:

Pediatric professionals from various organizations nationwide were included in the survey and this group is part of a regional association for pediatrics. Specialists were nominated and selected by the national pediatric organizations in their countries. The survey asked these delegates because they were thought to be familiar with childhood infections and the guidelines for antibiotic use in their hospitals. People took part in the survey if they chose to do so. According to the invitation sent, delegates could get advice from colleagues or select alternate members of the local pediatric committee to complete the survey if they preferred. The flexibility in the responses made it possible to add the opinions of national doctors and professionals, so that every healthcare setting's experience was considered. In May 2022, the association's governing board gave their consent to the survey protocol and it was distributed to members electronically. Two notifications reminding users to take part were distributed in June 2022 to encourage more people to join. Participants did not receive any kind of incentives or payment. Data was gathered online and the results were studied using simple descriptive ways. Before analysis, responses that came from the same region or system were combined into a single summary response. If the same system gave both positive and negative decisions, the affirmative input was always preferred. If a program for antimicrobial stewardship in pediatrics was present (answering "yes"), that setting was included in the study results as having an ASP. If the question involved several options or aspects—for example, the details of pediatric ASPs—all the options checked by one respondent from a system were included in the study. By doing this, a complete view of what pediatric stewardship programs involve was created, despite the fact that information could be inconsistent between people managing the same system. The objective of the approach was to give a wide and inclusive view of pediatric ASP across different healthcare environments. To give an exact view of things, the study gathered opinions from all involved and reorganized them so that the process could find ways to improve and support future changes across healthcare systems.

RESULT:

Looking at the survey results, we see important ways of implementing and running pediatric antibiotic stewardship programs (ASPs) in various healthcare settings. The table below lists the staff who are part of pediatric ASPs. About two-thirds of responses featured pediatricians who were trained in dealing with infectious diseases. Microbiology laboratory representatives appeared in 59% of health science programs. In almost half of the initiatives studied, physician leaders were more involved than infectious disease or infection control physicians. It was found that 37% of ASPs involved pharmacists, showing that they play an increasing role of supervising and advising on antibiotic use. Medical director representatives were only found in 19% of shows which shows that there may be chances to integrate them better into stewardship operations. There is an increasing acceptance, as shown by these data, that handling antimicrobial resistance (AMR) requires cooperation across various fields. Since children's ASPs have several specialists, the decisions made are thorough, fit with confirmed guidelines and aim to use antibiotics appropriately. Yet, since staffing changes are

uneven, this means some programs get more help from experts and the institution than others.lists the types of treatments used in pediatric ASPs. According to the study, educational initiatives were by far the most common and almost all respondents (89%) included training on responsible antibiotic use. This means they put a lot of focus on distributing knowledge and getting prescribers to change their habits. More than two-thirds of programs (74%) regularly monitored how antibiotics were used and 70% regularly reported antibiotic resistance. They play a key role in spotting possible patterns in prescribing and supporting prompt interventions. Practices such as auditing with feedback (52%), requiring permission for some antibiotics (48%) and reviewing each prescription after writing (37%) show an intention to support doctors when deciding on treatment and make sure they take responsibility. Less frequent use of these management strategies could be explained by limited resources or because the priorities of these institutions vary. A majority of healthcare professionals (96%) acknowledged the use of stewardship measures, indicating that these programs matter in pediatric care. Generally, while most pediatric Associations for Speech Pathology work toward the same goals, their methods and structure are not the same. Striving to align these programs and share effective strategies could help reduce antibiotic overuse and antimicrobial resistance and thus benefit the health of children.

Table I: Staff Composition of Pediatric Antibiotic Stewardship Program (ASP)

Personnel	Number	%
Physician Leader	14	52%
Pediatrician with formal infectious disease training	18	67%
Infectious disease/infection control physician	11	41%
Pharmacist	10	37%
Microbiology laboratory representative	16	59%
Medical director representative	5	19%

Table 2: Types of Interventions Found in Pediatric Antibiotic Stewardship Programs (ASPs)

Intervention	Number	%
Prior approval of selected antibiotics	13	48%
Post-prescription review (48–72 h)	10	37%
Periodic audits with feedback	14	52%
Monitoring antibiotic use and reporting	20	74%
Monitoring antibiotic resistance and periodic reporting	19	70%
Education sessions on the judicious use of antibiotics	24	89%
None	1	4%

Figure 1: Staff Composition of Pediatric Antibiotic Stewardship Program (ASP), Personnel distribution showing both count and percentage.

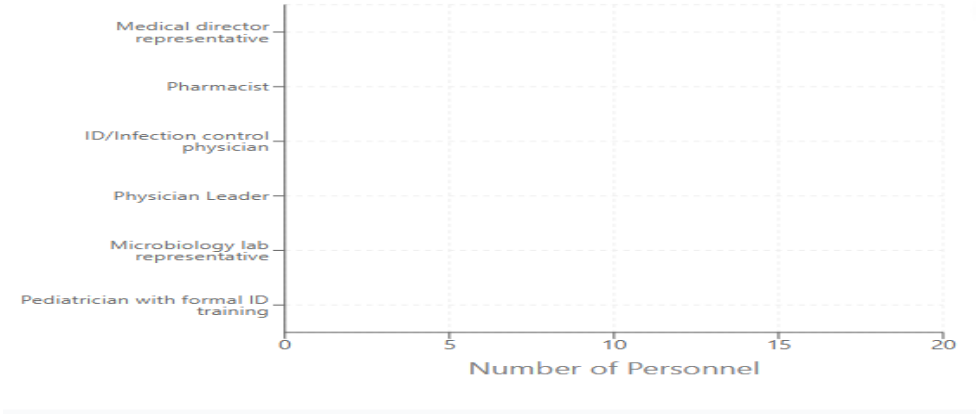
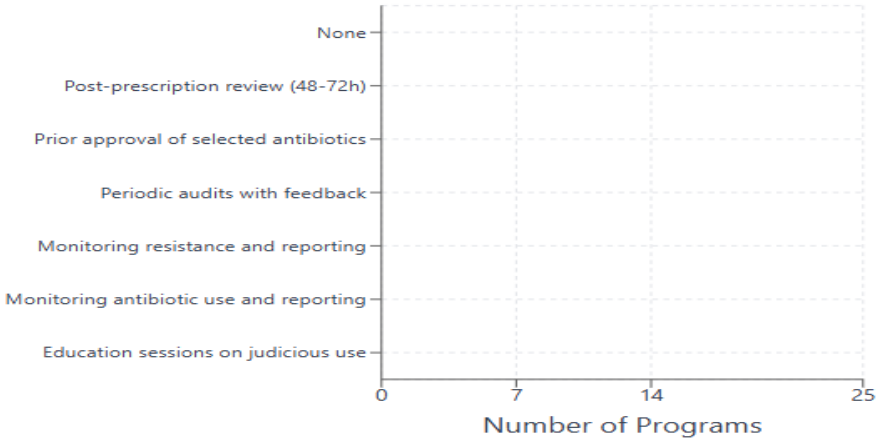


Figure 2: Types of Interventions in Pediatric Antibiotic Stewardship Programs, Distribution of intervention strategies across ASP programs.



DISCUSSION

The findings from this survey provide a comprehensive overview of the current landscape of pediatric antibiotic stewardship programs (ASPs) and reveal both encouraging progress and significant variation in how these initiatives are structured and implemented (9,10). The widespread inclusion of pediatricians with infectious disease training, along with microbiology laboratory representatives and physician leaders, reflects a growing understanding of the need for multidisciplinary involvement in addressing antimicrobial resistance (AMR). However, the variability in the personnel composition across programs also underscores existing disparities in resources and institutional priorities, which may influence the overall effectiveness of these programs. The inclusion of pharmacists and infectious disease control physicians in a substantial proportion of programs suggests an evolving recognition of their pivotal roles in optimizing antimicrobial use. Pharmacists can offer valuable insights into drug selection, dosing, and duration, while infection control physicians bring essential knowledge on local resistance patterns and infection prevention strategies. Despite this, the limited presence of medical director representatives raises concerns about the level of administrative support and leadership engagement in some programs. Strong institutional backing is essential for the sustainability of stewardship activities and the integration of stewardship goals into broader hospital or healthcare system policies. The range of interventions employed within pediatric ASPs reflects different levels of maturity and resource allocation. Educational initiatives remain the cornerstone of most programs, highlighting the importance placed on awareness and continuous professional development in changing prescribing behavior. The near-universal implementation of education sessions indicates that practitioners across settings recognize the need to reinforce knowledge around judicious antibiotic use. However, while education is critical, it often needs to be supported by more structured interventions to translate into measurable behavior change. Monitoring and reporting practices, including surveillance of antibiotic use and resistance patterns, are widely adopted and form the backbone of any stewardship effort. These practices enable programs to assess the impact of their interventions and adapt strategies in response to emerging trends. Nonetheless, less frequent use of interventions such as prior approval protocols, post-prescription review, and periodic audits with feedback points to missed opportunities for more direct control over prescribing practices. These strategies, though more resource-intensive, have been shown in various studies to significantly improve antibiotic use and reduce unnecessary prescriptions. One of the major challenges identified in the survey is the inconsistency in implementation across healthcare systems. This suggests that while the concept of stewardship is broadly accepted, practical application remains uneven. Contributing factors may include differences in healthcare infrastructure, availability of trained personnel, and access to microbiology services. Furthermore, the varying levels of program sophistication indicate that some regions may benefit from additional support, guidance, and shared best practices to strengthen their efforts. In conclusion, this survey highlights the essential role of pediatric ASPs in addressing AMR and optimizing antimicrobial use in children. The results emphasize the need for continued investment, harmonization of practices, and stronger leadership commitment. Building on these findings, collaborative efforts to standardize core components of stewardship programs and promote equitable access to resources will

be key to achieving meaningful and sustained improvements in pediatric infectious disease management.

CONCLUSION:

The study gives clear pictures of how pediatric ASPs function today, uncovering strengths as well as challenges that need to be addressed further. There are many pediatric ASPs in healthcare because more people realize how vital it is to address antimicrobial resistance and use antibiotics properly in children. Programs with pediatric specialists and infectious disease professionals demonstrate a strong clinical base that is very important for good stewardship. However, since pharmacists, infectious disease physicians and medical directors might not always be present, it means some programs may lack complete multidisciplinary involvement. Because a diverse team has a wide range of skills and views, it improves how well stewardship efforts are implemented. Making sure all members of the healthcare team contribute will most likely increase the effect of these policies. Education is used most often, showing it is crucial in helping doctors change their prescribing behavior. In addition, effective education isn't enough by itself to create lasting changes. There is evidence of ineffective stewardship practice, seen by the less frequent use of guidelines for antibiotics, audits and reviews. Such tactics help directly impact antibiotic use because they monitor and hold people accountable. Given that different pediatric ASPs vary a lot in their focus and operations, making standard rules and sharing successful practices is essential. Working more closely together allows for all programs to meet minimum quality and effectiveness standards, at any stage. Regularly checking, adjusting and modifying stewardship strategies will help maintain success. In short, pediatric ASPs are key for dealing with AMR and even though a number are underway and active, it's vital to include more experts and change current approaches. Improved use of antibiotics for kids supports their well-being, helps treat diseases better and keeps antibiotics useful for a long time.

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