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Major Article

Integrating staff nurses in antibiotic stewardship: Opportunities and barriers

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Background: Nursing has been called for greater participation in antibiotic stewardship. Although many of the functions that are integral to successful stewardship are within the scope of bedside nurses, data evaluating nursing engagement in stewardship are limited. The objective of this study was to identify nurses' roles and confidence in engaging in stewardship practices by conducting a survey of pediatric staff nurses employed at a 354-bed freestanding children's hospital with a well-established prospective audit and feedback stewardship program.

Methods: An investigator-developed online survey was used to assess 10 identified practices that fall within the responsibility of inpatient nurses and contribute to the stewardship process.

Results: One hundred and eighty nurses participated in the study. Nurses were highly confident assessing for an adverse drug reaction history, obtaining cultures prior to antibiotics, and participating in patient education. They were less confident in reviewing microbiology results to determine antibiotic appropriateness. Clinical practice and hospital culture influenced perceptions of the nursing role in stewardship. Reported barriers to stewarding included nurses not included in rounds, interdisciplinary power differentials, and nursing input not actively sought.

Conclusions: Barriers to nurse engagement were identified and could be addressed by improving education in microbiology and principles of antibiotic use along with more consistent inclusion of nurses in bedside rounds while also cultivating an environment where nurse contribution is actively sought.

It has been >2 decades since the Infectious Diseases Society of America (IDSA) sounded an alert regarding the need for antibiotic stewardship to stop or slow the development of bacterial resistance.[1] In 2007, the IDSA issued guidelines to promote development of stewardship teams with a primary goal to optimize clinical outcomes, while decreasing the rates of *Clostridium difficile*, antimicrobial toxicity, and the emergence of resistance.[2] The policy statement that followed, endorsed by the IDSA, the Society for Healthcare Epidemiology of America, and the Pediatric Infectious Diseases Society, outlined recommendations to monitor interventions and promote education and research regarding antibiotic use in the United States.[3]

As regulatory and accrediting agencies began to adopt policies related to antibiotic stewardship, the IDSA reiterated the need for all health care systems to commit to stewardship programs that align with the Centers for Disease Control and Prevention's (CDC) Core Elements.[4] The critical roles of infectious disease professionals, including infectious disease physicians, infectious disease pharmacists, clinical microbiologists, and infection preventionists, were emphasized, and it was recommended that antibiotic stewardship programs (ASPs) use team-based systems to optimize care and reduce adverse events associated with antibiotic misuse. As the body of evidence increased, there was a call for greater participation by the entire health care team in stewardship programs, including nurses.[5-9]

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The inclusion of nurses as members of the ASP team has been endorsed by the CDC, the American Nurses Association, the American Academy of Nursing, the National Institute of Nursing Research, and accrediting agencies.[5-8] A better understanding of how nurses perceive their role in stewardship is needed. Currently, there is a paucity of information specific to practices facilitating nursing engagement as stewards.[10] Herein we report the results of a pediatric nurse antibiotic stewardship survey to identify staff nurses' perceptions and performance confidence of their stewardship role, and barriers to nursing stewardship engagement.

METHODS

Setting

This single-centered, cross-sectional survey study describes how inpatient staff nurses perceive their role and confidence to perform an identified set of nursing practices that support stewardship processes. The study was undertaken in a 354-bed, freestanding, Midwestern pediatric hospital, which, since 2008, has an ASP using a prospective audit and feedback method to help providers tailor and optimize therapies. With >26,000 reviews of antibiotic treatment, this program is led by a dedicated team of infectious disease physicians and pharmacists who interface daily with antimicrobial prescribers on each unit.

Survey design

The investigator-developed online survey was modeled after an article published by Olans et al,[8] which listed nursing activities that support the stewardship process. There were 16 practices in the original list. Using a consensus approach, 10 practices that commonly fall within the responsibility of hospital nurses were selected as practices of interest for the stewardship team. These 10 practices were obtaining cultures prior to antibiotic administration, performing a 48-hour time-out, assessing for adverse drug reactions, reviewing culture results, identifying wrong antibiotic doses, notifying the provider of wrong antibiotic doses, assessing for potential adverse events, transitioning antibiotics from intravenous to oral therapy, limiting antibiotic exposure to prevent *Clostridium difficile* infections, and educating patients on appropriate antibiotic use. The survey included a total of 31 items, 20 of which were 10 pairs of role and confidence assessments about nursing practices that support the stewardship process. The remaining questions included free-text, demographic, and contextual questions about engagement and antibiotic stewardship. The survey was pilot tested for semantic clarity and face validity with 6 nurses working within the pediatric intensive care unit, oncology unit, and float pool. The survey used a 5-point Likert scale with 1 (strongly disagree) to 5 (strongly agree) to assess role and confidence for each of the 10 practices. The investigators added a category of "I do not know" based on staff feedback. The survey included the following basic information for respondents: (1) number of years since completion of formalized clinical training, (2) description of their current role, (3) number of years worked at current facility, (4) primary unit, and (5) routine clinical shift. The study was reviewed and approved by the hospital institutional review board.

Study participants

A total of 1,098 direct care registered nurses, representing 11 diverse clinical units, were invited to participate in a Web-based survey using the REDCap application.[11] The survey was open for 1 month and began with dissemination via e-mail by the chief nursing officer, with 2 subsequent reminder e-mails to participate.

Analysis

Of the 10 nursing stewardship practices, each practice was associated with parallel role and confidence questions. To examine the association between role and confidence in performing stewardship practices, the 10 role and 10 confidence questions were averaged separately to create 2 composite scores for a ratio comparison. Pearson correlation was used to determine the relationship between the total role score and total confidence score. Next, a series of pairwise χ^2 tests were completed using each of the 10 role questions with their respective confidence question. For example, if nurses positively perceived their role to transition medications from intravenous to oral therapy, the investigators examined the performance confidence for that practice. "I do not know" selections were treated as missing data. If >1 unit was selected, then the respondent was assigned to a >2 units category. Frequency statistics were computed for antibiotic stewardship questions exploring process aspects, such as time to receiving antibiotics in suspected sepsis patients, and 3 contextual questions on nurse engagement. All quantitative analyses were completed using SAS software (version 9.4; SAS Institute, Cary, NC).

Participants had the opportunity to elaborate on their role in stewardship and to define their perception of stewardship barriers using free-text comments. These free-text comments were categorized by a study team member (E.M.). The research team then reviewed categories and related constructs for consensus regarding analytic decisions. Stewardship barriers were then organized by clinical unit and type and number of years of nursing experience to explicate variations in unit- and experience-based responses. Potential activities associated with the nurse stewardship role were categorized separately. This analysis was completed using Microsoft Office Professional Plus 13 (Microsoft, Redmond, WA).

RESULTS

Respondents

A total of 180 nurses completed the survey (response rate, 16.4%), with all levels of nursing experience represented (Table 1). Seventy-nine (43.8%) participants were recent nursing graduates, and 38 (21.1%) had graduated >15 years ago. Most have practiced at the hospital <5 years. More than 50% of respondents worked in an intensive care unit or on the hematology-oncology unit, and 46 (25.6%) identified working on ≥2 units.

Beliefs and attitudes

Most respondents (n = 125, 69.4%) either agreed or strongly agreed that they knew what the term antibiotic stewardship meant (Table 2). However, nurses who worked <5 years at the hospital were least familiar with the term antibiotic stewardship (21.6% disagree or strongly disagree) compared with nurses with >15 years of practice (6.9% disagree or strongly disagree). Most wanted to be more involved in the stewardship process, and 97 (54%) perceived they were already functioning as stewards (Table 2).

Free-text results

Of the 180 survey participants, 17 (9%) elected to provide comments in the free-text fields. Barriers were condensed into the following categories: education, compliance, hospital culture, and clinical practice. Nurses articulated that lack of knowledge (education), not following procedures consistently (compliance), poor collaboration, communication and disrespect between disciplines