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SHEA

Concise Communication

Assessing clinicians' and trainees' knowledge and practice of the IDSA guidelines for asymptomatic bacteriuria in older adults

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Abstract

A survey of advanced practice clinicians (APCs), physicians, residents, and medical students at an academic medical center and community practices in southeastern Texas revealed a gap in knowledge and practice related to testing and treatment for asymptomatic bacteriuria (ASB) in older adults.

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Asymptomatic bacteriuria (ASB) describes the presence of bacteria in bladder urine without symptoms attributable to urinary tract infection (UTI).[1,2] ASB is common in older adults, but data indicate no benefit to treating ASB in this population and suggest that older individuals are more susceptible to adverse effects of antibiotic treatment, including *Clostridioides difficile* infection and antimicrobial resistance.[1–5] A 2019 update to the Infectious Diseases Society of America (IDSA) ASB guidelines recommended against empiric antimicrobial treatment of ASB in older patients with cognitive or functional impairment and with delirium or a recent fall in the absence of systemic or genitourinary symptoms.[1] In practice, however, many still treat older adult patients with new delirium or a new fall empirically for UTI.

Several studies have identified reasons for the overtreatment of ASB, including deficits in knowledge of guidelines, perception of risks associated with the nontreatment of ASB, workplace norms, and concern for complications due to infection.[6–8] To the best of our knowledge, prior research has not yet investigated deficits in knowledge or practice related to treating ASB in older adults with new delirium or a new fall. We identified factors associated with these knowledge and practice gaps and recognize opportunities for future antibiotic stewardship interventions applicable to older adults with ASB.

Methods

Setting and participants

Electronic survey invitations were emailed to potential participants between January and March 2023. Participants were advanced practice clinicians (APCs), physicians, fellows, residents, and third- and fourth-year medical students working at Baylor College of Medicine or within the Common Spirit Texas Division. Fellows, residents, and medical students were working at inpatient and outpatient clinical sites affiliated with a private hospital, a county hospital, and a VA hospital. Physicians and APCs surveyed were working at a single, private hospital and/or affiliated outpatient clinics. Emergency medicine, family medicine, and internal medicine departments were included. These departments are generally involved in hospital-wide stewardship efforts focused on education. The study was approved by the Baylor College of Medicine Institutional Review Board.

Survey

Our anonymous survey was adapted from a previously validated survey,[2,6,7] with language specific to the 2019 update to the IDSA ASB guidelines describing older adults. It was distributed using RedCap electronic data capture tools hosted at Baylor College of Medicine.[9,10]

The survey contained 7 sections, including 1 demographics section. Also, 4 sections measured cognitive-behavioral constructs relevant to medical decision-making: self-efficacy, social norms, risk perceptions, and acceptance of ASB guidelines. A fifth section included 1 question measuring self-reported familiarity with IDSA ASB guidelines using a scale from 1 ("have not heard of guidelines") to 6 ("complete recall of guidelines"). The sixth section measured knowledge through 8 clinical scenarios, asking whether antibiotics were indicated in each. A knowledge score was calculated using the percentage of questions answered correctly from the knowledge section of the survey. The final section included 3 questions about practice behavior answered on a Likert scale from 1 ("strongly agree") to 5 ("strongly disagree"), with 5 indicating best antibiotic stewardship. The behavior score, a measure of antibiotic stewardship practices, was calculated as the average of a participant's responses to the behavior section questions.

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Table 1. Guidelines Familiarity, Knowledge Score, and Behavior Score by Group

Variable	Respondents, No. (%)	Familiarity With ASB Guidelines, Mean	Knowledge Score, Mean	Behavior Score, Mean
Setting of practice				
Emergency room	46 (29.%)	3.33	56.94	2.25
Inpatient	47 (30.5)	2.98	70.48	2.97
Outpatient	61 (39.6)	3.74	66.39	2.93
P value		**.027**	**.018**	**<.001**
Level of training				
Advanced practice clinician	27 (17.5)	3.85	58.8	2.56
Physician	75 (48.7)	3.51	65.03	2.74
Resident/Fellow	34 (22.1)	3.24	75.37	3.09
Medical student	18 (11.7)	2.44	53.47	2.37
P value		**.036**	**.005**	**.027**
Department				
Emergency medicine	44 (28.6)	3.3	56.69	2.26
Family medicine	50 (32.5)	3.64	63.75	2.89
Internal medicine	43 (27.9)	3.58	78.49	3.17
Medical school	17 (11)	2.35	54.41	2.45
P value		**.013**	**<.001**	**<.001**

Note. ASB, asymptomatic bacteriuria. Bold indicates statistical significance.

Statistical analysis

The χ^2 test or Fisher exact test were used, where appropriate, to determine associations between guidelines familiarity and the level of training, practice setting, and department. A one-way analysis of variance (ANOVA) was used to assess differences in knowledge and behavior scores across these groups. Two multiple linear models were performed to evaluate the relationship between dependent variables (cognitive behavioral constructs, guidelines familiarity, and other categorical variables) and main outcomes (knowledge and behavior scores). The significance level used for all calculations was $P < .05$.

Results

Of 1,305 eligible participants to whom the survey invitation was emailed, we received 154 (11.8%) responses. The breakdown of respondents by level of training and department is shown in Table 1. The setting of practice, level of training, and department were significantly associated with guidelines familiarity, knowledge score, and behavior score (Table 1).

Guidelines familiarity

The mean familiarity score for all groups was 3.39 of 5 (SD, 1.21). Also, 51% of participants responded that they had not heard of the IDSA ASB guidelines, had no recall of guidelines, or had a minimal recall of guidelines. In addition, 49% reported some or more familiarity with guidelines.

Knowledge score

The mean knowledge score for all groups was 64.87 of 100 (SD, 23.65). In the multiple linear regression model, higher knowledge scores were significantly associated with better antibiotic stewardship practices ($P < .001$) and a better understanding of risks related to treating ASB ($P = .019$) (Table 2). Self-reported familiarity with the guidelines did not correlate with knowledge scores ($P = .807$).

Behavior score

The mean behavior score for all groups was 2.73 of 5 (SD, 0.91). In the multiple linear regression model, higher behavior scores were significantly associated with better familiarity ($P = .002$), workplace social norms ($P < .001$), knowledge scores ($P < .001$), and risk perceptions ($P < .001$) (Table 2).

Discussion

Knowledge of evidence-based practices regarding ASB in older adults was relatively low across departments, practice settings, and levels of training. Emergency room providers, APCs, and medical students scored lower than other groups surveyed. Low knowledge scores may be due to a lack of formal education or training on ASB guidelines regarding older adults. Some departments or trainees may be less likely to receive formal education on ASB, which may contribute to disparities in knowledge scores between groups. Future research could investigate the inclusion of ASB guidelines in medical school, residency, and continuing medication education curricula.

Notably, self-reported familiarity with IDSA ASB guidelines was not associated with knowledge scores, suggesting that respondents' self-assessment of their awareness of ASB guideline content did not align with actual knowledge as measured by our survey.

The association between knowledge, social norms, and behavior suggests that a multipronged intervention targeting both awareness and workplace social norms may be most beneficial for improving antimicrobial stewardship. Continuing medical education curricula or lectures at academic and community centers can target knowledge of guidelines, their evidence base, and the risks of overtreating ASB in older adults. Identification of faculty champions within practice groups or departments may contribute to addressing workplace social norms that influence behavior. Aligning undergraduate medical teaching with ASB guidelines can lay the groundwork for future practice behavior. Both educational and behavioral interventions may target groups with lower knowledge or behavior scores to maximize the impact on antibiotic stewardship.

The strengths of this study include the use of an adapted version of a previously established survey to collect data from 3 different medical specialties and across settings of practice, including inpatient, outpatient, academic, and community sites.[2] We also surveyed a broad array of clinicians at different levels of training, including APCs, physicians, residents, and medical students.

This study also had several limitations. Convenience sampling was used, predisposing the study to sampling and selection biases. The study was geographically limited to southeastern Texas, which may limit generalizability outside the region. A primary limitation of this study was the low response rate.

In conclusion, there is a gap in knowledge and practice related to antibiotic use for ASB in older adult patients. Focusing

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Table 2. Multivariable Analysis Assessing the Relationship Between Knowledge and Behavior Scores and Cognitive Constructs, Guideline Familiarity, and Other Categorical Variables

	Knowledge Score			Behavior Score		
Predictor	Estimates	CI	*P* Value	Estimates	CI	*P* Value
(Intercept)	20.28	−11.76 to 52.32	0.213	−0.72	−1.71 to 0.27	.153
Knowledge score				0.01	0.01 to 0.02	**<.001**
Behavior	13.36	8.20 to 18.52	**<0.001**			
Self-efficacy	1.55	−3.09 to 6.19	0.51	−0.03	−0.18 to 0.11	.649
Social Norms	0.69	−5.28 to 6.67	0.819	0.34	0.17 to 0.52	**<.001**
Risk Perception	5.51	0.93 to 10.09	**0.019**	0.36	0.23 to 0.49	**<.001**
Acceptance	−4.87	−11.00 to 1.26	0.118	−0.07	−0.26 to 0.13	.499
Familiarity	0.37	−2.64 to 3.39	0.807	0.14	0.05 to 0.23	**.002**
Age 31–45 y (ref, 20–30)	4.67	−5.98 to 15.33	0.387	−0.14	−0.47 to 0.19	.412
Age >45 y	−4.41	−16.17 to 7.35	0.459	0	−0.36 to 0.36	1
Sex, male (ref, female)	2.63	−4.17 to 9.43	0.446	0.07	−0.14 to 0.28	.507
Race, Black (ref Asian)	−2.78	−14.14 to 8.57	0.628	0.23	−0.12 to 0.58	.192
Race, Other	−4.11	−16.01 to 7.78	0.495	0.3	−0.07 to 0.67	.107
Race, White	1.04	−5.99 to 8.08	0.769	−0.01	−0.22 to 0.21	.959
Ethnicity non-Hispanic (ref, Hispanic)	−4.71	−12.51 to 3.09	0.234	0.2	−0.04 to 0.44	.095
Inpatients setting (ref, emergency)	−7.37	−33.84 to 19.11	0.583	0.87	0.06 to 1.68	**.035**
Outpatient setting	−4.89	−30.94 to 21.16	0.711	0.68	−0.12 to 1.48	.094
Training, medical student (ref, APC)	3.42	−33.48 to 40.31	0.855	−0.81	−1.94 to 0.32	.159
Training, physician	0.94	−7.99 to 9.86	0.836	0.2	−0.08 to 0.47	.157
Training, resident/fellow	−0.22	−17.44 to 17.00	0.98	0.02	−0.51 to 0.55	.945
Family medicine department (ref, emergency)	5.4	−20.78 to 31.59	0.684	−0.37	−1.18 to 0.43	.361
Internal medicine department	14.53	−12.81 to 41.86	0.295	−0.58	−1.42 to 0.27	.18
Medical school	3.02	−39.58 to 45.63	0.889	0.39	−0.92 to 1.71	.556
Observations		149			149	
R^2/R^2 adjusted		0.573/0.503			0.721/0.675	

Note. CI, confidence interval; ref, reference; APC, advanced practice clinicians. Bold indicates statistical significance.

interventions on improving knowledge, risk perceptions, and workplace social norms to change clinician behavior is critical for patient safety and antibiotic stewardship.

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Competing interests. All authors report no conflicts of interest relevant to this article.

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