

Evaluation of Antimicrobial Stewardship for the Treatment of Urinary Tract Infections After Pharmacist-Led Provider Education at the Center for Family Medicine

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Purpose: Urinary tract infections are a common outpatient infection, and proper antibiotic treatment is important for better patient outcomes, reducing healthcare costs, and reducing bacterial resistance. Specifically at the Center for Family Medicine (CFM), resident physicians may lack experience in prescribing proper antibiotic treatments based on patient factors for UTIs. The purpose of this study is to assess the appropriate use of antibiotics before and after a provider education pertaining to guideline recommended therapy for UTIs. The education included classifications of UTIs, first line and second line antibiotic therapy for acute uncomplicated UTIs, and first line therapy based on renal function or pregnancy status. The primary endpoint was a composite outcome of appropriate antibiotic therapy defined as the right drug, duration, diagnosis, and dose. The secondary endpoints were the individual components of the composite primary outcome.

Methods: The pharmacist-led education was provided on October 27th of 2022. The study was a single-center prospective cohort study comparing prescribing habits 115 days prior to provider education and 115 days after education. Patient medical records were evaluated for diagnosis of a UTI, antibiotic therapy, and patient characteristics. The pre-intervention group was compared to the post-intervention group using a Chi-squares test.

Results: There were a total of seven patients in the pre-education group and six patients in the post-education group. The primary endpoint occurred in one of seven (14.28%) patients prior to education and in three of six (50%) patients following the education ($p = 0.27$). Right diagnosis occurred in seven of seven (100%) in the pre-education group and in four of seven (66.67%) in the post-education group ($p = 0.19$). Right drug occurred in five of seven (71.43%) in the pre-education group and in four of seven (66.67%) in the post-education group ($p = 1$). Right dose occurred in five of seven (71.43%) in the pre-education group and in six of six (100%) in the post-education group ($p = 0.46$). Right duration occurred in three of seven (42.86%) in the pre-education group and in four of seven (66.67%) in the post-education group ($p = 0.59$).

Conclusions: The implementation of provider education regarding UTI antibiotic therapy improved proper prescribing but was not statistically significant. Further research with larger study populations is required to further assess effectiveness of antimicrobial provider education.

	Pre Education (n=7)	Post Education (n=6)	P Value
Patient Characteristics			
Total Patients	7	6	
Mean Age	46.1	28.8	0.2029
Non-Complicated UTI	4	5	
Mean Age	26.0	24.0	0.8671
End Points			
Right Composite (Right Dx, Drug, Dose, Duration)	1 (14.28%)	3 (50%)	0.2657
Right Dx	7 (100%)	4 (66.67%)	0.1923
Right Drug	5 (71.43%)	4 (66.67%)	1.0
Right Dose	5 (71.43%)	6 (100%)	0.4615
Right Duration	3 (42.86%)	4 (66.67%)	0.5921
Right Dx	7	4	
Right Dx + Right Drug	5 (71.43%)	3 (75%)	1.0
Right Dx + Right Drug + Right Dose	3 (42.86%)	3 (75%)	0.5455

Right Dx + Right Drug + Right Dose + Right Duration	1 (14.28%)	3 (75%)	0.0879
Non-Complicated	4	5	
Right Composite	1 (25%)	2 (40%)	1.0
Right Diagnosis	4 (100%)	3 (60%)	0.4444
Right Drug	3 (75%)	3 (60%)	1.0
Right Dose	3 (75%)	5 (100%)	0.4444
Right Duration	1 (25%)	3 (60%)	0.5238

Reasons for....

1. Complicated UTI
 - a. Pre-Educate – 3 women \geq 65
 - b. Post Education – 1 man
2. Wrong Dx
 - a. Pre – N/A
 - b. Post - Patient had cast cells present and should have been diagnosed with BV
3. Wrong Drug
 - a. Pre – incorrect drug choice in a child, incorrect drug choice in a complicated infection (age)
 - b. Post - one inappropriate drug prescribed during pregnancy (Bactrim) and one second line therapy option.
4. Wrong Dose
 - a. Pre – once daily ciprofloxacin instead of twice daily dosing, and ciprofloxacin 250mg was used instead of 500mg
 - b. Post – N/A
5. Wrong Duration
 - a. Pre –
 - i. 3 longer duration than recommended
 - ii. 1 shorter duration than recommended
 - b. Post – 2 longer duration than recommended

All end points pertaining to composite, diagnosis, drug, dose, duration, were calculated utilizing ***Two-Tailed Fisher's Exact Test 2x2 Contingency Table Calculator***

P-value for age related values was calculated using ***t-test: 2 sides of unequal variance.***