Evaluating addition of pharmacist consult to a midlevel provider driven outpatient antimicrobial stewardship program in a community emergency department

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BACKGROUND

Antibiotics are commonly prescribed in the emergency department (ED) for a variety of conditions including skin and soft tissue infections (SSTIs), lower and upper respiratory infections (LRI, URI), urinary tract infections (UTIs), and blood stream infections (BSIs).[1-3] The collaborative efforts made between the ED clinicians, infectious disease clinicians, and pharmacists can yield long term success which includes the reduction of inappropriate empiric antibiotic use.[4] There are multiple barriers to the execution of an antibiotic stewardship program (ASP) in the ED, including a high patient turnover rate, and the lack of microbiologic data when prescribing antibiotics due to discharge prior to culture results.[2] A study conducted by Randolph et al, demonstrated the impact of pharmacist managed cultures in an ED setting and showed more antibiotic regimen modifications and a reduction in the rate of unplanned admissions in 96 hours of the initial culture review.[5]

PURPOSE

The objective of this study is to evaluate the addition of pharmacist consult to a midlevel provider driven outpatient ED culture follow up program on prescribing optimal antimicrobial therapy.

Primary Outcome	• Evaluate if appropriate optimal antimicrobial therapy is utilized in the current outpatient ED culture follow up program
Secondary Outcomes	• Optimal dose • Optimal duration • Optimal antibiotic • Return visit to the ED within 30 days for an infection

METHODS

This is a single center prospective cohort study at Community Medical Center. The retrospective data collection occurred from June 2019 to August 2019 and the prospective cohort occurred from January 2020 to March 2020.
This study was approved by the Institutional Review Board (IRB).

Inclusion	Exclusion
• Adults 18 years or older • Discharged from the ED • Had a positive microbial culture	• Admitted for inpatient treatment • Discharged to hospice care or palliative care

DISCLOSURES

Authors of this presentation have nothing to disclose concerning possible financial or personal commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

RESULTS

Table 1: Patient Demographics

	Pre-implementation phase (N=220)	Implementation phase (N=91)	P value
Age (yr) – mean (SD)	57.34 (± 23.64)	55.65 (± 24.24)	0.570
Female gender – no. (%)	164 (74.55%)	68 (74.73%)	1.000
Pregnancy status – no. (%)	9 (4.09%)	6 (6.59%)	0.386
Charlson Comorbidity Index Score, no. (%)			
0	87 (39.55%)	40 (43.96%)	0.527
1	23 (10.45%)	10 (10.99%)	0.843
2	22 (10.00)	10 (10.99%)	0.838
3	35 (15.91%)	12 (13.19%)	0.605
4	51 (23.18%)	19 (20.88%)	0.766
5 or greater	2 (0.91%)	0 (0.00%)	1.000
Site of infection, no. (%)			
UTI	174 (79.09%)	79 (86.81%)	0.149
SSTI	46 (20.91%)	12 (13.19%)	0.149
Concomitant infection, no. (%)	8 (3.64%)	3 (3.30%)	1.000
Received antibiotics in the emergency department, no. (%)	137 (62.27%)	53 (58.24%)	0.525
Antibiotic use within the past 30 days, no. (%)	29 (13.18%)	12 (13.19%)	1.000

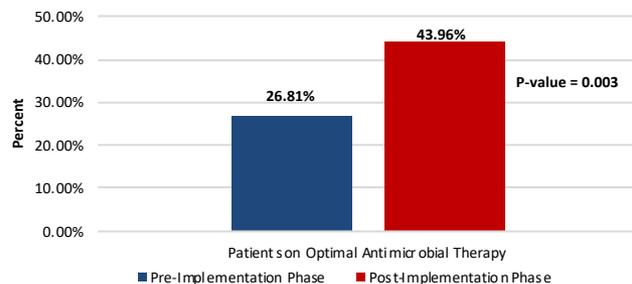### Figure 1: Primary Outcome Optimal Antimicrobial Therapy

P-value = 0.003
- Pre-Implementation Phase: 26.81%
- Post-Implementation Phase: 43.96%

Patients on Optimal Antimicrobial Therapy

Table 2: Secondary Outcomes

	Pre-implementation phase (N=220)	Implementation phase (N=91)	P value
Optimal antibiotics prescribed	115 (52.27%)	66 (72.53%)	0.001
Optimal dose of antibiotics prescribed	113 (51.36%)	65 (71.43%)	0.001
Optimal duration of antibiotics	65 (29.55%)	40 (43.96%)	0.014
Return ED visits within 30 days	12 (5.45%)	2 (2.20%)	0.209

DISCUSSIONS

The baseline characteristics in the two groups were similar, with a low Charlson Comorbidity Index Score indicating that the patients included in the study were low complexity patients with minimal co-morbid conditions. The only statistical difference seen between the two groups in the infectious characteristics was in regards to *Proteus mirabilis* UTI patients (p=0.019) in the implementation phase and *Klebsiella* spp. UTI patients (p=0.026) in the pre-implementation phase. The results of this study showed that pharmacist consult to a midlevel provider driven outpatient antimicrobial stewardship program improved optimal therapy by 17% (p-value 0.003). For the secondary outcomes, optimal antibiotic prescribed increased 20% (p-value 0.001), optimal dose increased 20% (p-value 0.001), and optimal duration increased 14% (p-value 0.209). In the pre-implementation phase of the 174 patients that were diagnosed with a UTI and prescribed antibiotics, 53 (29.9%) were defined as asymptomatic bacteriuria, and therefore received treatment inappropriately. In the implementation phase, out of the 79 patients that were diagnosed with a UTI, 15 (18.99%) were defined as asymptomatic bacteriuria. The pharmacist had recommended to discontinue antibiotics in all these asymptomatic bacteriuria patients but was only successful in discontinuing antibiotics in 4 patients (26.67%). For the 12 patients that returned within 30 days in the pre-implementation phase, 10 returned to the ED for worsening infection and 2 were diagnosed with an active *clostridioides difficile* infection. For the 2 patients in the implementation phase, both of them returned to the ED for worsening infection.

Limitations of this study include:
- Inability to see if the patient went to another facility for treatment
- In the pre-implementation phase the pharmacy reviewed cultures at the request of the nurse practitioner or physician assistant completing the follow up
- Reluctance of the midlevel provider changing the ED physician's antimicrobial therapy
- The implementation phase of the trial occurred during the COVID-19 pandemic, which decreased the number of patients visiting the hospital, resulting in less culture call backs in the month of March than expected

CONCLUSIONS

To our knowledge, this is the first study to directly look at pharmacists assisting with midlevel practitioner follow-up. A statically significant difference was seen, with increased optimal antimicrobial therapy prescribed when pharmacy was involved. A lower rate of return ED visits within 30 days was identified with pharmacy involvement, with a reduction of 3.25%. This shows the impact pharmacists can have in regards to improving optimal therapy in an ED culture callback program.

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