Evaluation of Antimicrobial Prescribing Patterns at a Referral Hospital in Mbeya, Tanzania

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Abstract

OBJECTIVE: To follow up and assess effectiveness at Mbeya Zonal Regional Hospital (MZRH) with an antimicrobial guidebook designed to aid in management of illness and subsequent, appropriate antimicrobial therapy.

METHODS: Retrospective chart review assessing the use of 122 evaluable courses of infectious diagnosis and subsequent usage of antibiotics. Cases were judged on completion of the entire course of medication prescribed, or completion of doses up until death or discharge from hospital.

RESULTS: Of 124 total evaluable courses, 16 were truncated by death or discharge, leading to 104 courses that were examined. 24 (23%) of these courses were completed. Of the 80 (77%) of courses that were not completed, there was an average dose missed of 4.52 for the first course of medication, 5.44 for the second course of antibiotic, and an average of 2 missed doses for a 3rd course of medication if applicable.

CONCLUSIONS: Antibiotic stewardship remains a continuing area of concern and improvement. While this review did not show strong improvements on stewardship after the first review and guidebook implementation, future interventions at MZRH should be considered to optimize antibiotic use and stewardship.

Introduction

Antimicrobial resistance is a growing international concern. While many high-income countries have developed empiric antibiotic stewardship recommendations, lower- and middle-income countries have differing levels of antibiotic resistance. Therefore, antimicrobial resistance surveillance and stewardship is needed in these countries in order to develop local recommendations on how to combat antimicrobial resistance.. With collaboration with Mbeya Zonal Hospital of Tanzania, this study aims at looking at the effectiveness of an antimicrobial stewardship handbook created in the spring of 2018, which was designed to act as comprehensive guidelines on management of illness and the subsequent appropriate antimicrobial therapy. The study aims to follow up and look for any changes regarding antibiotic course completion and use by infectious indication after the adoption and implementation of the guidebook.

Methods

This study used chart reviews of 124 total evaluable courses of prescription medications. An evaluable course was an antibiotic prescription in which the prescribing physician indicated a stop date or course duration (for example, a course of medication taken 3 times a day for 7 days, leading to 21 doses prescribed). Each prescription course was measured to be complete if every prescribed dose of medication was taken by the patient. If a patient course was truncated by their discharge from the hospital or their death, the course was marked as truncated and excluded from the final calculations. In cases where the patient took more than the prescribed dose, the chart was marked as complete and the additional doses were marked as exceeding prescribed duration. If the patient failed to complete all doses prescribed, the course was marked as incomplete and the average number of missed doses were calculated for all incomplete courses and compared to results pre-intervention.

Results

- Only 16 of 65 antibiotic 1st courses (24.6%) were successfully completed, which indicates that there is still a pressing concern with antibiotic stewardship even after the intervention
- 56.2% of courses were partially completed, indicating that a large issue is in maintaining use of antibiotics throughout the course duration.
- 6.4% of antibiotic courses exceeded the prescribed course duration
- Ceftriaxone (40.4%) and Metronidazole (24%) made up the bulk of the antibiotics prescribed
- While the guidebook implementation assisted in identifying correct prescription based on infectious diagnosis, there were issues with maintaining this practice.

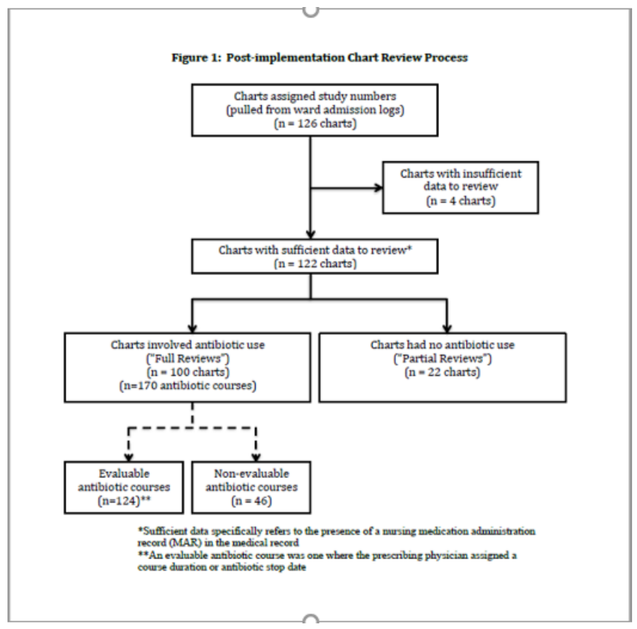


Table 1. Process on Identifying Evaluable Antibiotic Courses

Antibiotic Course	1st	2nd	3rd	Total
Total No. of Evaluable Courses	72	48	2	122
• Courses Truncated by Discharge	2			
• Courses Truncated by In-house Mortality	5	11	0	16
Remaining Courses*	65	37	2	104
• Courses Complete	16	6	2	24 (23%)
• Courses Incomplete	49	31	0	80 (77%)
• Courses Exceeding Prescribed Duration	5	1	1	7 (7%)
• Average No. of Missed Doses	4.52	5.44	2	X

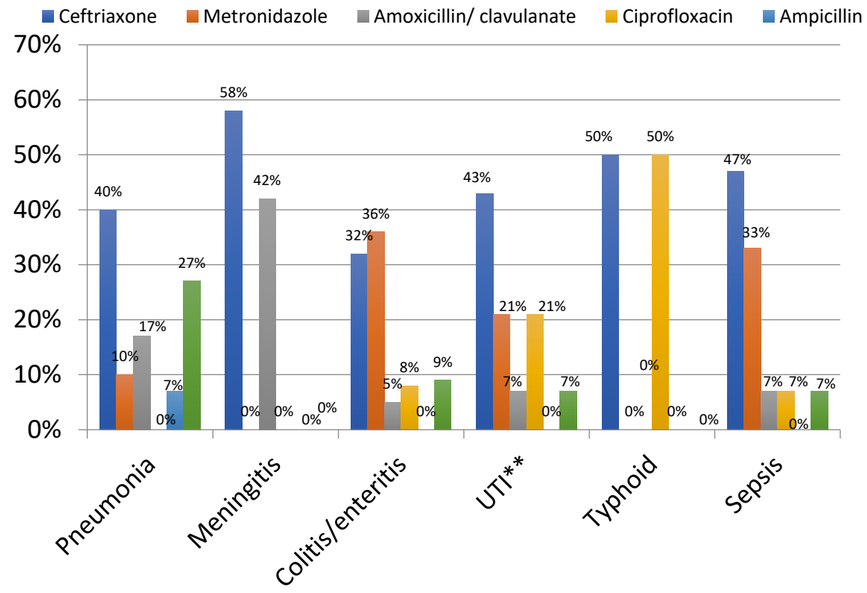
Table 2. Analysis of Antibiotic Courses

Results: Antibiotic Use

	#1	#2	#3
Overall (n=171 courses)	Ceftriaxone 69 (40.4%)	Metronidazole 41 (24.0%)	Ciprofloxacin 16 (9.4%)
Bacterial Pneumonia (n=37 courses)	Ceftriaxone 26 (70.2%)	Metronidazole 9 (24.3%)*	Amoxicillin/clavulanate 9 (24.3%)**
Urinary Tract Infection (n=4 courses)	Metronidazole 2 (50%)	Ceftriaxone and Ciprofloxacin 1 each (25% each)	
Skin and Soft Tissue Infection (n=3 courses)	Amoxicillin/cloxacillin 2 (67%)	Amoxicillin/clavulanate 1 (33%)	
Bacterial Meningitis (n=18 courses)	Ceftriaxone 10 (55.6%)	Metronidazole 4 (22.2%)	Others (Ampicillin, Benzyl PCN, Clarithromycin, Cefoperazone/sulbactam) 1 (5.6%)
Colitis/Enteritis (n=11 courses)	Metronidazole 5 (45.4%)	Ciprofloxacin 4 (36.3%)	Ceftriaxone 2 (18.1%)

*8 of these courses were combined with ceftriaxone; 1 was combined with ciprofloxacin; 1 was combined with both
**5 of these were combined with ceftriaxone; 4 were monotherapy

Table 3. Description of Antibiotics Prescribed by Number of Courses



Graph 1. Percentage of Infectious Diagnoses that Received the Indicated Antibiotic

Discussion

There are still ongoing concerns in developing effective antimicrobial stewardship in Mbeya Zonal Regional Hospital (MZRH). For example, current antibiotic prescribing habits, such as the overuse of ceftriaxone, could be leading to greater resistance against this broad-spectrum antibiotic in the future. The number of partially completed courses, of which over half of the evaluable courses consisted of, is a known driver of antibiotic resistance and should be looked to further reduce in the future. There are some concerns as to the cost/inability to pay for necessary antibiotics and supplies among some patients, and further social interventions could be needed in this regard. Finally, clinicians need to work on better understanding local resistance patterns and relaying these concerns to patients, as this may help patients understand the need to fully complete their antibiotic courses in the future. A plan to develop an improved social work program, create an antibiogram from local culture data, and better communication strategies between doctors and patients are being looked at in the future, and may have promising results.

References

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