



Development & Implementation of a Biomarker-based Remotely-delivered Antimicrobial Stewardship (AMS) Strategy during the COVID-19 Pandemic

Hanna Alexander, Divya Deodhar, Jane Miracline J, Naveena Gracelin Princy Z, Premkumar Thangavelu, and Priscilla Rupali

Department of Infectious Diseases, Christian Medical College, Vellore, Tamilnadu, India



BACKGROUND

Increased antibiotic usage during the COVID-19 pandemic and resultant infection control measures derailed the existing antimicrobial stewardship program which involved in person post prescription review and feedback. We performed a time series analysis using Procalcitonin as a tool for a remotely delivered antimicrobial stewardship program by a clinical pharmacist.

METHODS

This study was conducted in a tertiary care 3500 bedded teaching hospital in southern India. In the baseline phase, all COVID-19 in-patients receiving antibiotics > 48 hours were screened via the electronic records by a pharmacist and antimicrobial consumption indices like days of therapy (DOT) and length of therapy (LOT) were measured. In the intervention phase, if a patient was on antimicrobials, then a PCT was sent. An alert was sent to the treating team based on the procalcitonin levels and a screening of electronic records by a clinical pharmacist to either continue/ de-escalate or discontinue an antibiotic under supervision of an Infectious Diseases physician.

Fig1.Guideline for continuing or stopping antibiotics based on procalcitonin levels

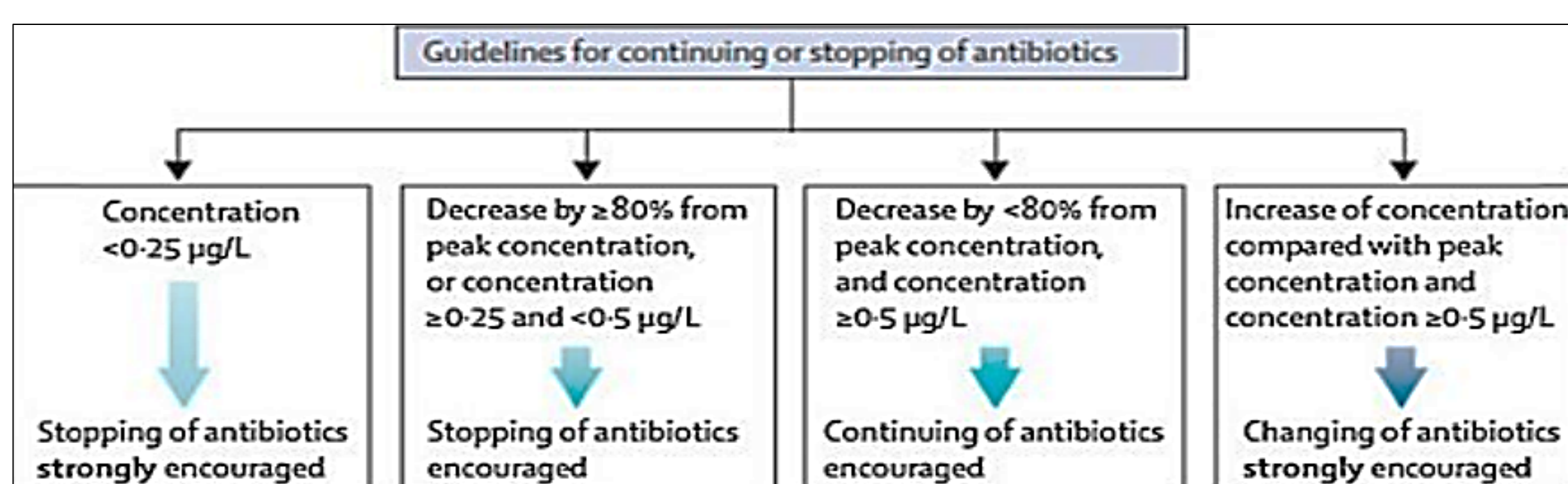
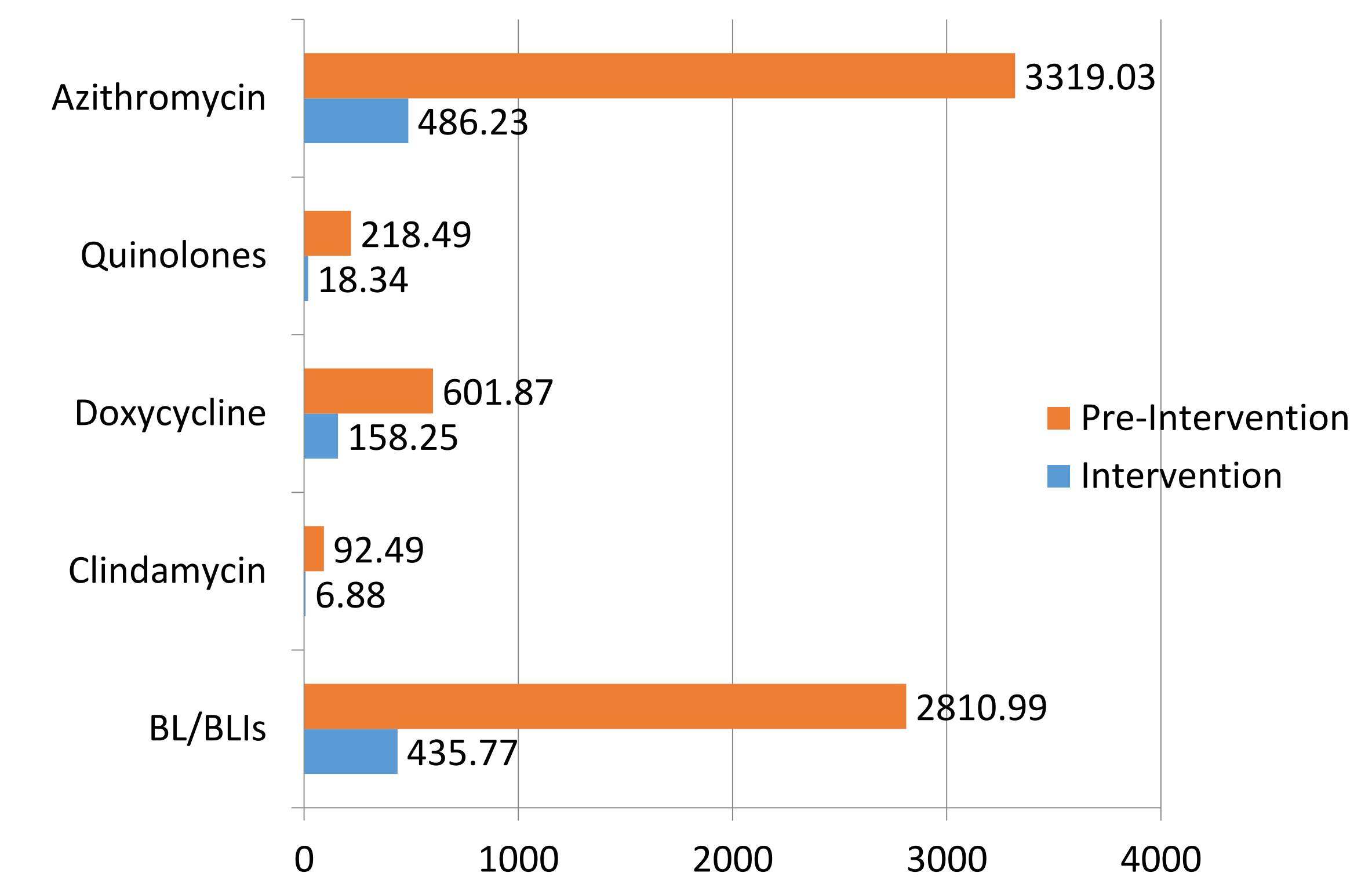


Fig3.Baseline Characteristics comparing Pre- intervention and Intervention Phase

Baseline Characteristics	Pre-intervention Phase (N = 481)	Intervention Phase (N = 90)
Gender		
Male	355 (73.80)	64 (71.11)
Female	126 (26.19)	26 (28.88)
Age#	57.01 (13.28)	57.02 (15.79)
Co-morbidity		
Diabetes	286 (59.46)	51 (56.67)
Hypertension	238 (49.48)	41 (45.56)
Obesity	11 (2.29)	2 (2.22)
Chronic Kidney Disease	36 (7.48)	9 (10.0)
Chronic Lung Disease	49 (10.19)	13 (14.44)
Chronic Liver Disease	6 (1.25)	2 (2.22)
Malignancy	11 (2.29)	6 (6.67)
Cardiovascular Disease	10 (2.08)	1 (1.11)
The severity of Covid-19 Infection		
Asymptomatic	13 (2.70)	0 (0.00)
Mild	60 (12.47)	32 (35.36)
Moderate	141 (29.31)	29 (32.22)
Severe	243 (50.52)	15 (16.67)
Critical	24 (4.99)	14 (15.56)
System Involved		
Lung	379 (78.79)	70 (77.78)
Lung with sec. infection	67 (13.93)	16 (17.18)
Skin and Soft Tissue Inf.	1 (0.21)	1 (1.11)
UTI	6 (1.25)	2 (2.22)
Outcome		
Death	60 (12.47)	10 (11.11)
Alive	421 (87.52)	80 (88.88)

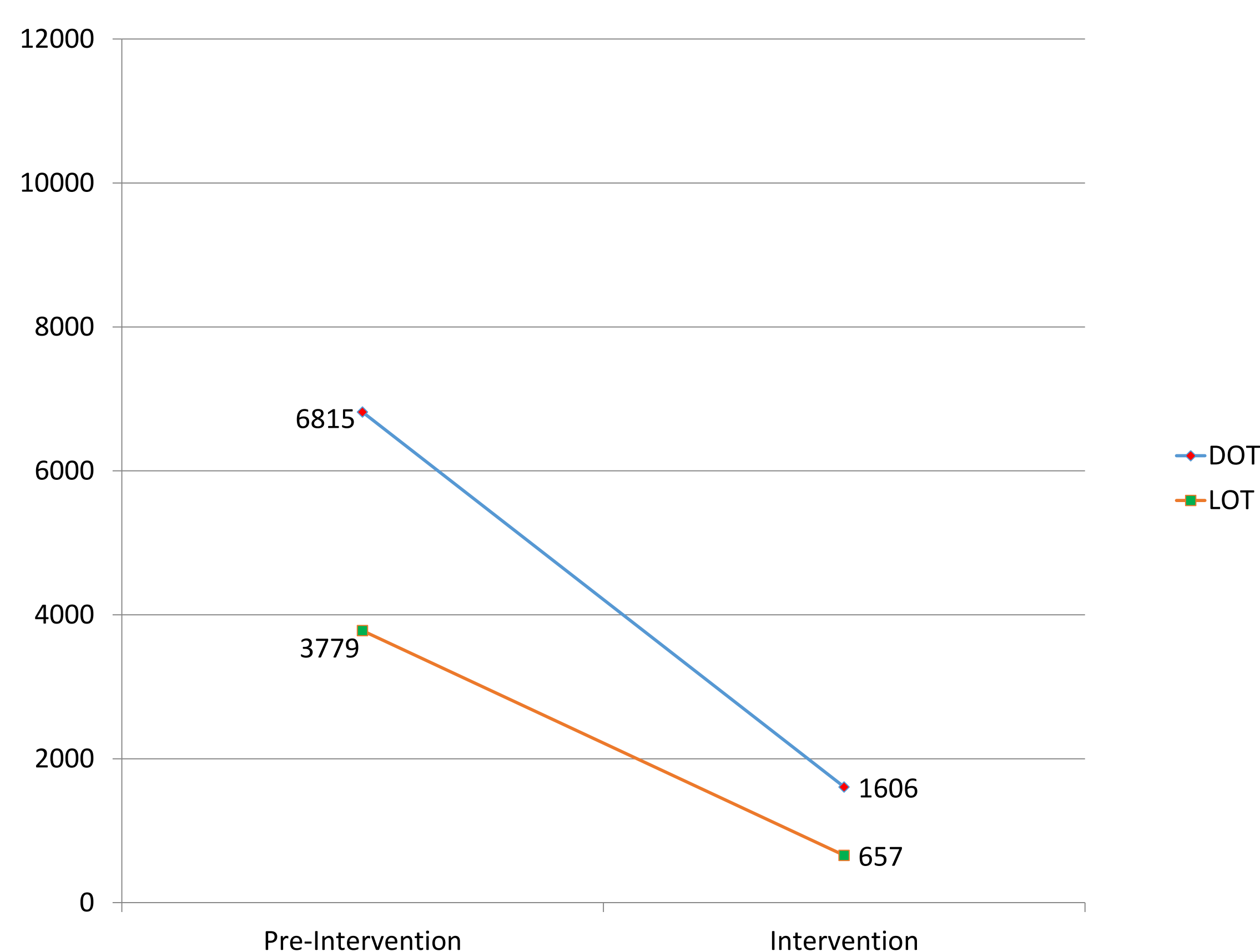
Fig5.Comparison of the DOT per 1000 PD in the Pre-Intervention and Intervention phase of frequently used antibiotics in Covid- 19 infection



RESULTS

About 481 patients were enrolled in the pre intervention phase of the study from July to October 2020 (peak of the pandemic) and 90 patients in the intervention phase December 2020 - March 2021 (decline of the pandemic). The baseline characteristics are shown in Figure3. The DOT/1000 patient days (PD) for all antibiotics was 9269 (DOT-6915) in the baseline and 2032 (DOT-886) in the intervention arm. The total length of therapy (LOT) for antimicrobial consumption significantly reduced from 3779 in the pre-intervention phase to 657 in the intervention phase (Figure 4). Out of the 90 recommendations given in the intervention phase, 82 (91.1%) were accepted by the treating team. For Azithromycin and Doxycycline, DOT significantly reduced from 3319 to 486 per 1000 PD and 602 to 158 per 1000 PD respectively. The DOT of the reserve antibiotics according to the WHO AWaRe classification like Polymyxins and Carbapenems decreased from 323 to 67 and 777 to 443 per 1000 PD days in the intervention phase.

Fig4.Comparison of LOT (Length of therapy) and DOT (Days of therapy) in the Pre-intervention and Intervention Phase



CONCLUSION

This study demonstrated the utility of a novel biomarker driven antimicrobial stewardship strategy by clinical pharmacists during the COVID pandemic when access to patients was restricted to both infection control physicians and pharmacists.

Fig2.Study Flow

