ESTABLISHING ANTIMICROBIAL STEWARDSHIP PROGRAMME AT FOUR SECONDARY CARE HOSPITALS IN INDIA THROUGH HUB AND SPOKE MODEL WITH CHRISTIAN MEDICAL COLLEGE, VELLORE AS GUIDING CENTRE

Prasannakumar Palanikumar, Naveena Gracelin Princy Zacchaeus, Hanna Alexander, Abi Manesh, Lydia John, Jemin Webster. Indu Kulshrestha, Mahima Sadanshiv, Rincy John, Prasanna Samuel.Priscilla Rupali

Department of Infectious Diseases,and Biostatistics Christian Medical College, Vellore, Tamilnadu, India, Baptist Christian Hospital, Assam; Bangalore Baptist Hospital, Bangalore; Padhar Hospital, Madhya Pradesh; Christian Fellowship Hospital, Tamilnadu

BACKGROUND

India faces serious threat due to antimicrobial resistance at all levels of healthcare including secondary care level. Thus, Antimicrobial Stewardship (ASP) needs to be extended to all health care levels.

METHODS

We adopted hub and spoke model to implement ASP based on our early experience with ID Physician driven Prospective Audit with Intervention and Feedback (PAIF) ASP strategy.   We translated our experience into training programme for local physicians and pharmacist/nurse to adapt AMSP strategies in four secondary care hospitals with central support from our centre. The study consisted of three phases. Initial phase was to capture baseline antimicrobial days of therapy DOTs data, followed by intervention phase wherein secondary care physicians of the four chosen hospitals were trained in distance education mode for a year along with development of antibiogram based on local hospital microbial resistance pattern entered through WHONET and hospital specific algorithms and augmentation of the existing laboratory facilities by training microbiologists and technicians at CMC for required period. This was followed by post intervention phase with PAIF strategy and assessment of DOTs.

Fig1.Study Flow
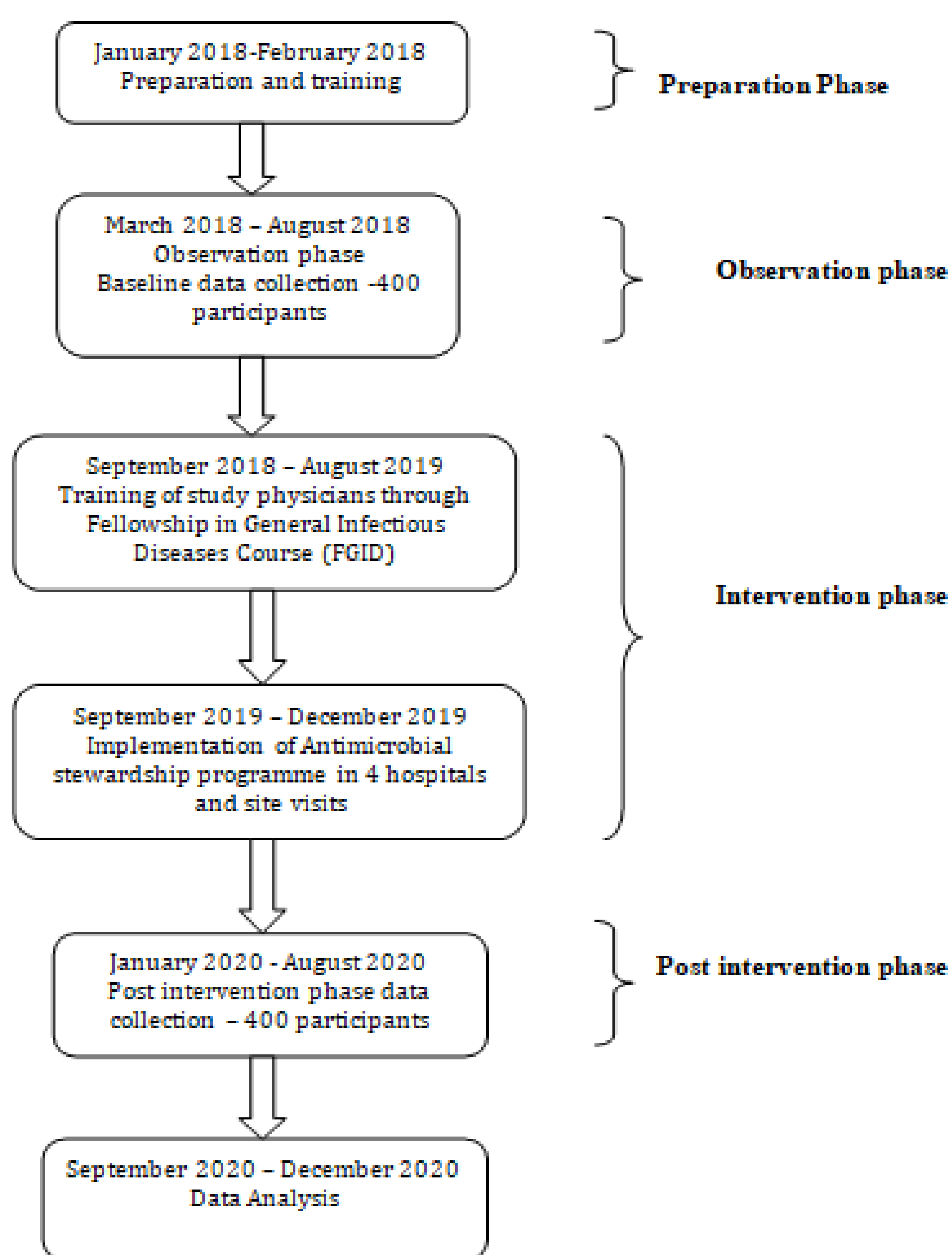
RESULTS

During the baseline phase, 1459 patients from all four sites were enrolled; 1233 patients were enrolled in the intervention phase. Both groups had comparable baseline characters. The key outcome, DOT per 1,000 patient days, was 1952.63 in the baseline phase. The DOT/1000 patient days was significantly lower in the post intervention period, at 1483.06 (P =0.001). Quinolones, macrolides, Cephalosporin's, Clindamycin, and nitroimidazole use were significantly decreased in the post intervention group. Post intervention showed 79.9% of antibiotic use was justified. The reason for unjustified antibiotic use corresponded to the choice (59.75%), duration (39.4%) and route of administration (33.3%), 13.9% of antibiotic use was clinically not indicated. The intervention rate was 38%. Overall, the recommendations given by the ID team were fully followed in 946 cases (77.7%), partially followed in 59 cases (4.8%), and not followed in 137 cases (35.7%). There were no significant adverse events post intervention.

Table1. Overview of Antibiotic Therapy use

Variables	Overall	Baseline n(%)	Intervention n(%)	p value
Indication for antimicrobial therapy				
Definite infection	1074 (39.9)	515 (35.3)	559 (45.3)	<0.001
Probable Infection	1018 (37.8)	608 (41.7)	410 (33.3)	<0.001
Prophylaxis	600 (22.3)	338 (23.2)	262 (21.2)	0.234
Antibiotic therapy status after 48 hours of study enrolment or discharge in baseline phase *				
Inappropriate Prophylaxis	2(0.1)			
Continued antibiotic therapy	787(53.9)			
De-escalated antibiotic therapy	183(12.5)			
Discontinued antibiotic therapy	63(4.3)			
Escalated antibiotic therapy	114(7.8)			
Changed IV to Oral therapy	443(30.4)			
Stopped redundant cover	0(0)			
Discharge with antibiotics	324(22.2)			
Justification for antibiotic use	Baseline n(%)	Intervention n(%)	p value	
Justified	940(64.5)	980 (79.9)	<0.001	
Unjustified	518(35.5)	246 (20.1)		
Reason for Unjustified use of antibiotics in intervention phase				
Inappropriate choice	147 (11.9)			
Inappropriate duration	97 (7.9)			
Inappropriate mode of administration	82 (6.7)			
Reason for inappropriate choice of antibiotics				
Narrow-spectrum antibiotics available	47 (3.8)			
Clinically not indicated	104 (8.4)			
Redundant cover	8 (0.6)			
Other	5 (0.4)			

Table2. Secondary Outcomes

Variable	Baseline Phase (n=1459)	Intervention Phase (n=1233)	P Value
De-escalation rate	186 (12.5)	22 (44.0)	<0.001
Mortality			
Infectious	36 (61.0)	14 (43.8)	0.193
Non-Infectious	8 (13.6)	4 (12.5)	
Both	15 (25.4)	14 (43.8)	
Length of Stay, Median IQR	5.0 (3.0,8.0)	6.0 (4.0,9.0)	<0.001$
Prevalence of multidrug-resistant organism (MDRO)			
Extended-spectrum β lactamase (ESBL)	89 (10.6)	65 (8.6)	
Vancomycin-resistant Enterococcus (VRE)	0 (0.0)	1 (0.1)	0.001
Carbapenem-resistant Enterobacteriaceae (CRE)	9 (1.1)	15 (2.0)	
Methicillin-resistant Staphylococcus aureus (MRSA)	25 (3.0)	5 (0.7)	
None	720 (85.4)	674 (88.7)	
Unintended consequences			
No reaction	1455 (99.7)	1221 (99.0)	0.023
Diarrhea	0 (0.0)	7 (0.6)	0.004

Table 3. Acceptance of Recommendation Given by the Infectious Disease Physician during the Intervention Phase

Type of Recommendation	Recommendation Given*	Recommendation Accepted
De-escalation	50	22 (44.0)
Discontinue	315	204 (65.8)
Redundant cover	37	9 (24.3)
Continue the same	763	704 (93.9)
Modify according to susceptibility	116	54(46.6)
Escalation	7	6 (85.7)

CONCLUSION

Our Hub and Spoke model of ASP was successful in implementing ASP in secondary care hospitals.