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PRESCRIPTION PATTERN OF ANTIBIOTICS AND GUIDELINE ADHERENCE IN ELDERLY PATIENTS

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ABSTRACT

Infection was a major cause of morbidity and mortality, prior to the development of Antibiotics. Antibiotics have played a vital role in achieving major advances in medicine and surgery. Infectious diseases pose a major challenge in the elderly for two reasons:1.) On the one hand the susceptibility to infection increases with age and when infections occur they often present atypically. 2.) On the other hand diagnostic uncertainty is much more pronounced in the geriatric population. Antibiotics were one of the most prescribed drugs in the world.

The aim of the study was to evaluate prescription pattern of antibiotics and guideline adherence in elderly patients.

A total of 140 patients case records satisfying the inclusion criteria were analysed over a period of six months to determine the antibiotic adherence using ICMR guideline. Case records were prospectively reviewed for demographic details, laboratory data, management and outcomes.

During the study period 140 prescriptions were screened. Evaluation of antibiotic adherence to guideline shows that, 81.56% of the prescriptions were prescribed according to the guideline. The most commonly prescribed antibiotics were Piperacillin & Tazobactam (20.9%), Followed by Faropenam (9.01%), Cefixime (8.19%). The antibiotics which are not prescribed according to the guideline were found to be Meropenem (15.55%), Followed by

Faropenem (13.33%), Imipenem (11.11%) and Cefepime (11.11%).
Non-adherence to antibiotics has a considerable impact on treatment outcome. It may result in microbial resistance, which reduces the future usefulness of antibiotics and increases health-care burdens, medical expenditures. This study also highlighted the importance of prescription of antibiotics according to the guidelines.

KEYWORDS: Antibiotics, Elderly Patients, ICMR Guideline.

INTRODUCTION

Infection was a major cause of morbidity and mortality, prior to the development of Antibiotics. Antibiotics have played a vital role in achieving major advances in medicine and surgery. Infectious diseases pose a major challenge in the elderly for two reasons: 1.) On the one hand the susceptibility to infection increases with age and when infections occur they often present atypically. 2.) On the other hand diagnostic uncertainty is much more pronounced in the geriatric population.[1]

The unique challenge of managing infectious diseases in elderly patients with multiple co-morbidities, polypharmacotherapy, imminent disabilities, and functional impairments. Early administration of antimicrobials has been proposed as a vital methodology in the survival of patients with very extreme contaminations requiring emergency unit admissions.[2]

Antibiotics were one of the most prescribed drugs in the world. Since the 2000s, there has been an increase of more than 20% of antibiotics prescriptions in elderly patients. Despite their undeniable positive effects on health, antibiotics can also have adverse effects that pose a serious threat to public health. High comorbidity have negative association with the guidelines adherence in antibiotics prescriptions. Adherence to prescription guidelines, will decrease the side-effects.[1]

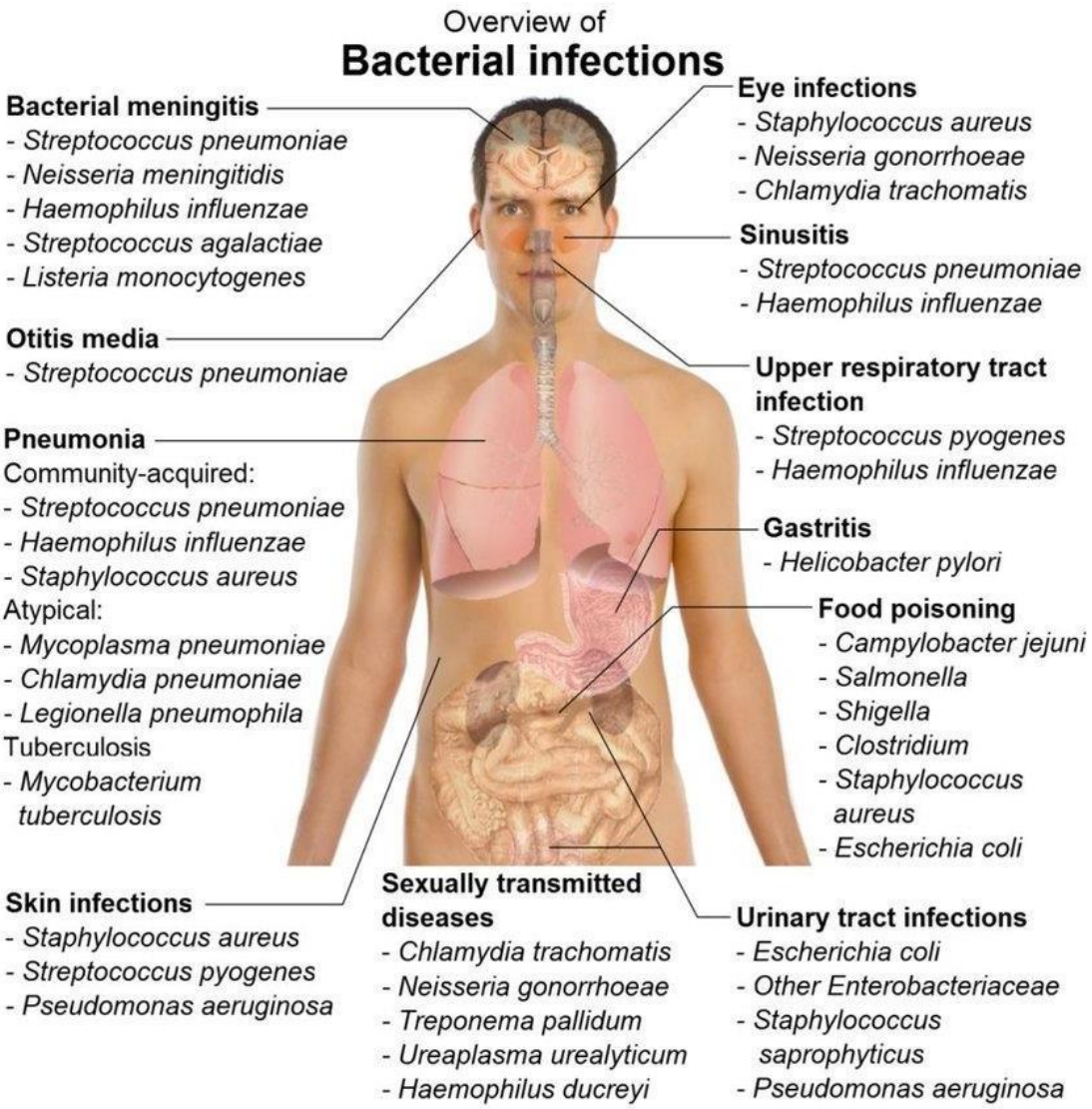


Figure no 1: Overview of bacterial infections

Guidelines for the use of antimicrobials in common infectious disease aims to rationalise the use of antibiotics and to establish treatments in various infectious disease.

Rational use of drugs - Requires that patients receive medicines appropriate to their clinical needs, in doses to meet individual requirements, for an adequate period of time, at the lowest cost to them & the community – WHO (1985).[5]

Antimicrobial resistance is well recognised as a global threat to human health.

Infections caused by antimicrobial-resistant micro-organisms in hospitals are associated with increased morbidity, mortality and healthcare costs. Resistance has emerged even to newer and more potent antimicrobial agents like carbapenems. Selection and spread of resistant

microorganisms in the presence of antimicrobials is facilitated by.[3]

- ❑ Irrational use of drugs
- ❑ Self-medication
- ❑ Misuse of drugs

Steps of rational antibiotic use

Step 1: Making a clinical diagnosis

Step 2: Limiting empiric antibiotic therapy Step 3: Know your bugs

Step 4: Choose the appropriate antibiotic Step 5: De-escalation/modification

Step 6: Stop antibiotics in the following clinical situations Step 7: Reduce the duration of therapy

Step 8: Optimize PK-PD parameters

Antimicrobial stewardship is a pressing need and is the only proven strategy to prevent human antimicrobial over use and abuse which is one of the main drivers of antimicrobial resistance. Rational use of antibiotics needs to be taught at all levels in the medical school curriculum.[4]

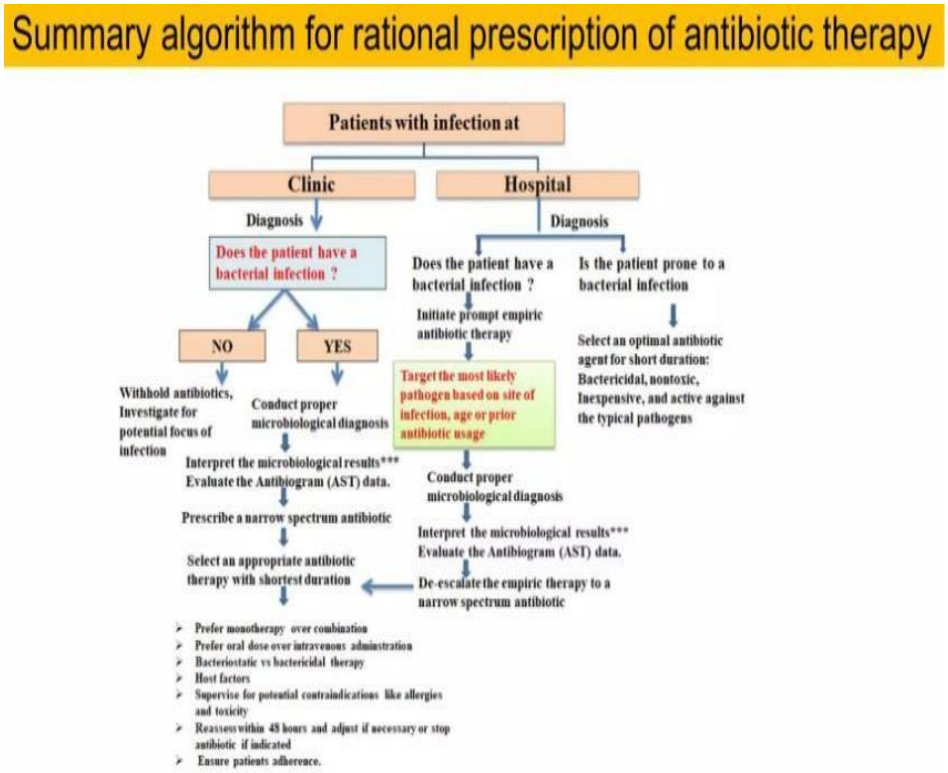


Figure no 2: Algorithm for rational prescription of antibiotic therapy

Antibiotic treatment should generally be continued for a maximum of 5 days or shorter period. However some specific conditions require a long course of therapy (Endocarditis,

Osteomyelitis).

The clinician should consider some factors like age of the patient, immune status, associated conditions like renal and hepatic function and epilepsy etc. while selecting an Antibiotics.[5]

MATERIALS AND METHODS

Study design: Prospective Cross sectional Study

Study setting: S H Medical Centre, Kottayam

Study duration: 6 Months

Sample size: 140 Geriatric Patients

Sampling technique: Convenience sampling technique was used

Sampling size determination

140 Cases were collected from general medicine department.

Sample size:- 140

$$n = \left(\frac{z^2 \ (p*q)}{me^2}\right)$$

where, z = 0.95 (95%)

ME = 0.05 (5%)

p = 0.9

q = 0.1

$$n = \frac{1.96^2 * 0.9 * 0.1}{(0.05)^2}$$

= 138.27

= **140**

Criteria for patient selection

Inclusion criteria

- Either sex
- Age above 65 years
- Patients with co-morbid conditions
- Prescription should contain atleast one Antibiotic

Exclusion criteria

- Age below 65 years.

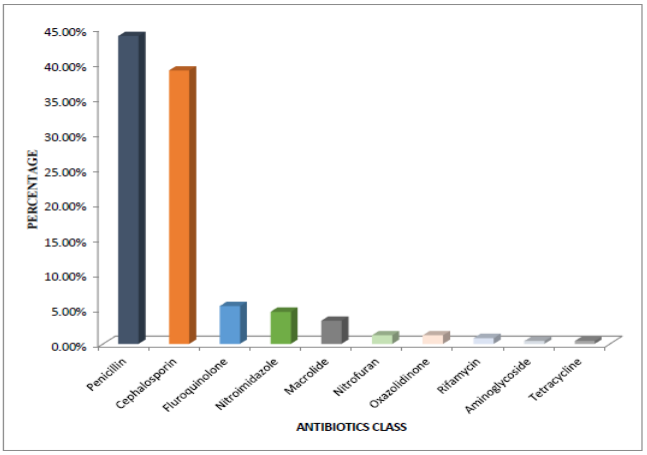
- Unconscious patients.
- Out patients

RESULT

Table no 1: Antibiotic Class (n = 140)

Antibiotic class	Frequency (n)	Percentage
Penicillin	107	43.85%
Cephalosporin	95	38.93%
Fluroquinolone	13	5.32%
Nitroimidazole	11	4.51%
Macrolide	8	3.27%
Nitrofuran	3	1.22%
Oxazolidinone	3	1.22%
Rifamycin	2	0.82%
Aminoglycoside	1	0.41%
Tetracycline	1	0.41%

Antibiotic class



Graph no 1: Antibiotic class

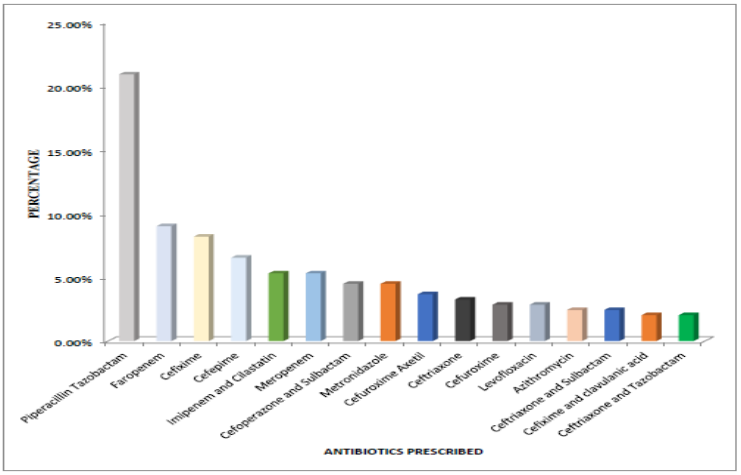
Inference: During the study, the frequently prescribed antibiotic class among study population were found to be Penicillin (43.85%), Cephalosporin (38.93%), Fluroquinolone (5.32%) and Nitroimidazole(4.51%).

Table no 2: Antibiotics Prescribed among study population (n = 140)

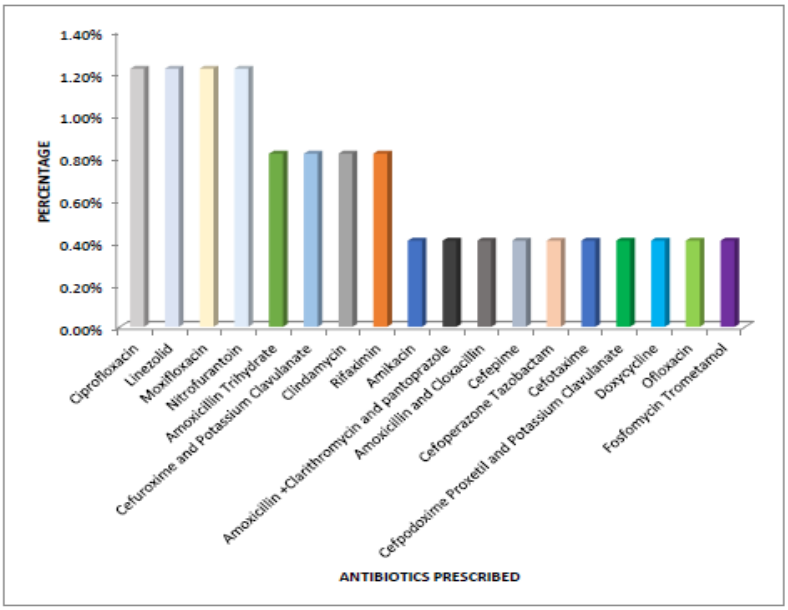
Sl. No.	Antibiotics	Freqency (n)	Percentage
1	Piperacillin Tazobactam	51	20.90%
2	Faropenem	22	9.01%
3	Cefixime	20	8.19%
4	Cefepime	16	6.55%
5	Imipenem and Cilastatin	13	5.32%
6	Meropenem	13	5.32%

7	Cefoperazone and Sulbactam	11	4.5%
8	Metronidazole	11	4.5%
9	Cefuroxime Axetil	9	3.68%
10	Ceftriaxone	8	3.27%
11	Cefuroxime	7	2.86%
12	Levofloxacin	7	2.86%
13	Azithromycin	6	2.45%
14	Ceftriaxone and Sulbactam	6	2.45%
15	Cefixime and clavulanic acid	5	2.04%
16	Ceftriaxone and Tazobactam	5	2.04%
17	Amoxicillin and Potassium Clavulanate	4	1.63%
18	Ciprofloxacin	3	1.22%
19	Linezolid	3	1.22%
20	Moxifloxacin	3	1.22%
21	Nitrofurantoin	3	1.22%
22	Amoxicillin Trihydrate	2	0.82%
23	Cefuroxime and Potassium Clavulanate	2	0.82%
24	Clindamycin	2	0.82%
25	Rifaximin	2	0.82%
26	Amikacin	1	0.41%
27	Amoxicillin +Clarithromycin and pantoprazole	1	0.41%
28	Amoxicillin and Cloxacillin	1	0.41%
29	Cefepime	1	0.41%
30	Cefoperazone Tazobactam	1	0.41%
31	Cefotaxime	1	0.41%
32	Cefpodoxime Proxetil and Potassium Clavulanate	1	0.41%
33	Doxycycline	1	0.41%
34	Ofloxacin	1	0.41%
35	Fosfomycin Trometamol	1	0.41%

Antibiotics prescribed among study population



Graph no 2a: Antibiotics prescribed among study population



Graph no 2b: Antibiotics prescribed among study population

Inference: The commonly prescribed Antibiotics to the elderly patients were Piperacillin Tazobactam (20.90%) followed by Faropenem (9.01%) and Cefixime (8.19%).

Table no 3: Errors identified in antibiotic prescriptions

Sl. No.	Drug	Percentage	Recommendation as per icmr	Inappropriateness
1	Amikacin	2.22%	Not recommended for Respiratory disorders.	It was prescribed for Respiratory disorder in 1 patient
2	Cefepime	11.11%	2g, Twice daily for Respiratory disorder.	1g was prescribed for Respiratory disorder in 5 patients.
3	Cefixime	2.22%	400mg/day	325mg was prescribed for fever in 1 patient
		2.22%		200mg was prescribed for UTI in 1 patient
		4.44%	Not recommended for Respiratory disorders	It was prescribed for respiratory disorders in 2 patients.
4	Cefotaxime	4.44%	2g, Thrice daily	1g, Thrice daily was prescribed for Respiratory disorders in 2 patients.
5	Cefoperazone Sulbactam	4.44%	3g, Twice daily	2g, Twice daily was prescribed for UTI in 2 patients
		2.22%		1.125g, Twice daily was prescribed for Respiratory disorders in 1 patient.

6	Cefoperazone Tazobactam	2.22%	Not recommended for Respiratory disorders.	It was prescribed for Respiratory disorder in 1 patient
7	Ceftriaxone	2.22%	2g, Once daily	1g, Once daily was prescribed for Sinusitis in 1 patient.
		2.22%		1.125g, Once daily was prescribed for Cellulitis in 1 patient.
		2.22%	2g, Once daily	2g, Twice daily was prescribed for Respiratory disorder in 1 patient.
8	Cefuroxime	2.22%	500mg, Twice daily	625mg, Twice daily was prescribed for Sinusitis in 1 patient.
		2.22%		200mg, Twice daily was prescribed for Respiratory disorder in 1 patient.
		2.22%	Not recommended for urosepsis.	It was prescribed for urosepsis in 1 patient.
9	Ciprofloxacin	2.22%	400mg, Twice daily	200mg, Twice daily was prescribed for Sepsis in 1 patient.
10	Faropenem	13.33%	Not recommended for respiratory disorders	It was prescribed for respiratory disorders in 6 patients.
11	Imipenem	11.11%	500mg, 4times daily for Respiratory disorder	500mg, 3 times daily was prescribed for respiratory disorders in 5 patients.
		2.22%	1g, Thrice daily for Respiratory disorders	1g, Twice daily was prescribed for respiratory disorders in 1 patient.
12	Meropenem	15.55%	1g, Thrice daily for Respiratory disorders	1g, Twice daily was prescribed for respiratory disorders in 7 patients.
13	Piperacillin Tazobactam	2.22%	4.5g, Thrice daily	2.25g, Thrice daily was prescribed for respiratory disorders in 1 patient.
		2.22%		2.5g, Thrice daily was prescribed for fever in 1 patient.
14	Rifaximin	2.22%	550mg, Thrice daily for IBD	550mg Twice daily was prescribed for IBD in 1 patient.

CONCLUSION

Geriatric population is rising throughout the world. The aging process makes geriatric populations more prone to various chronic diseases for which more number of medications are to prescribed. Antibiotics were one of the most prescribed drugs in the world. Since the

2000s, there has been an increase of more than 20% of antibiotics prescriptions in elderly patients. Non-adherence to antibiotics has a considerable impact on treatment outcome. It may result in microbial resistance, which reduces the future usefulness of antibiotics and increases health-care burdens, medical expenditures. This study also highlighted the importance of prescription of antibiotics according to the guidelines.

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