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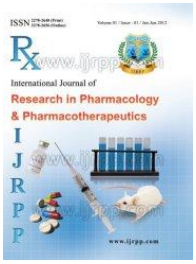

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Research article ***Open Access***

A prospective study on antimicrobial therapy and its clinical outcomes in infectious diseases with stewardship programme

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ABSTRACT

Background

Antimicrobial agents are some of the most widely, injudicious and therapeutically drug used in various conditions ranging from simple bacterial infections to various life threatening conditions. AMA are a double edged sword, hence their indiscriminate & inappropriate use has already lead to the emergence of resistant strains of many bacteria, lack of efficacy, increased side effects. Antibiotic stewardship programs (ASP) implicit to improve systematic approach, rational use of antimicrobial agents and improve patient outcomes. Rationality in the use of antimicrobial agents will surely control the emergence of antibiotic Resistance, avoidance of combinational drugs, also it will curb the side effects. Careful titration of AMA is imperative to ensure the ideal treatment outcomes.

Objectives

Assessed the Prescription pattern in infectious diseases. Assessed the efficacy of mono therapy, dual therapy and triple therapy, multiple therapy. Monitored the clinical outcomes in patient treated with different antimicrobial therapy in infectious diseases. Analyzed the antibiotic sensitivity pattern of common microorganisms. Detected Adverse drug reactions. Evaluated the Rational and Irrational use of drugs. De-escalation of antimicrobial therapy (stewardship programme)

Results

A total of 300 patients were included in our study, which shows a female preponderance with 154 (51%) in the age group of 40-49yrs. And 146 (49%) male patients mostly in the age group of 60-69yrs. And most frequent clinical conditions were LRTI 118 (40%). The most common AMA prescribed were beta lactum and betalactam inhibitors 197 (35%). The most common Antimicrobial agents were Ceftriaxone 85. Sensitivity pattern was studied in which out of 54 bacterial culture isolates, 32 cultures were gram -ve bacteria and 22 culture were gram +ve bacteria. Most prescribed regime was mono therapy 153 (51%) in which mostly given was ceftriaxone 49 (32%), cefoperazone/ salbactum 27 (18%) and dual therapy 95 (31%) in which mostly given was doxycycline+ ceftriaxone 8 (9%). Comparison of clinical outcomes in infectious diseases, cured patients were 224, controlled patients 61, no

improvement patients were 15. The occurrence of 24 ADR were detected. The second most objective was performing stewardship programme in which a total of 64 cases out of 300 cases were de-escalated. According to NCDC guidelines, out of 300 patients, 78% were rational and 22% were irrational. In conclusion,

Conclusion

An antibiotic use policy should be framed. Formation of a multidisciplinary team to oversee drug use and periodically review microbial sensitivity patterns will be helpful. Longitudinal surveillance of drug use should be carried out.

Keywords: Stewardship programme, NCDC guidelines, Rational and Irrational, De-Escalated, ADR.

INTRODUCTION

Quality of life can be improved by appealing standards of medical treatment at all levels of the health care delivery system. Setting standards and assessing the quality of care through performance review should become part of everyday clinical practice. The study of prescribing patterns seeks to monitor, assess and suggest modifications in practitioners prescribing habits so as to make medical care rational and cost effective [1]

Rationality

Study were to evaluate antibiotic prescription patterns and the factors related to the rationale for antibiotic prescriptions.

a) The therapy was considered rational if the antimicrobial use and its route of administration, dose, frequency and duration of use were considered sequestrate for infection. Adverse drug reactions (ADRs) are starting point of cause of morbidity and mortality [5].
b) Therapy was considered irrational if the antimicrobial was used without indication, prophylaxis under situation of unproven efficacy or by clearly inappropriate route, dose or preparation for that indication [9]. A growing body of evidence demonstrates that hospital-based programs dedicated to improving antibiotic use, commonly referred to as "Antibiotic Stewardship Programs (ASPs)", can both optimize the treatment of infections and reduce adverse events associated with antibiotic use, these programs help clinicians improve the quality of patient care [14].

Combat drug resistance

The overuse of antibiotics clearly steer the evolution of resistance. Epidemiological studies have demonstrated a direct relationship between antibiotic consumption and the emergence and dissemination of resistant bacteria strains. In bacteria, genes can be inherited from relatives or can be acquired from nonrelatives on mobile genetic elements such as plasmids. This horizontal gene transfer (HGT) can allow antibiotic resistance to be transferred among different species of bacteria. Resistance can also occur spontaneously through mutation. Antibiotics remove drug-sensitive competitors, leaving resistant bacteria behind to reproduce as a result of natural selection. Despite warnings regarding overuse, antibiotics are overprescribed worldwide [16].

Adverse drug reactions

(ADRs) are a leading reason of morbidity and mortality, accounting for up to 30% of hospital. Actual, perceived, or even fear of ADRs increases the likelihood for medication non adherence, leading to suboptimal treatment efficacy and adding to the burden of disease [24]. Actual ADRs can result from medication pharmacology, whereas perceived or fear of ADRs are influenced by psychological factors such as predetermined medication views, lack of belief in treatment necessity, anticipation of ADRs, conditioning based on past experiences, and misattributing symptoms as ADRs [15]. Clinician awareness of these factors will help to reduce risk for ADRs and optimize management, ultimately allowing patients to benefit from intended treatment [15].

Core elements of stewardship program

A growing body of evidence demonstrates that hospital-based programs dedicated to improving antibiotic use, commonly referred to as "Antibiotic Stewardship Programs (ASPs)", can both optimize the treatment of infections and reduce adverse events associated with antibiotic use. These programs help clinicians improve the quality of patient care [19] and improve patient safety through increased infection

cure rates, reduced treatment failures, and increased frequency of correct prescribing for therapy and prophylaxis. They also significantly reduce hospital rates of CDI and antibiotic resistance [25, 26]. Moreover these programs often achieve these benefits while saving hospitals money [17, 27]. In recognition of the urgent need to improve antibiotic use in hospitals and the benefits of antibiotic stewardship programs, in 2014 CDC recommended that all acute care hospitals implement Antibiotic Stewardship Programs [7].

MATERIAL AND METHODS

Study design

This is a prospective observational study will be conducted over a period of six months using questionnaires as a tool. The study will be conducted at general Medicine ward of THUMBAY NEW LIFE HOSPITAL, CHADARGHAT. Patients who admitted to the general Medicine ward of the hospital during a six month period from August 2018 to March 2019 will be eligible for enrolment. Patient who meets the following criteria will be enrolled.

Collection of data

Using a suitably designed data collection form, the following details will be collected

- Patient demographics
- Prescription chart
- Lab data
- Progress chart
- Medical record
- Doctors note

Inclusion criteria

1. Patients aged between 18-99 yrs of either sex
2. Patients having infectious diseases.
3. Patients with other co morbid conditions.
4. Patients with mixed infections.
5. Patients who are willing to participate in the study
6. Non surgical patients

Exclusion criteria

- Pregnant women and nursing mothers.
- Patients aged less than 18 yrs.
- Patients with disinfected conditions

Method and collection of data

Patient will be interviewed at bedside to determine the chief complaints, history of the present illness, past medical and medication history.

- Patient's prescriptions.
- Medical records of inpatients.
- Interviews with patient and/or care takers.

Duration of the study

The study will be conducted for a period of 6 months.

Place of study

THUMBAY NEW LIFE HOSPITAL.
CHADARGHAT

Does the study require any investigation or intervention to be conducted on patient or other humans or animals if so, please describe briefly.
Yes applicable.

Has ethical clearance been obtained from your institution?
Yes applicable.

STATISTICAL TOOLS

CHI SQUARE TEST (X^2 TEST)

RESULTS

Age gender distribution in infectious patients

Out of 300 patients included in the study, female patients (n-154) were more in number than male patients (n-146). Out of 146 male patients 38 belong to age group of 60 years and above, followed by 23 under 20-29 age group, 21 under 50-59 age group, 20 under 40-49,17 under 30-39 age group, 17 under 70-79 age group, 9 under 80-89 age group, 1 under 90-99 age group. Out of 154 female patients,30 belonged to 40-49 age group, followed by 29 under 60-69 age group, 28 under 70-79 age group, 25 under 20-29 age group, 25 under 50-59,15 under 30-39 age group,1 under 80-89 ,1 under 90-99 age group,{results summarized in table 1.1 and fig 1.1}.

Table 1.1: Age gender distribution in infectious patients

AGE	NO.OF MALES	NO.OF FEMALES
20-29	23	25
30-39	17	15
40-49	20	30
50-59	21	25
60-69	38	29
70-79	17	28
80-89	9	1
90-99	1	1
Total	146 (49%)	154 (51%)
TOTAL NUMBER OF PATIENTS=300		

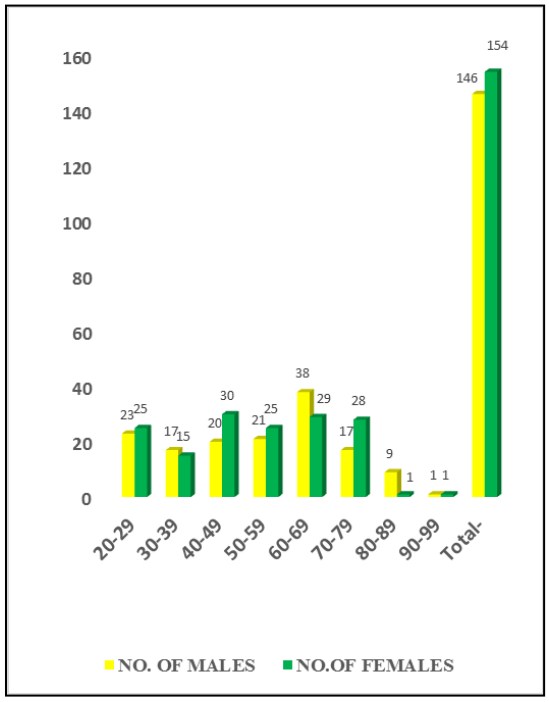

Fig 1.1: Age gender distribution in infectious patients

Assessment of diseases conditions in infectious patients

In a study conducted on 300 patients, the disease conditions observed were: 118(40%) patients had LRTI, 70(23%) patients had UROSEPSIS, 36(12%) had AFI, 30(10%) patients had DENGUE, 21(7%) patients had CELLULITIS, 13(4%) had HEPATITIS, 12(4%) had AG. {results summarized in table 1.2 and fig 1. 2.

Table 1.2: Assessment of Disease Conditions in Infectious Patients

S.NO	DISEASES	NO. OF PATIENTS	% OF PATIENTS
1)	LRTI (LOWER RESPIRATORY TRACK INFECTION)	118	40%
2)	UROSEPSIS	70	23%
3)	AFI (ACUTE FEBRIL ILLNESS)	36	12%
4)	DENGUE	30	10%

5)	CELLULITIS	21	7%
6)	HEPATITIS	13	4%
7)	AG(ACUTE GASTRITIS)	12	4%
	TOTAL	300	100%

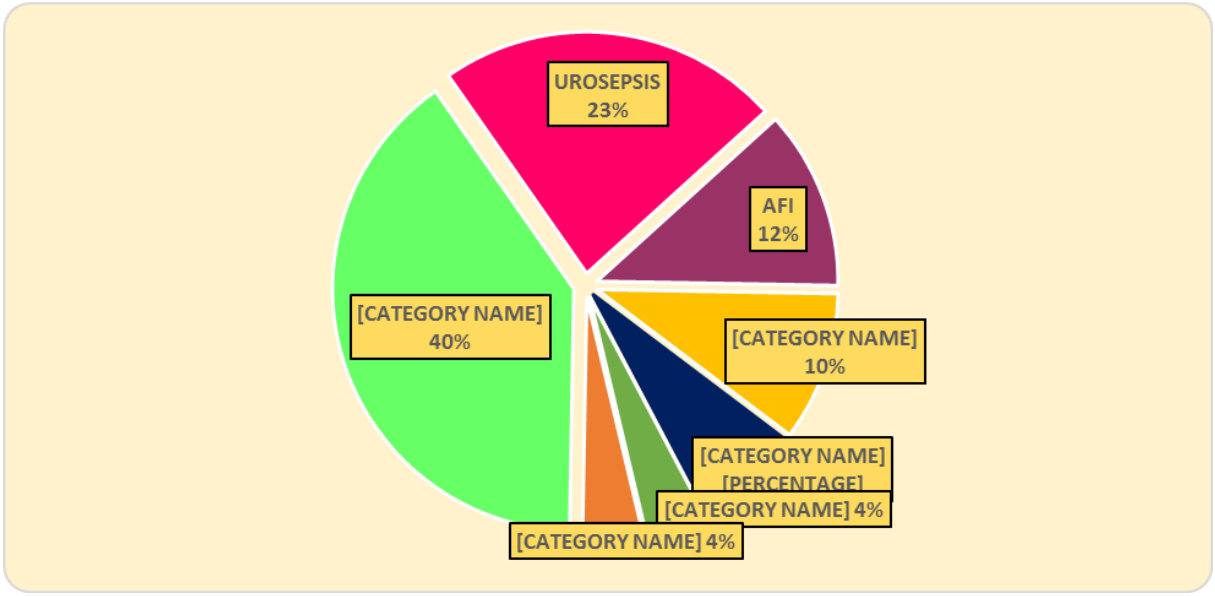

Figure-1.2 Assessment of Disease Conditions in Infectious Patients

Evaluation of antimicrobial class prescribed in infectious diseases

During the study it was observed that, out of 557 drugs which were prescribed to 300 patients, commonly prescribed antimicrobials were beta lactams and beta lactamase inhibitors 197 (35%), followed by cephalosporin 94 (17%), quinolones 45 (8%), tetracycline 40 (8%), carbapenem 30(5%), aminoglycosides 24(4%), Anti-fungal 20(4%), macrolides 16(3%), polypeptide 16(3%), lincosamides 16(3%), oxazolidinone 15(2%), antiviral 11(2%), Anti –TB 4(1%) other antimicrobials 19(3%) {results summarized in table 1.3 and figure 1.3}

Table 1.3- Antimicrobial class prescribed in infectious disease

S.NO	ANTIMICROBIAL CLASS	NO. OF DRUGS	% OF DRUGS
1	B.L+ BL INHIBITORS	197	35%
2	CEPHALOSPORINS	94	17%
3	QUINOLONES	45	8%
4	TETRACYCLINS	40	8%
5	CARBAPENEM	30	5%
6	AMINOGLYCOSIDE	24	4%
7	ANTI FUNGAL	20	4%
8	OTHER ANTIBIOTICS	19	3%
9	MACROLIDES	16	3%
10	POLYPEPTIDE	16	3%
11	LINCOSAMIDES	16	3%
12	OXAZOLIDINONE	15	2%
13	ANTI VIRAL	11	2%
14	ANTI HELMENTICS	10	2%
15	ANTI TB	4	1%
	TOTAL ANTIMICROBIAL AGENTS PRESCRIBED IN 300 PATIENTS	557	100%

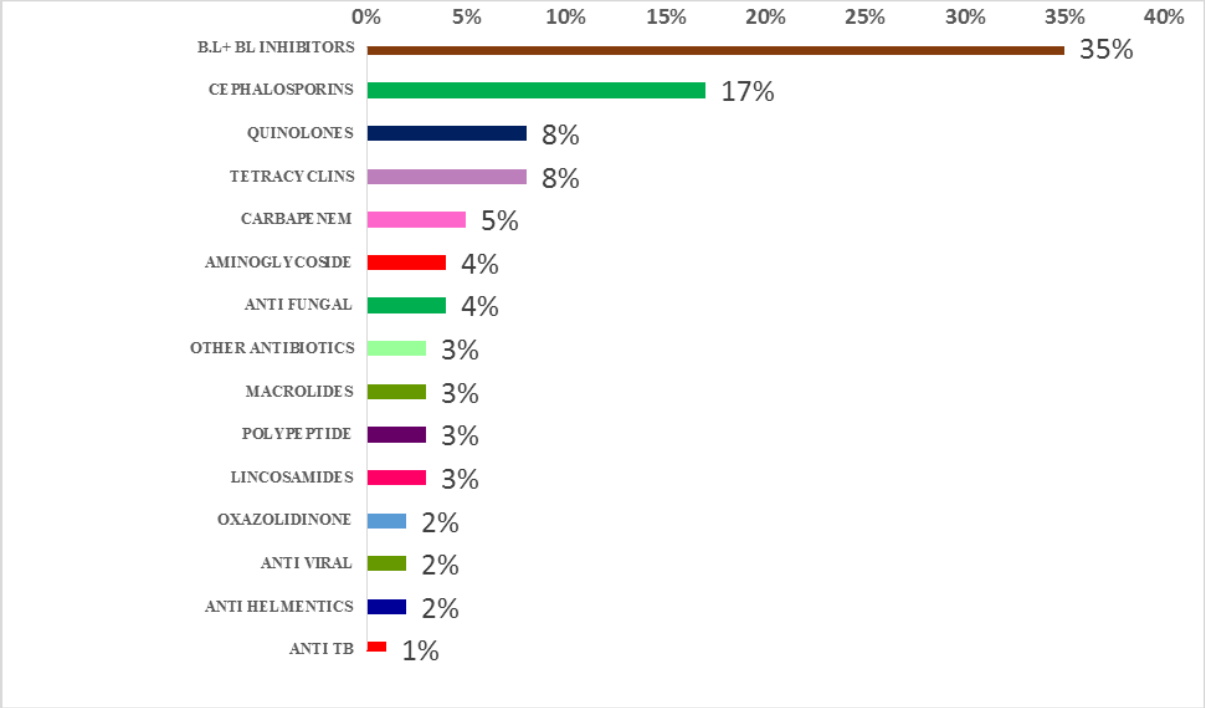

Figure 1.3: Evaluation of antimicrobial class prescribed in infectious diseases

Commonly prescribed antimicrobial drugs in infectious diseases

In the study on 300 patients, 557 drugs were prescribed, in which commonly prescribed drugs were Ceftriaxone 85, followed by Cefoperazone/salbatum 67, Piperacillin/tazobactum 49, Ampicillin/salbactum 37, Meropenem 30, Doxyclline 30, Amoxicillin /clavunate 24, Moxifloxacin 19, { Results summarized in table 1.4 and figure 1.4}

S.NO	ANTIMICROBIAL DRUGS	NO. OF DRUGS
1	CEFTRIAXONE	85
2	CEFOPERAZONE/ SALBACTUM	67
3	PIPERCILLIN/ TAZOBACTUM	49
4	AMPICILLIN/SALBACTUM	37
5	MEROPENEM	30
6	DOXYCYCLIN	30
7	AMOXYCILLIN/CLAVUNATE	24
8	LEVOFLOXACIN	22
9	MOXIFLOXACIN	19
10	FLUCANAZOLE	19
11	CEFEMINE/TAZOBACTUM	18
12	METRONIDAZOLE	17
13	CLINDAMYCIN	17
14	LINEZOLID	15
15	RIFAXIMIN	15
16	TEICOPLANIN	15
17	OSELTAMIVIR	11
18	TIGYCYCLINE	9
19	AMIKACIN	7
20.	COLISTIN	5
21	OTHER ANTIMICRIBIAL AGENTS	46
		557
TOTAL ANTIMICROBIAL AGENTS PRECRIBED IN 300 INFECTIOUS PATIENTS		

Table 1.4: Commonly prescribed am drugs in infectious disease

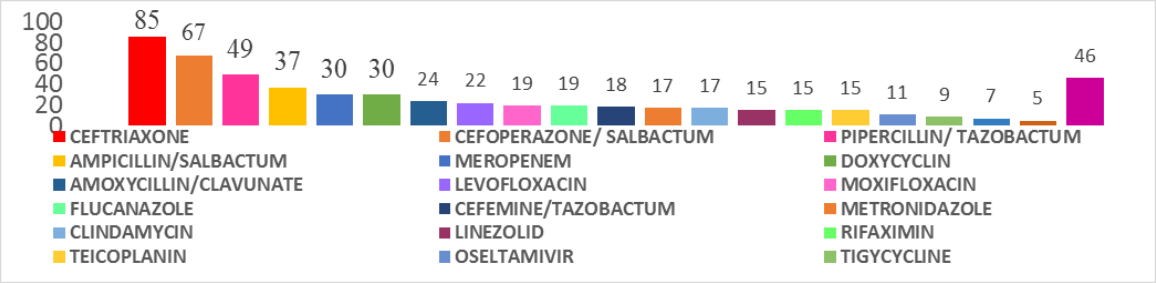

Figure 1.4: Commonly prescribed am drugs in infectious disease

Monitoring of culture sensitivity pattern

Out of 54 bacterial culture isolates, 32 were gram negative bacteria and 22 were gram positive bacteria. The most frequent gram negative isolate was E.coli 37%, followed by klebsiella 22%, and the most frequent gram positive was enterococcus 20%, followed by streptococcus 20%

Table 1.5: Monitoring of culture sensitivity pattern

S.NO	SPECIMEN	BACTERIA	MICRO ORGANISM	NO. OF ISOLATES	% OF ISOLATES
1	URINE	GRAM –VE	E.COLI	20	37%
2	SPUTUM	GRAM -VE	KLEBSIELLA	12	22%
3	URINE	GRAM +VE	ENTERO-COCCUS	11	20%
4	SPUTUM	GRAM +VE	STREPTO- COCCUS	11	20%
				54	99%

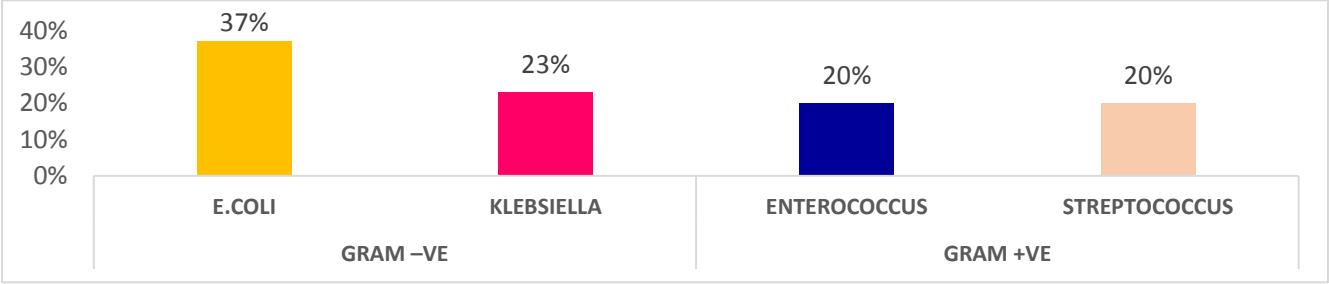

Figure 1.5: Monitoring of culture sensitivity pattern

Antibiotic sensitivity pattern of e.coli

The isolates of E.COLI were mostly susceptible to Meropenem (100%) Nitrofurantoin (93%), and mostly resistant to ceftriaxone (77%), ceftazidime (77%).

Table 1.5.1: Antibiotic sensitivity pattern of e.coli

DRUGS	SENSITIVE	RESISTANCE
AMPICILLIN/ SALBACTUM	61%	39%
PIPERACILLIN/TAZOBACTUM	87%	13%
CEFTRIAXONE	23%	77%
CEFTAZIDIME	26%	77%
MEROPENEM	100%	0
GENTAMYCIN	78%	21%
AMIKACIN	78%	21%
CIPROFLOXACIN	(35%)	64%
NITROFURANTION	93%	7%
CEFOPERAZONE / SALBACTUM	87%	13%

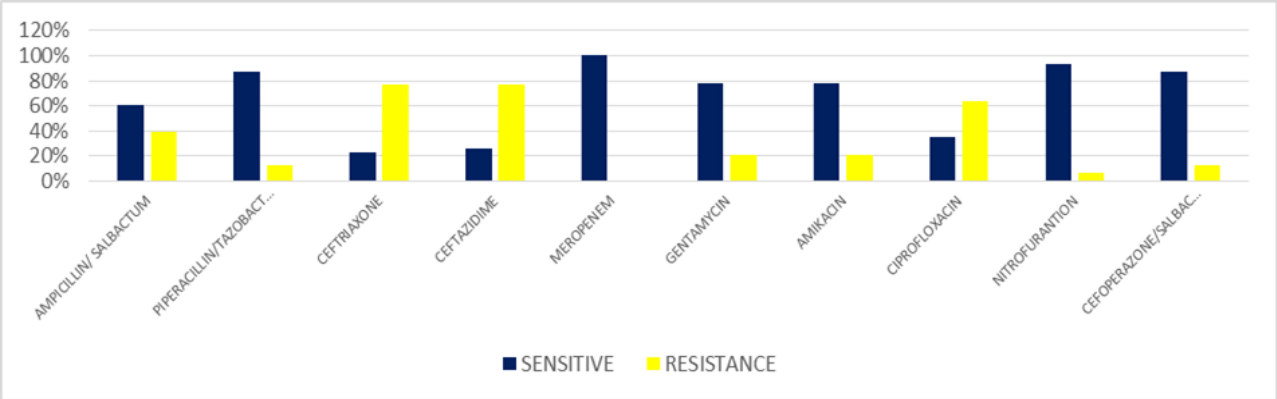

Figure 1.5.1: Antibiotic sensitivity pattern of e.coli

Antibiotic sensitivity pattern of klebsiella

The isolates of klebsiella were mostly susceptible to Meropenem (72%) and were mostly resistant to Ceftazidime (70%) and Ceftriaxone (70%), They have also shown equivalent sensitive and resistance patterns to antibiotics like Amikacin (55%), Gentamycin (55%).

Table 1.5.2: Antibiotic sensitivity pattern of klebsiella

DRUGS	SENSITIVE	RESISTANCE
AMPICILLIN/ SALBACTUM	34%	66%
PIPERACILLIN/TAZOBACTUM	46%	64%
CEFTRIAXONE	30%	70%
CEFTAZIDIME	30%	70%
MEROPENEM	72%	28%
GENTAMYCIN	55%	55%
AMIKACIN	45%	55%
CIPROFLOXACIN	44%	66%
CEFOPERAZONE / SALBACTUM	46%	64%

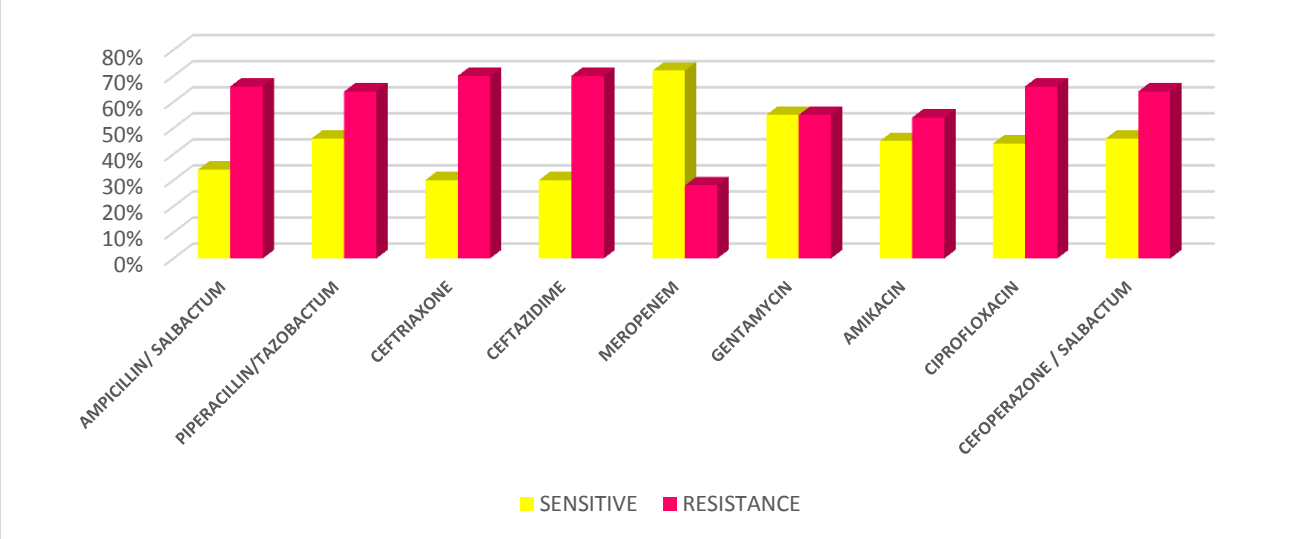

Figure 1.5.2: Antibiotic sensitivity pattern of klebsiella

Antibiotic sensitivity pattern of enterococcus

The isolates of enterococcus were mostly susceptible to linezolid (100%), Vancomycin (100%), cotromoxazol (100%), and were mostly resistant to ciprofloxacin (98%), Norfloxacin (98%)

Table 1.5.3: Antibiotic sensitivity pattern of enterococcus

DRUGS	SENSITIVE	RESISTANCE
HIGH LEVEL GENTAMYCIN (HLG)	83%	17%
CIPROFLOXACIN	0	100%
NORFLOXACIN	0	100%
LINEZOLID	100%	0
NITROFURANTOIN	80%	20%
VANCOMYCIN	100%	0
AMPICILLIN	60%	40%
COTROMOXAZOL	100%	0

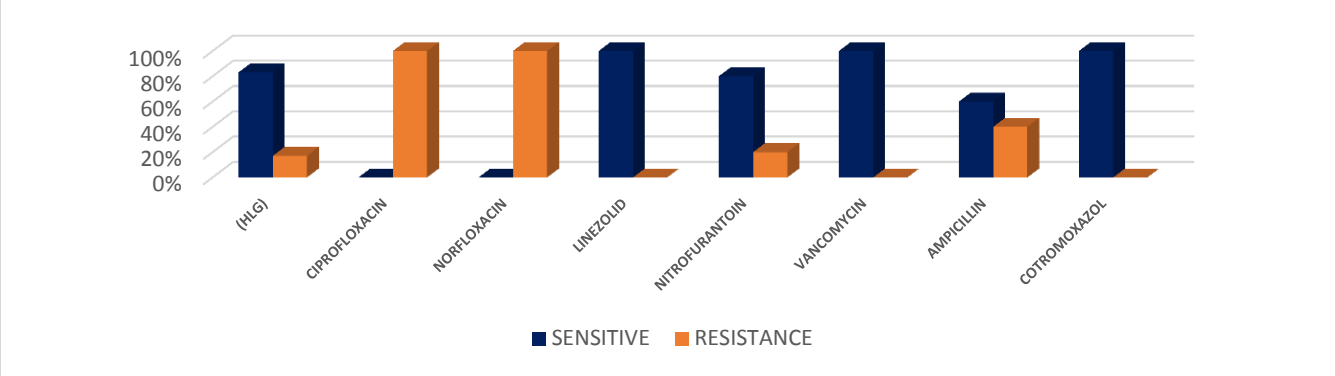

Figure 1.5.3: Antibiotic sensitivity pattern of enterococcus

Antibiotic sensitivity of streptococcus

The isolates of streptococcus were mostly susceptible to linezolid (100%), vancomycin (100%), and they have also shown eqivlent sensitivity and resistivity patients to antibiotics like ciprofloxacin (50%).

Table 1.5.4: Antibiotic sensitivity of streptococcus

DRUGS	SENSITIVE	RESISTANCE
GENTAMYCIN	83%	16%
CIPROFLOXACIN	50%	50%
LINEZOLID	100%	0
VANCOMYCIN	100%	0
AMPICILLIN	72%	28%
PENICILLINS	72%	28%

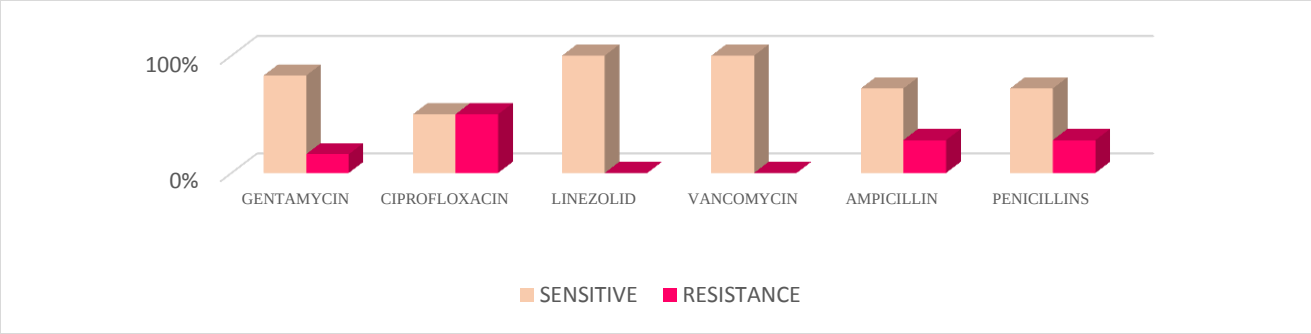

Figure 1.5.4: Antibiotic sensitivity of streptococcus

Pattern of drug regime prescribed for infectious patients

In the study conducted on 300 patients, mostly prescribed regimen was mono therapy 153 (51%)in infectious patients, followed by dual therapy 95 (31%) prescriptions, triple therapy 17 (6%) prescriptions, but multiple therapy was very less 17 (6%) prescriptions. {results summarized in table 1.6, 1.6.1,1.6.2, 1.6.2, 1.6.3, 1.6.4, 1.6.5, 1.6.6}

Table 1.6 Pattern of drug regime prescribed for infectious patients

S.NO	PRESCRIBING PATTERN	NO OF PRESCRIPTIONS	% OF PRESCRIPTION
1	MONO THERAPY	153	51%
2	DUAL THERAPY	95	31%
3	TRIPLE THERAPY	35	12%
4	MULTIPLE THERAPY	17	6%
	TOTAL	300	100%

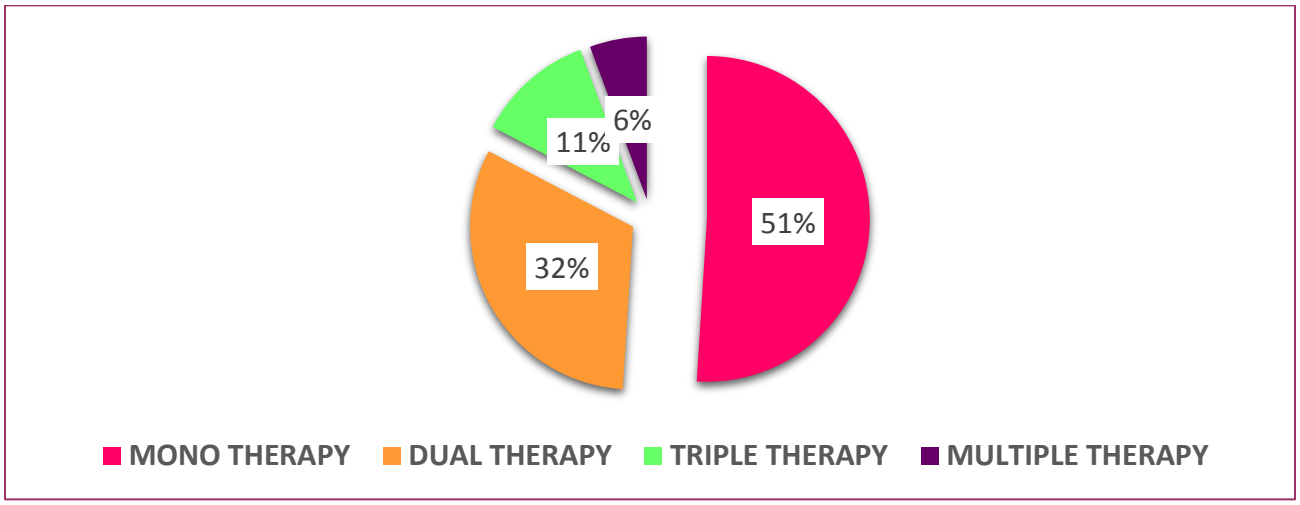

Figure 1.6: Pattern of drug regime prescribed for infectious patients

Table: 1.6.1 Prescription pattern of mono therapy

MONO THERAPY DRUGS	NO OF PATIENTS	% OF PATIENTS
CEFTRIAXONE	49	32%
CEFOPERAZONE / SALBACTUM	27	18%
AMPICILLIN / SALBACTUM	15	10%
PIPERACILLIN/ TAZOBACTUM	15	10%
CEFIPIME / TAZOBACTUM	13	8%
AMOXICILLIN / CLAVUNATE	10	6%

CIPROFLOXACIN	5	3%
METRONIDAZOLE	5	3%
AMIKACIN	4	2%
CEFOTAXIM	4	2%
OTHERS	6	6%
TOTAL	153	99%

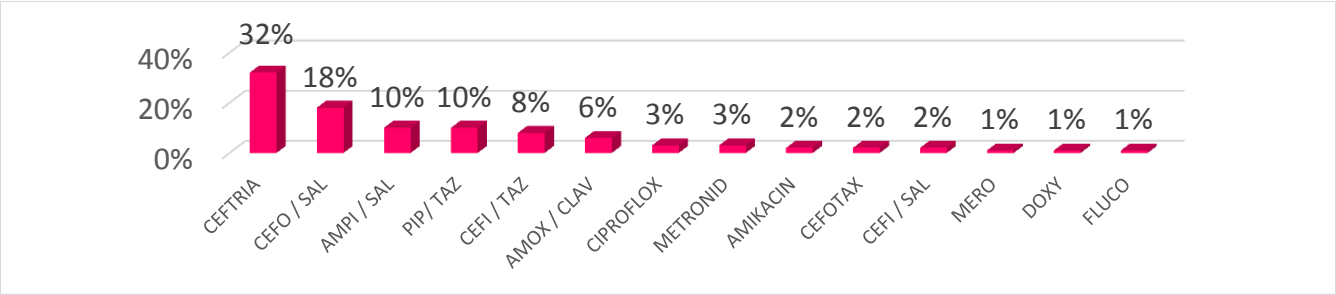

Figure 1.6.1: Prescribtion pattern of mono therapy

Table 1.6.2: Prescription pattern of dual therapy

DUAL THERAPY DRUGS	NO OF PATIENTS	% OF PATIENTS
DOXY+CEF	8	9%
CEFO/SAL+NITRO	6	7%
PIP/TAZ+MOXI	5	6%
AMI /SAL+DOXY	5	6%
CEFO/SAL +LEVO	4	4%
PIP/TAZ+CLIND	4	4%
AMOX/CLAVU+ CLIND	4	4%
CEFI/TAZO+DOXY	4	4%
MERO+MOXI	4	4%
MERO+ LINE	3	3%
PIP/TAZ+AMI	3	3%
LINE+CLINDA	3	3%
CEFO/SAL+CEFI/TAZ	3	3%
CEFTRA+ METRO	3	3%
OTHER RARE DUAL THERAPY	36	36%

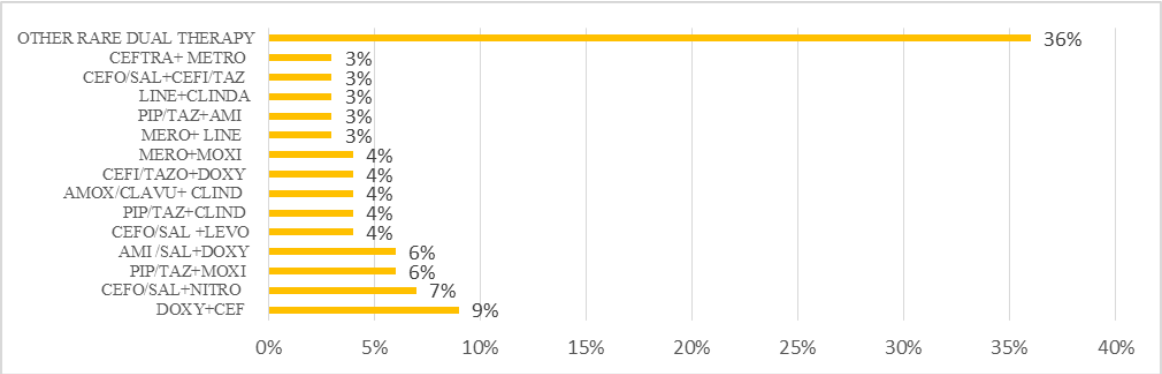

Figure 1.6.2: Prescription pattern of dual therapy

Fullforms: doxy-doxycyyclline,cefo/sal-cefoperazone/salbactum, cef- ceftriaxone,nitro-nitrofurantoin,pip/taz-piperaciilin/tazobactum,moxi-moxifloxacin,ami/sal-ampicillin/salbactum, levo-levoflaxacin., mero-meropenem, line- linezolid, ami-amikacin, clida-clindamycin, cefi/taz-cefipime/tazobactum, metro- metronidazole, rifax-rifaxicin, azee- azithromycin, oflox-oflaxacin.

Table 1.6.3: Prescription pattern of triple therapy

TRIPLE THERAPY DRUGS	NO OF PATIENTS	% OF PATIENTS
PIP/TAZO+TEICO+ FLUCO	4	12%
TEICO+COLI+FLUC0	3	9%
RIFAX+CEFO/SAL+ METRO	2	6%
LEVO+CEFO+ PIP/TAZ	2	6%
PIP/TAZ+CLIND+ DOXY	2	6%
CEFO/SAL+PIP/TAZ+ LEVO	2	6%
CEFTRA+ RIFAX+ DOXY	2	6%
PIP/TAZO+AMI+NITRO	2	6%
CEFTRI+ METRO+ DOXY	2	6%
OTHER RARE THERAPY	13	36%

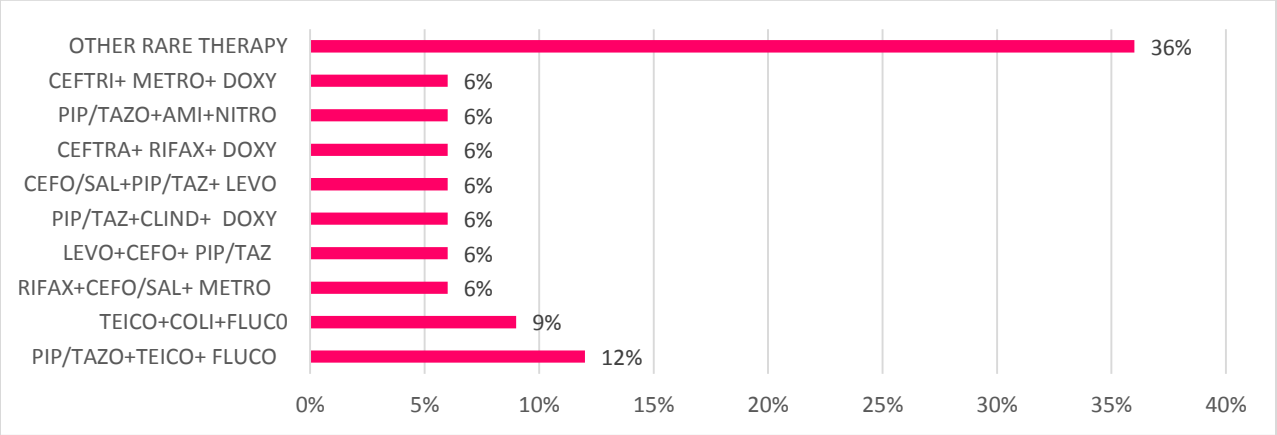

Figure 1.6.3: Prescripion pattern of triple therapy

Fullforms: pip/taz-piperacillin/tazobactum, teico-teicoplanin, fluco-flucanazole, rifax- rifaximin, cefo/sal- cefoperazone/salbactum, metro-metronidazole, levo-levofloxacin, cefo-cefoperazone, clinda- clindamycin, doxy- doxycylline, ami-amikacn, nitro- nitrofurantoin, moxi- moxiflaxacin, genta-gentamycin,ticar- ticarcilllin, poly-polypeptides, oselta-osetalmavir, azee- azithromycin, vori-voriconazole.

Table 1.6.4: Prescription pattern of multiple therapy

MULTIPLE THERAPY	NO OF PATIENTS	% OF PATIENTS
MERO+LINE+TEICO+COLI+FLUCO	3	18%*
FLUCO+LEVO+PIP/TAZO+NITRO	2	12%
CEFO+METRO+FLUCO+ PIP/TAZO	1	6%
TIGI+FLUCO+TOBRA+RIFAX	1	6%
OTHER RARE THERAPY	10	60%

Fullforms

mero-meropenem, line-linezolid, teico-teicopanin, fluco-fluconazole, levo-levoflaxacin, pip/taz-piperaciilin/tazobactum, nitro-nitrofurantoin, cefo-cefoperazone, metro-metronidazole, tigi- tigicyclline, tobra-tobramycin, colis,colistin, teico-teicoplanin, polym-polymyxin, osel-oseltamivir, doxy-doxycyclline, amox/clav- amoxicillin/clavunate, moxi-moxifloxacillin, clinda-clindamycin, etham-ethambutol, pyraz-pyrazinimide.

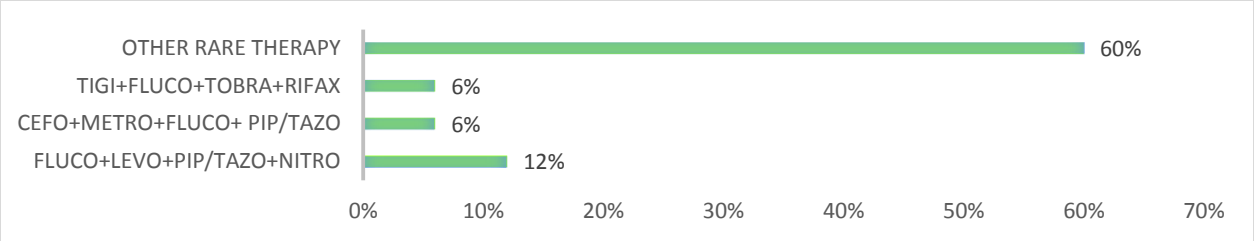

Figure 1.6.4: Prescripion pattern of multiple therapy

Comparision of clinical outcomes in infectious diseases

Out of 300 patients, Mono therapy was 153, in which 142 patients was cured, controlled patients was 10, No improvement patients was 1. Dual therapy was 95, in which 63 patients was cured, controlled patients was 29, no improvement patients was 3, triple therapy was 35, in which 16patients was cured, controlled patients was 16, no improvement patients was 3, multiple therapy was 17,in which 3 patients cured, controlled patients was 6, no improvement patients was 8. In total 300 patients cured patients was 224, controlled patients was 61, No improvement patients was 15. Finally after calculating all this, the chi square statistic is 118.36, hence the p value is <0.00001, hence the results is significant because p value is < .05.

Table 1.7: Comparison of clinical outcomes in infectious diseases

OUTCOMES	MONO THERAPY	DUAL THERAPY	TRIPLE THERAPY	MULTIPLE THERAPY	ROW TOTALS
CURED	142 (114.24) {6.75}	63 (70.93) {0.89}	16 (26.13) {3.93}	3 (12.69) {7.40}	224
CONTROLLED	10 (31.11) {14.32}	29 (19.32) {4.85}	16 (7.12) {11.09}	6 (3.46) {1.87}	61
NO IMPROVEMENT	1 (7.65) {5.78}	3 (4.75) {0.64}	3 (1.75) {0.89}	8 (0.85) {60.14}	15
COLUMN TOTALS	153	95	35	17	300 (GRADE TOTAL)

(***)- expected values, {***}- chi square values

Results: The chi-square statistic is 118.36. The *p*-value is < 0.00001. The result is significant at $p < .05$.

Submission of chi square values

Out comes	Mono therapy	Dual therapy	Triple therapy	Multiple therapy	Total
Cured	6.75	0.89	3.93	7.40	18.97
Controlled	14.32	4.85	11.09	1.87	33.96
No improvement	5.78	0.64	0.89	60.14	65.43
Chi square statistic total					**118.36**

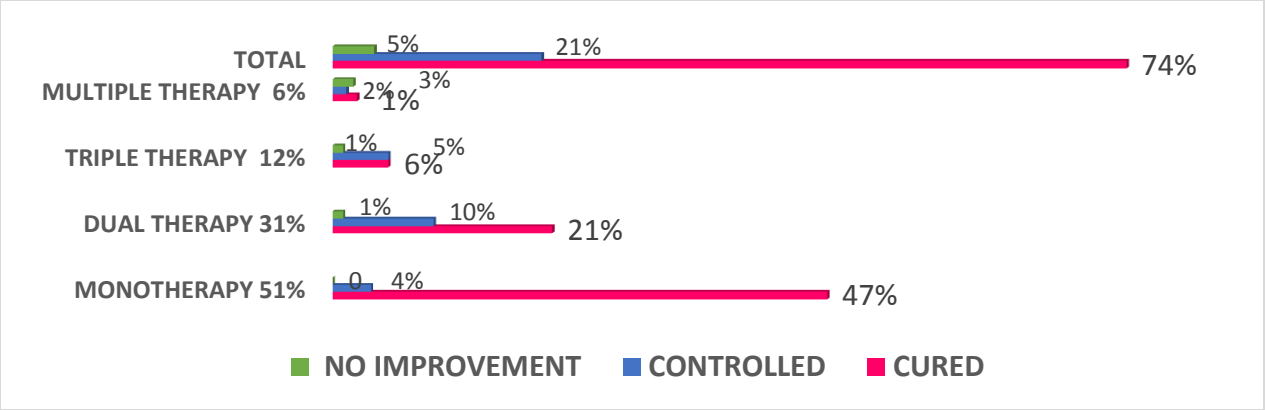

Figure 1.7: comparison of clinical outcomes in infectious diseases

Monitoring of adverse drug events

OUT OF 300 PATIENTS INCLUDED FOR THE STUDY, 24 REPORTED ADVERSE DRUG REACTIONS. OUT of which 7 (29%) patients had nausea, 5 (20%) patients had Diarrhea, 5(20%) had irritation at the site of inj, 4(16%) had vomiting, 3(12%) had rashes. {results summarized in table 1.8, 1.8.1 and figure 1.8}

Table 1.8: Monitoring of adverse drug events

S.NO	TYPES OF ADR	NO OF ADR REPORTED	% OF ADRREPORTED
1.	NAUSEA	7	29%
2.	DIARRHEA	5	20%
3.	IRRITATION AT THE SITE OF INJ	5	20%
4.	VOMITTING	4	16%
5.	RASHES	3	12%

Table 1.8.1 monitoring of adverse drug events

S.NO	DRUG	TYPE OF ADR	NO.OF ADR
1	CEFOPERAZONE/ SALBACTUM	NAUSEA	**4**
2	AZITHROMYCIN	NAUSEA	**3**
3	AMOXICILLIN/CLAVUNATE	DIARRHEA	**5**
4	CETRIAXONE	RASHES	**3**
5	AMPICILLIN/ SALBACTUM	IRRITATION AT SITE OF INJ	**3**
6	DOXYCYCLIN	IRRITATION AT SITE OF INJ	**2**
7	METRONIDAZOLE	VOMITTING	**4**

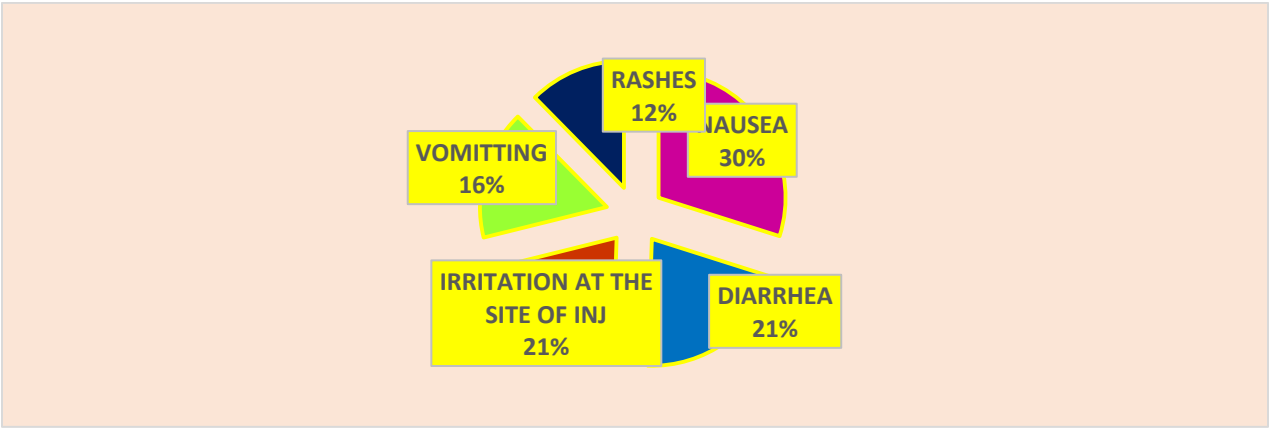

Figure 1.8: Monitoring of adverse drug events

Monitoring de-esclation (stewardship programme) of antimicrobial agents

In the study conducted on 300 prescriptions, a total of 64 cases were de-escalated, in which: 37i.e (12%) in LRTI, 15i.e (5%) in UTI, 5i.e(2%) in cellulitis, 3i.e(1%) in AFI, 1i.e(0.3%) in Hepatitis, 3i.e(1%) in AG were observed to be de-escalating { results summarized in table 1.9 and figure 1.9}

Table 1.9: monitoring de-esclation of antimicrobial agents

S.NO	DISEASES	DE-ESCALATED	% OF TOTAL PTS
1	LRTI	37	12%
2	UTI	15	5%
3	CELLULITIS	5	2%
4	ACUTE FEBRIL ILNESS	3	1%
5	HEPATITIS	1	0.3%
6	ACUTE GASTRITIS	3	1%
	TOTAL	64	22%

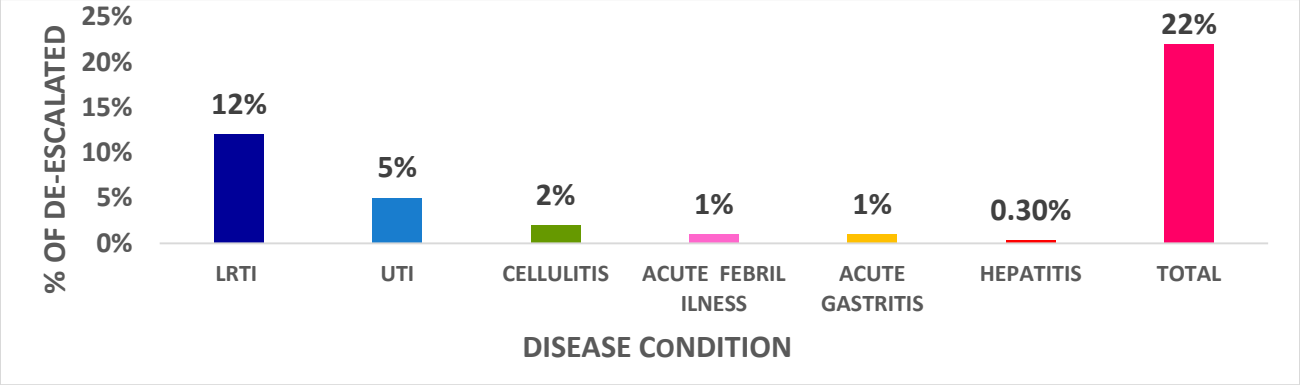

Figure 1.9: Monitoring De-Esclation of Antimicrobial Agents

Assessment of rationality of antimicrobial agents in infection

Rationality was assessed by using NCDC 2016 guildlines out of 300 patients, 234 (78%) patients were prescribed antimicrobial agents rationally and remaining 66 (22%) patients were prescribed antimicrobial agents irrationally {results summarized in table 1.10 figure 1.10}

Table 1.10: Assessment of rationality of antimicrobial agents in infectious patients

EVALVATION	NO.OF PATIENTS	% OF PATIENTS
RATIONAL	234	78%
IRRATIONAL	66	22%
TOTAL	300	100%

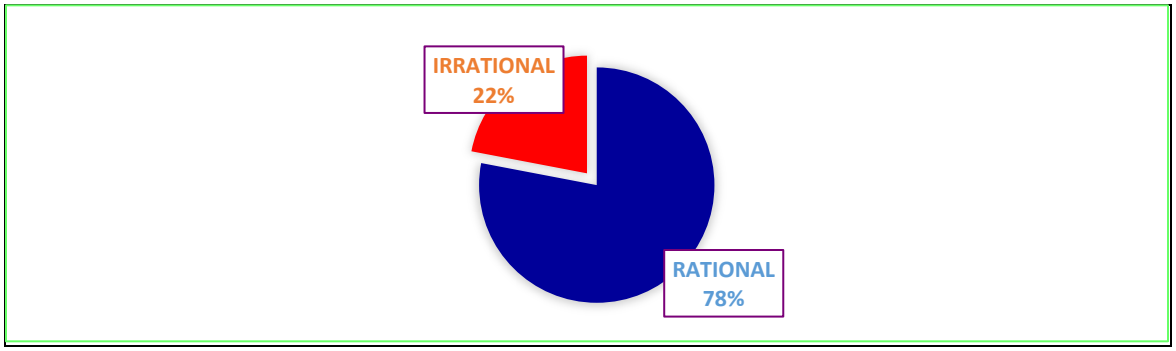

Figure 1.10: Assessment of rationality of antimicrobial agents in infectious patients

DISCUSSION

Antibiotics are considered as the second most prescribed drugs in the world. Most infections are serious in nature and require longer and complex treatment procedures. The treatment modalities for such infections always include antibiotics. Antibiotics are the most commonly used and misused drugs by patients and prescribers.

Total 300 patients were included in the study in the period of 6 months. In our study , It showed that female preponderance with **154 (51%)** Female patients, mostly to the age group of 40-49 yrs and **146 (49%)** Male patients mostly in the age group of 60-69yrs as opposed to the study conducted by ambili et al which showed preponderance of male patients.

In our study, Most frequent clinical conditions were LRTI 118 (40%), followed by Urosepsis 70 (23%), Acute febril illness 36 (12%), Dengue 30 (10%), Cellulitus 21 (7%), Hepatitis 13 (4%), Acute Gastritis 12 (4%), similar to the studies done by ravi PS et al , and Banerjee et al which showed that most frequent clinical condition was LRTI (58%) followed by UTI (32%), Intra Abdomen Infection (8%), Cellulitus (2%). In our study, The commonest AMA prescribed was Beta lactams and Betalactam inhibitors 197 (35%), one-third of the total drugs prescribed in 300 patients. where as Cephalosporin 94 (17%), Quinolones 45 (8%), Tetracycline 40 (8%), Carbapenem 30 (5%), Aminoglycosides 24 (4%) were 6 most commonly prescribed drugs in our study, similar to the study done by Abdulrahman al-yamani et al.

In our study, the most common Antimicrobial agents were Ceftriaxone 85, followed by Cefoperazone/Salbactum 67, Piperacillin/Tazobactum 49, Ampiciilin/Salbactum 37, Meropenem 30, this is in acordance with similar study done by vandan AB et al in April 2012 and pandiamunian .j et al. In our study, Out of 54 bacterial culture isolates, 32 cultures were gram negative bacteria and 22 culture were gram positive bacteria. The most frequent gram negative isolate was E.coli 37%, followed by klebsiella 22%, and the most frequent gram positive was enterococcus 20%, followed by streptococcus 20%. In our study most of the patients had infection from gram –ve organism such as E.coli and Klebsiella Pneumoniae. Analogue to the study done by Abdulrahman AY et al.

Al Shimemeri et al, found that the most commonly isolated organisms were gram-positive cocci (60%). This difference could be influenced by the types of infections seen in each study.

The isolates of E.coli were mostly susceptible to Meropenem (100%) Nitrofurantoin (93%), and mostly resistant to ceftriaxone (77%), ceftazidime (77%). The isolates of klebsiella were mostly susceptible to Meropenem (72%) and were mostly resistant to Ceftazidime (70%) and Ceftriaxone (70%), also shown equivalent sensitive and resistance patterns to antibiotics like Amikacin (55%), Gentamycin (55%). The isolates of Enterococcus were mostly susceptible to linezolid (100%), Vancomycin (100%), cotromoxazol (100%), and were mostly resistant to ciprofloxacin(98%), Norfloxacin (98%).The isolates of Streptococcus were mostly susceptible to to linezolid (100%), vancomycin (100%), and they have also shown eqivlent sensitivity and resistivity patients to antibiotics like ciprofloxacin (50%) Similar as bangari AK et al.

In our study of 300 patients, Most prescribed regimen in infectious diseases was **Mono therapy** regime 153 (51%) in which ceftriaxone 49 (32%), cefoperazone / salbactum 27 (18%) was mostly prescribed, followed by **Dual therapy** 95 (31%) in

which Doxycycline+Ceftriaxone 8 (9%), Cefoperazone/salbactum+Nitrofurantoin 6 (7%), Piperacillin/tazobactum+Moxifloxacin 5 (6%), was mostly prescribed. **Triple therapy** 17 (6%) prescriptions in which piperacillin/tazobactum +Teicoplanin + fluconazole 4 (12%), Teicoplanin+Colistin +Fluconazole 3 (9%), Rifaximin+ Cefoperazone/Salbactum+Metronidazole 2 (6%) was mostly prescribed, but **Multiple therapy** was very less 17 (6%) prescriptions in which meropenem+linezolid+colistin+fluconazole 3(18%), fluconazole+levofloxacin+piperacillin/tazobactum+nitrofurantoin 2 (12%) was mostly prescribed. Out of 300 patients in our study, Comparision of clinical outcomes in infectious diseases the Mono therapy regime patients (153), in which 142 patients were Cured, Controlled patients were 10, No Improvement patients were 1. Dual therapy regime patients were (95), in which 63 patients were Cured, Controlled patients were 29, no improvement patients were 3, Triple therapy regime patients were (35), in which 16 patients were Cured, Controlled patients were 16, No improvement patients were 3, Multiple therapy regime patients were (17), in which 3 patients were cured, controlled patients were 6, no improvement patients were 8. In total 300 patients, Comparision of clinical outcomes in infectious diseases, **Cured patients were 224**, **Controlled patients were 61, No improvement patients were 15**, Finally after calculating all this , the chi square statistic is 118.36, hence the p value is <0.00001 ,hence the results is significant because

p value is < .05, similar to instance to Bangari AK et al.

The occurrence of **24 ADRs** out of 300 patients confirms that the prescribed antibiotics are safe and tolerable in our study out of which 7 (29%) patients had nausea, 5 (20%) patients had Diarrhea, 5(20%) had irritation at the site of injection, 4(16%) had vomiting, 3(12%) had rashes. Simiar to the result done by Bangari AK et al.

In our study, Stewardship programme was performed in which, a total of **64 cases** out of 300 cases were de-escalated, in which: 37 (12%) in lower respiratory track infection, 15 (5%) in Urinary track infection, 5 (2%) in Cellulitis, 3 (1%) in Acute fibril illness, 1 (0.3%) in Hepatitis, 3 (1%) in Acute gastritis were observed to be de-escalating, similar to the study conducted by Malacarne P et al., reported that antibiotic therapy was de-escalated in 24% of patients of ICU 0 and by Nishah shah et al.

In our study, out of 300 patients, 78% were rational and 22% were Irrational, similar to the study done by Bangari AK et

CONCLUSIONS

Our study reveals that antibiotics continue to be widely prescribed in critically ill patients and form a significant proportion of the total drugs consumed in the hospital. In conclusions, our results shows that the choices of antibiotics seasonality comply with the NCDC guidelines, on the management of infectious patients. The benefit of mono therapy, dual therapy is more effective than any therapy in the study population demonstrated. The present study was restricted to 6 months, so the exact outcomes can't be expressed. Of the 300 patients analyzed over a period of six months, it was observed that, in the antibiotics prescribed by the hospital physicians, 78% of antibiotics were observed to be rational. It would rational and outcomes would be more prominent. An antibiotic use policy should be framed. Formation of a multidisciplinary team to oversee drug use and periodically review microbial sensitivity patterns will be helpful. Longitudinal surveillance of drug use should be carried out.

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