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Antibiotic Use Pattern Among Patients Attending Opd:A Teaching Hospital experience

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Abstract:*Antibiotics are used in plenty either with or without prescription.There is a growing concern that vast majority of patientsuses antibiotic without proper rationale.Consequencesof such practices are serious and resistance to many antibiotics already showing increasing trend.It is a Global problem and WHO has developed an action plan suggesting urgent action by member states.Indiais the largest consumer of antibiotic and reported to encounter increasing resistance to many antibiotics of public health importance.There is an urgent need to tackle the problem. Antimicrobial stewardship program (AMSP) being one of the effective measure in combating antibiotic resistance. AMSP is still rudimentary in our country. This study is an attempt to understand the pattern and the magnitude of the problem of antibiotic misuse in the setting of a teaching institute. It is found that antibiotic use is rampant. Culture of specific clinical specimens needs to be advised frequently before initiating antibiotics and ensurechangetoappropriate antibiotic in line with the culture sensitivity report. There is an urgent need for a strict vigilance of initiation of broad spectrum antibiotics by rationalizing use of antibiotic by one and all. High end antibiotics use should also be monitored.Educating the general public and sensitizing the health care providers about good antibiotic practice is highly suggested.*

Key words:*antibiotic, antibiotic resistance, culture sensitivity, antibiotic stewardship program*

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I. Introduction

Antibiotic consumption has increased by 35% from 2000-2010[1]. Antibiotic misuse is also rampant and consequential resistance has become a major public health challenge. CDC estimates up to 50% of all antibiotics prescribed are either not needed or are inappropriate. Both health care personals and general public indulge in such approach in some way or the other. Antibiotic resistance is one of the dreaded outcomes of improper use of antimicrobials. Because the excessive use of broad spectrum antibiotics underlies many resistance problems, Antibiotic stewardship has been promulgated actively. The main tenants are to restrict use of antibiotic for restricted indications to limit selective resistance pressure on the nosocomial flora and when broad spectrum antibiotics has begun empirically in critically ill patients, to de-escalate treatment as soon as possible on the basis of the results of culture and sensitivity tests[2]Moreimportantly, there is increasing level of drug resistance in pathogens of public health importance. There is an urgent need to rationalized the use of antibiotic as this issue has far reaching implications and consequences. Sensing the magnitude and effects of the problem, globally there is a surge of interest in preventing antibiotic misuse and ultimately avoid resistance. WHO developed a global action plan to mandate member countries to produce national strategies for antimicrobial resistance through surveillance reporting, antibiotic stewardship and preventing infection. Best hope is development of greater understanding of how antimicrobial resistance spreads, intelligent use and development of bacterial vaccines, antibiotic stewardship, and implementation of effective infection control measures[3].AMSP have shown 22-36% reduction in antimicrobial use and significant cost saving[4].Indiais considered to be the largest consumer of antibiotic with a recent trend of alarming increase in percentage of resistance to last resort antibiotics[5]. There is a need for properandobjective assessment of the problem to ascertain the magnitude of the problem in our setting.This will help us to understand the problem and take corrective measures in time. Paucity of new drugs and increasing bacterial resistance reinforce the need to use all antimicrobials judiciously[6]. The effort in this direction will help avoid adverse effects, emergence of resistance and reduce cost of health care. This study is attempted to understand and substantiate the pattern of use of antibiotics by patients attending a teachinghospital.

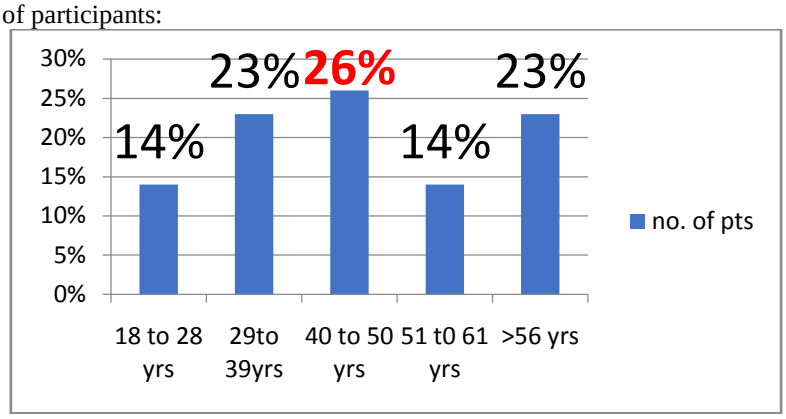
Aims and objectives:
1.To study the pattern of antibiotic use bypatientsattendingOPD of a teaching hospital
2.To study the culturesensitivitypattern of commonly usedantibiotics

II. Material and methods

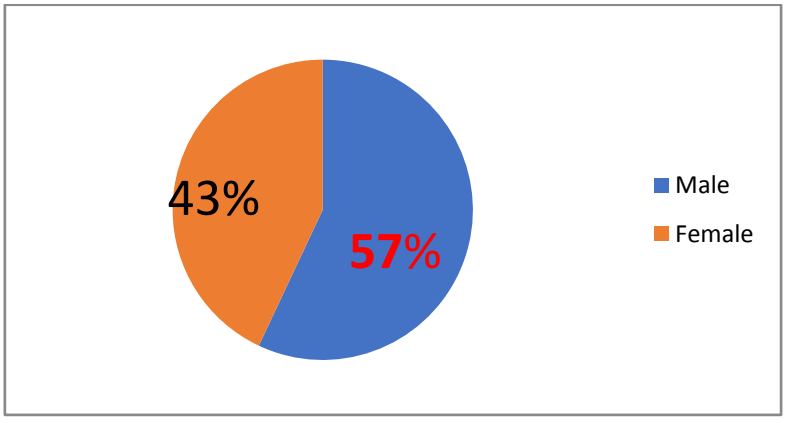
It is a hospital based,cross-sectional observational study.100 consecutive Patients;attending Medicine or Hematology OPD; who are already on antibiotic at the time of attendingOPD, being initiatedwithantibioticsat Medicine OPD of Regional Institute of Medical Sciences, Imphal, a teaching hospital in Manipur are enrolled for the study.Informed consent is taken from the prospective participants after due explanation about the study.The study involves only collection of data as done in routine patient care service as such,there is no risk likely to becaused to any subject in the study.There is no provision for financial incentive for being a participant.Pre-designed and tested proforma including participants particulars,chiefcomplaints,history of illness, and personal history, information on the advice by attending doctor for culture of appropriate clinical samples and report on sensitivity of the growth to antibiotics.Inclusion criteria-More than 18 years, initiated/changed antibiotic in Medicine OPD, and duly consented.Exclusion criteria-pregnancy, unwilling to consent, very sick and unable to give consent and complete the questionnaire. Patient interview and Data collection is done by PGTs duly trained for the purpose.This is done in the OPD ensuring proper privacy under the supervision of the principal investigator.Data is entered in the master chart and analyzed by SPSS with appropriate statistical methods.

III. Results

1. Age distribution of participants:



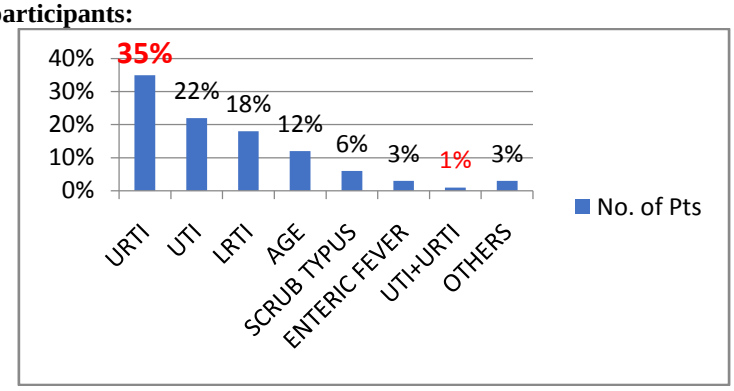
2. **Gender distribution:**



3.**Chief complaints of participants:**

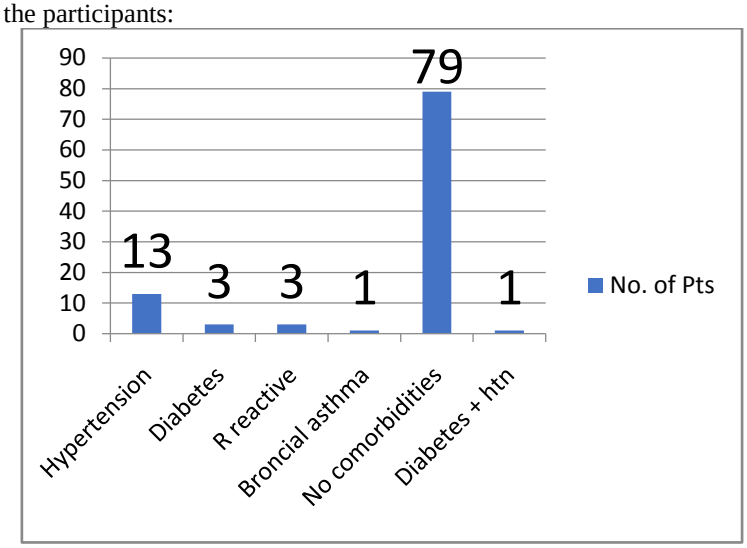
Symptom(s)	No.
1. Cough only	9
2. Fever only	**15**
3.Burning micturition only	8
4. Cough+ fever+ burning micturation	2
5. Fever + burning micturation	13
6. Loose stool	12
7. Cough with sore throat	4
8. cough with fever	**37**

4. **Diagnosis of the participants:**

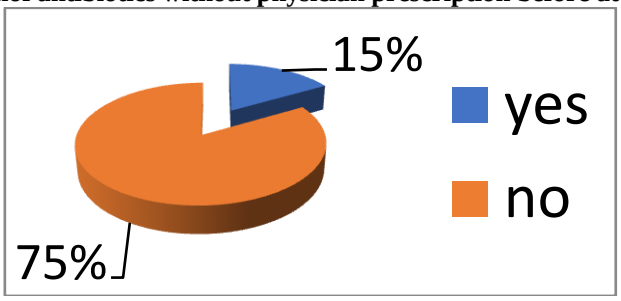


- Most common diagnosiswas Upper respiratory tract infection (35%) followed by urinary tract infection(22%) and lower respiratory infection(18%)
-

5. Co-morbidities of the participants:



6. **History of self-initiationof antibiotics without physician prescription before attending OPD:**

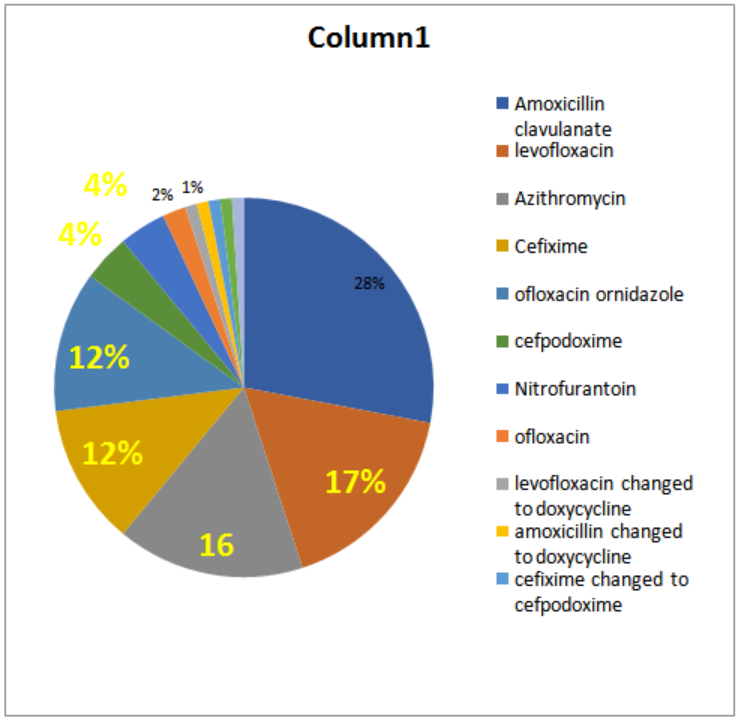


7. **Drug allergy history**

100 % of the study subjects did not reveal any underlying drug allergy history to the attending doctors.

History of drug allergy asked by physicians before prescribing antibiotics	**yes**	**No**
	0%	100%

8. Antibiotics self-medicated or prescribed at OPD (initiated/changed) for the participants:

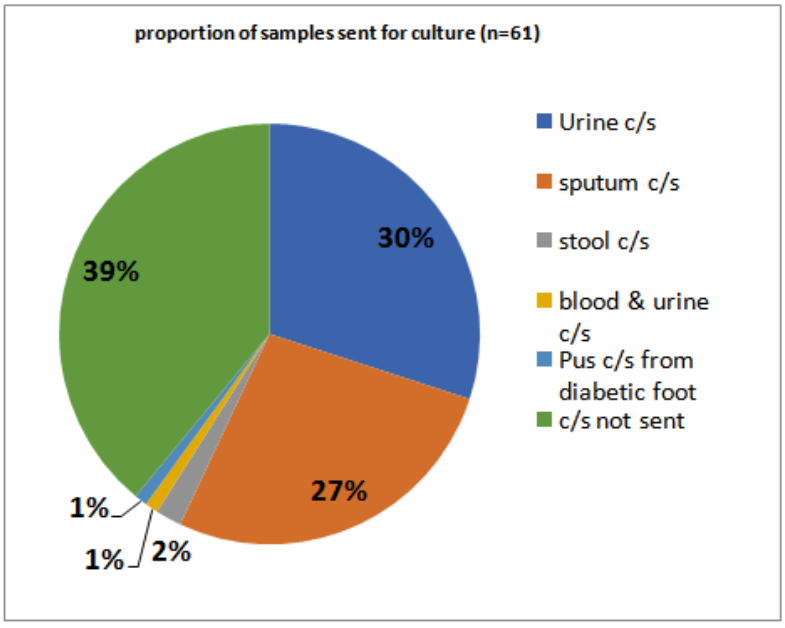


9**. Antibiotics duration:**

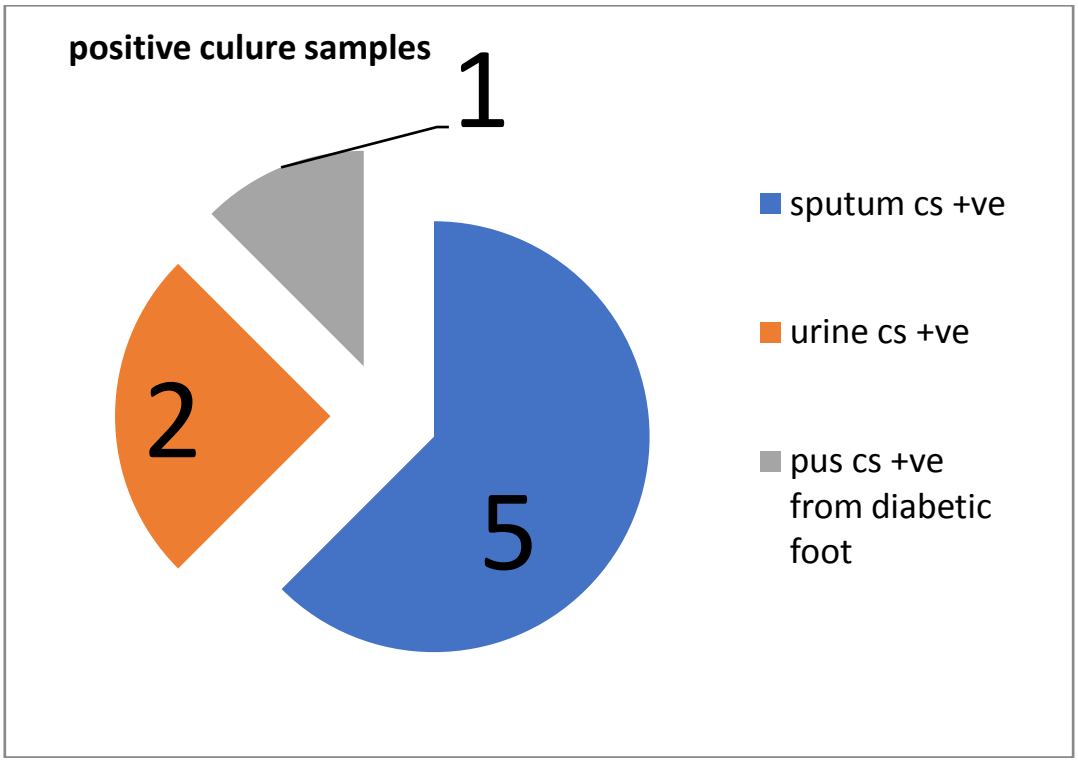
No. of days of Antibiotic prescribed	No of patient
10 days	3
7 days	27
5 days	62
3 days	7
Not prescribed specific duration	1

10. **Follow up and outcome:**Out of 100 patients, only 34 pts came for follow up.Out of which, 33 patients'conditions improved, only one patient did not improve

10. **Culture samples sent:**



61 patients were advised for culture.Out of 61 patients for whom culture sampleswere sent21 samples found to be sterile/culture negative.32 pts didn't come for follow-up hence their culture status not known.8 samples (8 patients) were found to be culture positive. Out of 8 culture positive cases 4 pts. had growth of Staphylococcus Aureus.1 culture sample each was positive for E.coli,proteus mirabilis, Klebsiella and AcinetobacterBaumani.



11. Antibiotics sensitivity report of the subjects.

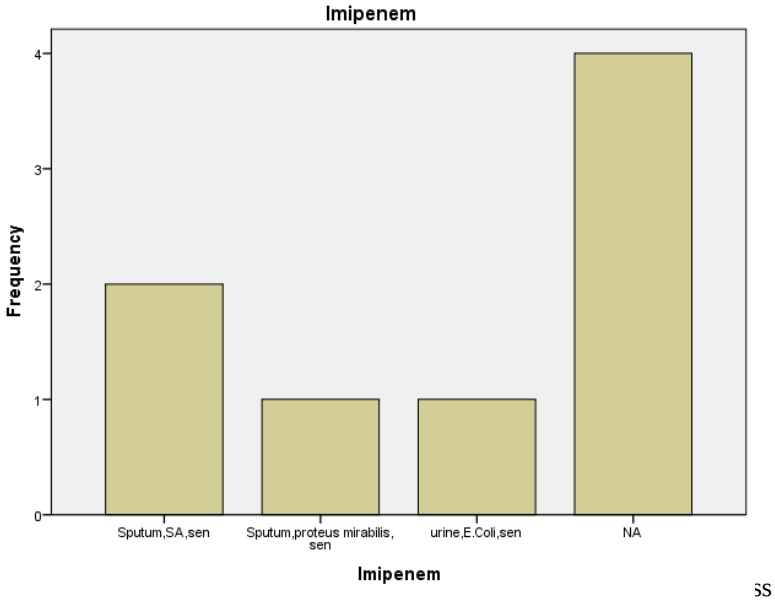
Antibiotics	S.A sensitive (no.of case)	S.A Resistant (no.of case)	K Sensitive (no.of case)	K Resist tant (no.of case)	E.coli Sensitive (no.of case)	E.coli Resistant (no.of case)	P.M Sensitive (no.of case)	P.M resistant (no.of case)	A.Bsensitve (no.of case)	A.B resistant (no.of case)
Amoxicillin clavulanate	1	1	1	0	0	0	0	1	0	0
levofloxacin	1	1	0	1	0	1	0	0	0	0
cefixime	1	0	0	1	0	0	0	0	0	0
Azithromycin	2	1	0	0	0	0	0	0	0	0
Nitrofurantoin	0	0	0	0	1	0	0	1	O	O
ceftriaxone	1	1	0	1	0	1	1	0	0	1
amikacin	1		0	1	0	0	1	0	1	0
ciprofloxacin	2	1	1	0	0	0	1	0	1	0
gentamycin	2	0	0	1	0	0	1	0	1	0
imipenem	2	0	0	1	0	0	1	0	1	0
meropenem	0	0	1	0	0	0	1	0	1	0
Piperacillin tazobactam	0	0	1	0	0	0	1	0	1	0
colistin	0	0	1	0	0	0	0	1	0	0
tigecycline	1	0	0	0	0	0	0	1	1	0
vancomycin	2	2	0	0	0	0	0	0	0	0
linezolid	2	0	0	0	0	0	0	0	0	0
ofloxacin	1	1	0	0	0	0	0	0	0	0

*S.A=staphylococcus Aureus ,K.P=Klebsiella pneumonae, P.M=proteus mirabilis, A.B=Acinetobacterboumani

12. HIGH END ANTIBIOTIC AND SENSITIVITY IN DIFFERENT CULTURE SAMPLE(s)

A. IMIPENEM

Culture sample	Frequency (out of 8 +vecultures)	Organism W grown	Sensitivity Status
Sputum	2	SA	sensitive
Sputum	1	Proteus mirabilis	sensitive
urine	1	E.Coli,	sensitive
NA(imipenem disc not provided)	4		



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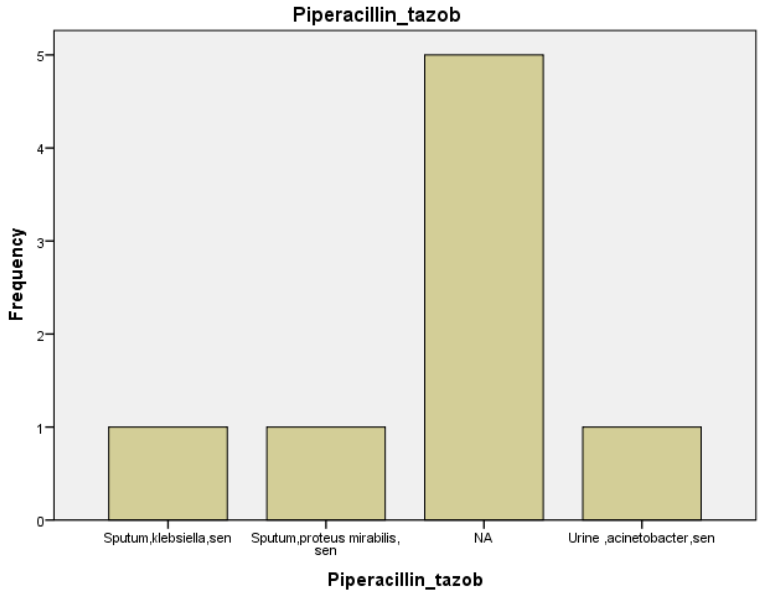
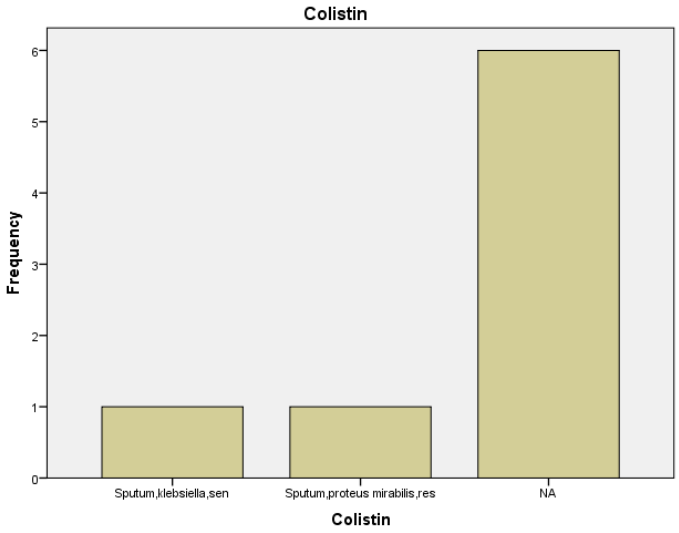
B. PIPERACILLIN TAZOBACTUM (P.T)

Culture sample	Frequency (out of 8 +vecultures)	Organism grown	Sensitivity status
Sputum	1	klebsiella	sensitive
Sputum	1	,proteus mirabilis	sensitive
Urine	1	acinetobacter	sensitive
NA (P.T disc not provided)	5		



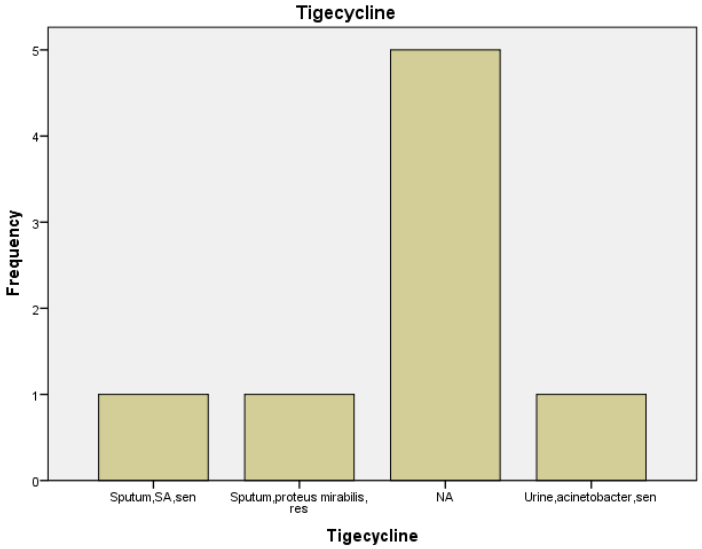
C. COLISTIN

Culture sample	Frequency(out of 8 +vecultures)	Organism Grown	Sensitivity Status
Sputum	1	klebsiella	sensitive
Sputum	1	proteus mirabilis	Resistant
NA(colistin disc not provided)	6		



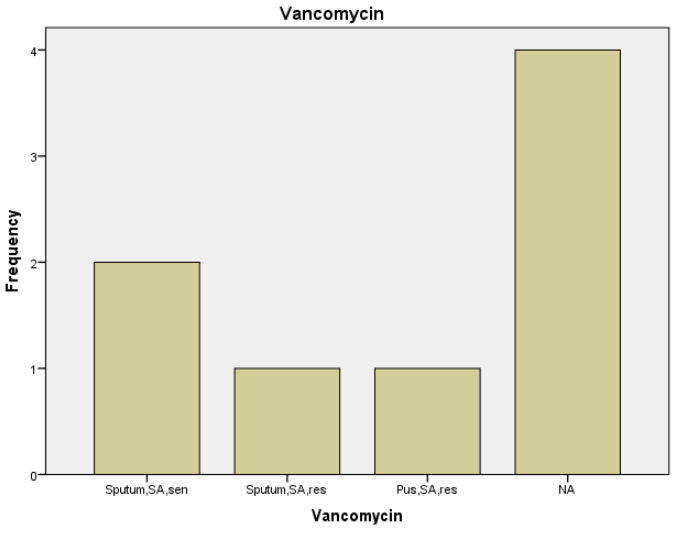
D. TIGECYCLINE (T)

Culture sample	Frequency(out of 8 +vecultures)	Organism Grown	Sensitivity Status
Sputum	1	SA	sensitive
Sputum	1	proteus mirabilis	resistant
Urine	1	acinetobacter	sensitive
NA(T disc not provided)	5		



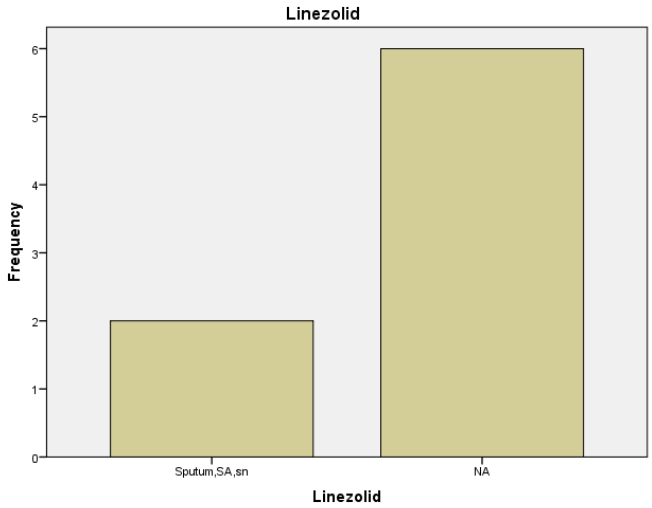
E.VANCOMYCIN (V)

Culture sample	Frequency(out of 8 +vecultures)	Organism Grown	Sensitivity status
Sputum	2	SA	sensitive
Sputum	1	SA	resistant
Pus,	1	SA	resistant
NA (V disc not provided)	4		



F. LINEZOLID(L)

Culture sample	Frequency (out of 8 +vecultures)	Organism Grown	Sensitivity Status
Sputum	2	SA	sensitive
NA(L disc not provided)	6		



Staph.aureus was found to be sensitive to linezolid in both sputum samples and no resistance was detected.

IV. Discussion

Antibioticsare routinely used in our day today life.In fact, the major way that modern medicine saves lives are through antibiotic treatment[7].There is an alarming trend developing,that,it is being used both with medical prescription and even without medical advice. This practice has serious consequences, to the extent that, there may be no effective antibiotic left for the human use in the future due to emerging antibiotic resistance. Antibiotic resistance to bacterial pathogens is a challenge that is associated with high morbidity and mortality[8]. The problem is global and recognized by the WHO as a major health challenge. The world body has called upon the member countries to take up urgent measures to combat the rising menace. Antibiotic stewardship program (AMSP), educating people about drug resistance and effects,and overall rational use of antibiotic are efforts to engage with the problem. In the present study all age groups are equally represented meaning that all young and old do use antibiotics. Female subjects with 57% and male with 43% of the subjects indicates equal use of antibiotics irrespective of gender. Cough with fever being the commonest presentation which could be possibly of a viral etiologydosuggest that antibiotics are often used where it is not absolutelyindicated.This is correlated by the fact that 35% of the subjects actually came with URTI followed by UTI and LRTI.Common causes of URTI being virus, antibiotic use randomly in all cases of URTI may be unwarranted.Scrub typhus is reported from this part of the world sporadically.Clinical features may be critical at times and thus timely detection and initiation of the specific antibiotic is lifesaving, underscoring the importance of specific diagnosis and specific molecule use. Hypertension was found to be most common comorbidity followed by diabetes .79% patients did not have comorbid condition.21% of the study participants had comorbidities. Hypertension (13%), Diabetes mellitus (3%), Retro-reactive (3%), Bronchial asthma (1%) were the main comorbidities. Thus 79% subjects were without any comorbid condition and hence the consideration for antibiotic use could probably been restricted depending upon the criticality. Manipur is the most prevalent state in India for HIV, the study reveals 3% of the subjects having the retro-reactive status.Restricting antibiotic where not indicated is one of the approach to prevent antibiotic resistance. Self-medication with Antibiotic without medical prescription is common and hazardous .In the study 15% patients took medicine from pharmacist before seeking any authorize medical personal advice. later they attended opd as symptoms were not improving.Efforts should be made to reduce self medication.Alarmingly 100% of the subjects did not communicate either presence or absence of drug allergy history to the attending Doctor. Rampant use of antibiotics which are broad spectrum is one of the important cause of rising antibiotic resistance. In the present study amoxicillin clavulanate was found to be the most common antibiotic prescribed in OPD followed by levofloxacin. Duration of antibiotic prescription has been a critical issue in the prevention of resistance. It depends upon the site of infection and seriousness of the case.In the study 62% patients were given for 5days,27% for 7 days,7 for 3 days, 3 for 10 days, thus it is evident that there is wide variation in the prescription behavior of antibiotic.Once treatment is initiated proper followup is paramount either to continue same antibiotic or switch to another molecule.34% only came for follow up.This could be an Important contributor to the antibiotic resistance.Out of 61 patients for whom culture samples were sent21 samples found to be sterile/culture negative.32 pts didn't come for follow-up hence their culture status not known.8 samples (patients) were found to be culture positive,Out of which 4 pts. had growth of Staphylococcus Aureus and 1 culture sample each was positive for E.coli, proteus mirabilis, Klebsiella and Acinetobacter Baumani.Out of 2 positive urine culture samples ,1 sample was found positive for E.Coli and 1 positive for Acinetobacter. lone pus

culture positive sample from diabetic foot was found positive for S.Aureus.Out of total 8 culture sensitivity positive sample reports, maximum resistance was found to ceftriaxone i.e. in 4 samples followed by amoxicillin, levofloxacin and ampicillin in 3 samples each. Least resistance was found with imipenem, meropenem, piperacillin tazobactam (no resistance) followed by ciprofloxacin n gentamicin (resistance in 1 sample).Thus the commonly used drugs are showing resistance pattern and growing trend that the last line drugs only are sensitive to the infections being encountered in the OPD setting.Staph.Aureus was found to more resistant to antibiotic in pus culture sample (levofloxacin,ceftriaxone,amikacin,ofloxacin,cotrimoxazole) than sputum culture (amoxicillin clavulanate,azithromycin, ciprofloxacin,vancomycin).Staph.Aureus was found more sensitive to linezolid,imipenem,gentamycin (sensitive in 2 sample and no resistant was noted) followed by vancomycin n azithromycin (sensitive in 2 & resistant in 1 sample). Even though Hospital presents only 20% of human usage of antibiotic it is important because it is concentrated and hospitals are fertile ground for drug resistance bacteria[9].CDC recommends that every hospital implement a program to help improve prescribing practices.such programs include ways to monitor prescribing practices and antibiotic resistance infections. It is recommended that physicians who prescribes antibiotic reassess their patients after 48hours after initiation to see whether the dose,duration,type of molecule should be changed[10].Antibiotic misuse is a major factor not only for emergence of multidrug resistance pathogens but is associated with adverse drug reactions, clostridium deficil and rising health care cost [11]. WHO Interagency coordinating group on antimicrobial resistance is formed to ensure effective global action against the threat to health security. The body is co-chaired by the deputy Secretary General UN and Director WHO.The members include relevant international agencies,individual experts across different sectors[12].There is good evidence that public campaignspromote responsible antibiotic use may be associated with reductions in overall antibiotic use[13].Therefore,Strict vigilance is required to ensure that antibiotics activity is preserved to treatinfections optimally and to achieve this there is a need for a massive social awareness effort in educating people about rationale use of antimicrobials, before things goes out of hand.

V. Conclusion

Antibiotic use is rampant.There is an urgent need for rationalizing use of antibiotic by one and all.Educating the general public and sensitizing the health care providers about good antibiotic practice is highly suggested. Our today will determine the future of the following generations.

Acknowledgement:

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