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PRESCRIPTION ANALYSIS FOR RATIONAL USE OF ANTI MICROBIALS

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ABSTRACT

Objective: To conduct the study on prescription analysis for rational use of Anti-microbials. **Methodology:** A Prospective observational study was conducted in a tertiary care hospital between August 2016 to January 2017. In patient department of general medicine, general surgery gynaecology, dermatology. **Results:** 152 patients were included in our study from general medicine, general surgery, gynaecology and dermatology. Statistical analysis was performed to obtain the standard main, standard error and P-Value <0.05 considered as significant and P-Value >0.05 considered as non-significant.

Conclusion: The present study was observational study performed in various departments in a tertiary care hospital. The Irrationality was found in the general medicine followed by general surgery, dermatology and gynaecology. The irrationality was observed based on elevated WBC's, pus discharge and fever. The results were statistically significant.

KEYWORDS: Rationality, Anti-microbials, Inappropriate.

INTRODUCTION

Rationality is taking medications appropriately according to the patient needs for an adequate period of time and at the lowest cost to the patient. The use of antibiotics was introduced in the early 1940 and a short time thereafter, there misuse and abuse potential were recognized. The conference of experts on the rational use of drugs, convened by the world health organization WHO in Nairobi in 1985, define that the rational use of drugs requires the patients receive medication appropriate to their clinical needs in dose that need their own individual requirement for an adequate period of time and of the lowest cost of them and their community. Rational use of drugs is based on RULE OF RIGHT; the right drug given to the right patient at right doses they should also fulfill safety, affordability, need and efficacy. The

definition implies that rational use of drugs, especially rational prescribing should meet certain criteria as follows. Prescription of drugs is based on rational use of drug therapy in an effective and safe treatment. Choosing of drug is based on efficacy, safety, suitability and cost considerations. The drug should choose according to the patient medical condition with minimal or no side effects. Should be counseled with clear information about drugs prescribed and the disease condition. Patient should be monitored regularly to prevent unexpected effect of drugs. Overdose, misuse of the drugs leads to morbidity and mortality, waste of resources leading to increased cost and increased risk of unwanted effects such as adverse drug reactions and the emergence of drug resistance. Anti-microbial is used for improving health and threatens the success of global efforts to combat the major infectious disease, implementation of the WHO global strategy can be considered appropriate risk management to protect current health care initiatives and the availability of the treatment for future generations. WHO has recommended various sources to improve hospital prescribing pattern of antimicrobials. Infection control programme is based on establishment of the current best practice, with the responsibility for effective management anti-microbial resistance in the hospitals and ensures that all hospitals have accessed to such programs. Establish effective hospital therapeutics committees with the responsibility for overseeing antimicrobial use in hospitals. Development and regular update guidelines for antimicrobial treatment and prophylaxis of the disease and hospital microbial formularies. Regular monitoring of the anti-microbial usage, including the quantity and patterns of use, and feedback results of prescribers. Unfortunately, in the real world prescribing patterns do not always conform to these criteria and can be classified as inappropriate or irrational prescribing. Hence the present study was designed to find the status of irrational use of anti-microbial in a tertiary hospital. Relation interplayed between cost, antimicrobial, and surgical factors ultimately determine the prevention and establishment of a wound infection. The most common group of bacteria responsible for SSI are Staphylococcus aureus. The emergence of resistance strains has been increased immobility and mortality associated with infections these strains are beginning to develop resistance to vancomycin in north India found in study of tiwari and they suggested to such study in other parts of India also because the emergence of capital VISA (Vancomycin intermediate staphylococcus aureus) might also be prevalent as antibiotic misuse is equally common there. Vancomycin is currently the most effective antibiotic against MRSA (Methicillin Resistant Staphylococcus aureus). This new resistance has arisen because other species of bacteria like acinobacter commonly express vancomycin resistance. Antimicrobial resistance is one of the major public health problems now a days

especially in developing countries where relatively easy availability and higher consumption of medicines have lead to disproportionality higher incidence of inappropriate use of antibiotics and high levels of resistance compared to developed countries. In India the infectious disease burden is among the highest in the world and recent report showed the inappropriate and irrational use of antimicrobial resistance. Recent studies shown that the importance of rationalizing antibiotic use to limit antibiotic resistance in India. Little is known regarding the epidemiological aspects of antimicrobial resistance in most of south East Asian countries. Although many international agencies like world health organization. European Centre for Disease Control and World Health Assembly resolutions highlighted the antimicrobial resistance as a major public health issue; it will be a big challenge to tackle the problem for the policy makers and health care providers. WHO has proposed regional strategy antimicrobial resistance with the goal to minimize the morbidity and mortality due to antimicrobial resistant infection to preserve the effectiveness of antimicrobial agents in the treatment and prevention of microbial infections In the public health point of view, it is important to look for the existing situational analysis in Indian context, so that appropriate interventions can be initiated at community level to tackle the problem. With this background, the study analyzed the situation of problem burden and various factors with recent developments, challenges and strategies required to tackle the antimicrobial resistance. Antibiotics are drugs which kill or prevent the growth of bacteria. Bacteria and fungi and have been mass produced using chemical synthesis since the mid 20 century there use has prevented countless millions of deaths. There are several different categories of antibiotics, classified according to them pathogens they targets. Some antibiotics such as penicillin g are narrow spectrum, which means that they are only effective against a limited age of bacteria. Broad spectrum antibiotics such as tetracycline are effective against wide range of organisms. Antibiotics are used to treat humans as well as animals. In some countries they are also used to treat bacterial disease in plants and to protect crops. Antifungal are used to kill or prevent further growth of fungi, they kill fungal organism without affecting the host. Antiviral drugs are specifically used for treating viral infections. Specific antiviral are used for specific viruses. They are harmless to the host. They should be distinguished from viricides which actively deactivate virus particles outside the body. Anti-parasitic is indicated for the treatment of infection by parasites, such as nematodes cestodes, trematodes infectious protozoa and amoeba. They must kill the infecting pest without damaging host. Antimicrobial resistance is the resistance of drug which was originally effective for treatment of infections caused by it and threatens the effective prevention and treatment of infections caused by

bacteria, parasite, virus and fungi. Inappropriate use in humans, such as over prescription, prescription for non-microbial illness, failure to complete a course of treatment etc. Routine, non-therapeutic use of antibiotics in intensive livestock farming as a substitute for healthier living conditions. Release of antibiotics into the environment through mismanagement factories, improper disposal of medicine or human and animal excretion, spreading around the world. Drug resistance bacteria are able to travel worldwide. They can be spread via contaminated water used to grow food crops, travel through the air.

Infections caused by superbugs already claim 700,000 lives annually around the world. Every year, 2 million Americans are infected with bacteria that are resistant to antibiotics resulting in 23,000 deaths. In India a growing number of babies carrying resistant bacteria are born each year. Newborns are particularly vulnerable because their immune systems are fragile, leaving little time for doctors to find a drug that works.

MATERIALS AND METHODOLOGY

Study Site: In-patient Department of General medicine, General surgery, Gynaecology, Dermatology, Gandhi Hospital, Secunderabad.

Study Design: A prospective observational study.

Study Period: August 2016 to January 2017.

Study Duration: 6 Months.

Study Approval: This Study was approved by Ethical Committee.

Inclusion Criteria

Prescriptions containing antimicrobials of any category were selected randomly irrespective of ailments, age or sex of the patients or the route of administration of the drug Complete cases with discharge medications.

Exclusion Criteria

Patients who were not Co-operated the study.

Study Procedure

The Study was conducted in a tertiary care hospital on rational use of antimicrobial drug usage pattern in General Medicine, Gynecology, Dermatology, General Surgery departments.

A prospective observational study was conducted, it include following:

A. Ward round participation on regular basis.

B. Above mentioned cases according to inclusion criteria are documented in structure documentation form (Annexure-1).

C. Collected cases were analyzed for rationality in respective departments.

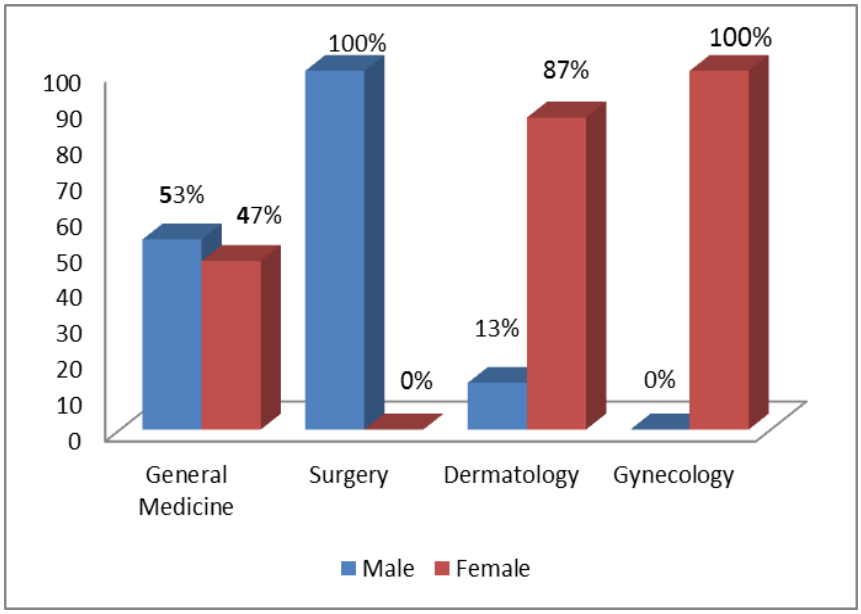
RESULTS

The results presented below are of 152 patients from General Medicine, General Surgery, Gynaecology, Dermatology. Statistical Analysis was performed to obtain the standard mean, standard error, and P-Value <0.05 considered as significant and P-Value >0.05 considered as non-significant.

Table 1: Gender Wise Distribution In Each Department.

S. No.	Gender	General Medicine	Surgery	Dermatology	Gynecology
1	Male	20(53%)	38(100%)	5(13%)	0(0%)
2	Female	18(47%)	0(0%)	33(87%)	38(100%)

The above table indicates 53% males were predominant in General Medicine and 87% females in Dermatology.



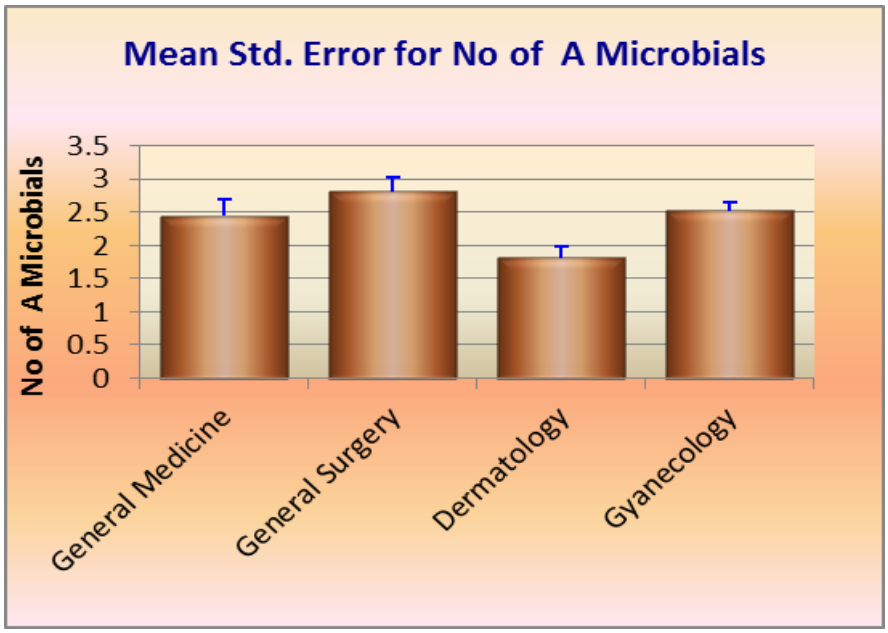
Graph 1: Gender Wise Distribution In Each Department.

Total number of cases was distributed according to their gender. More number of male patients were reported in General Surgery(100%) followed by General Medicine(53%) and Dermatology(13%). More number of females patients were reported in Dermatology(87%) followed by General Medicine(47%).

Table 2: Number of Antimicrobials Prescribed In Each Department.

S. No.	General Medicine	Surgery	Dermatology	Gynecology	Avg Mean
1.	2	3	2	3	2.401
					SM- 0.194
					P-0.00364**

The number of Anti-microbial prescribed in each department are 2,3,2,3 respectively for General Medicine, General Surgery, Dermatology and Gynecology The probability is <0.05% and it indicates significant.

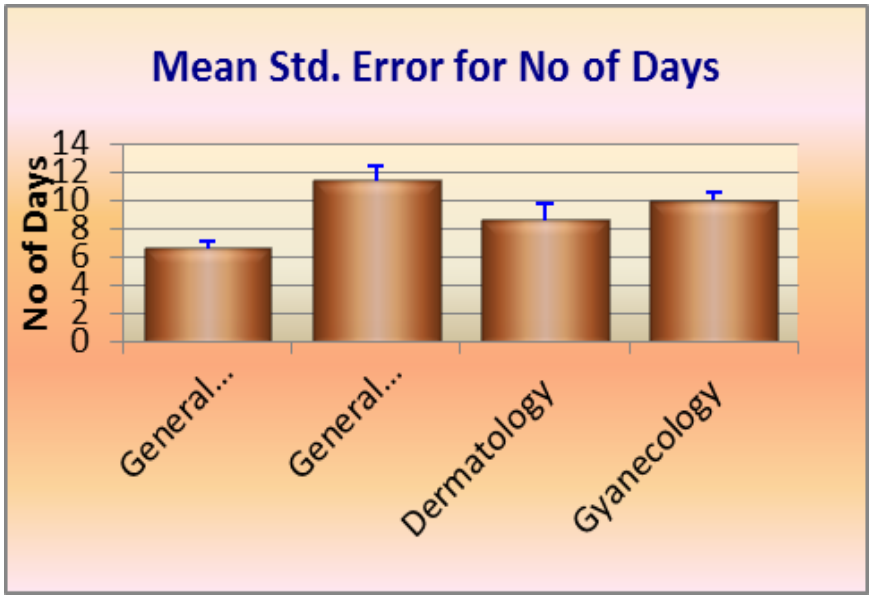


Graph 2: **Number Of Antimicrobials Prescribed In Each Department.**

Table 3: Length of stay of patients in each department.

S. No.	General Medicine	Surgery	Dermatology	Gynecology	Avg Mean
1.	7	11	9	10	9.138
					SM- 0.882
					P-0.00135**

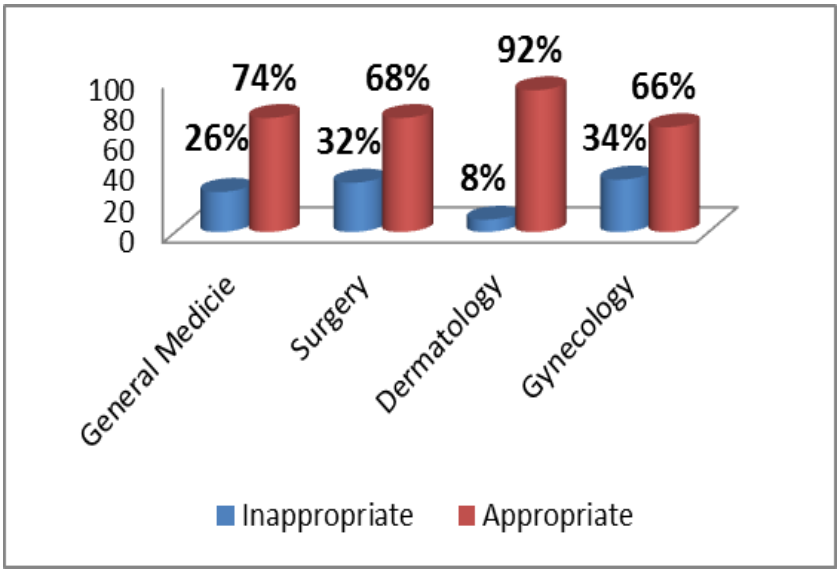
The above table indicates the length of stay in hospital in four different departments. Length of stay 7 (or) more than 7 days is appropriate as per standard guidelines and it was statistically significant (P<0.05%).



Graph 3: Length Of Stay Of Patients In Each Department.

Table 4: Indication wise distribution of drugs in each department.

S. No.	Indication	General Medicine	Surgery	Dermatology	Gynecology	Mean
1	Inappropriate	10(26%)	12(32%)	3(8%)	13(34%)	
2	Appropriate	28(74%)	28(68%)	35(92%)	25(66%)	1.586
Mean		0.742	0.684	0.926	0.661	
						SE-0.050
						P-0.000***

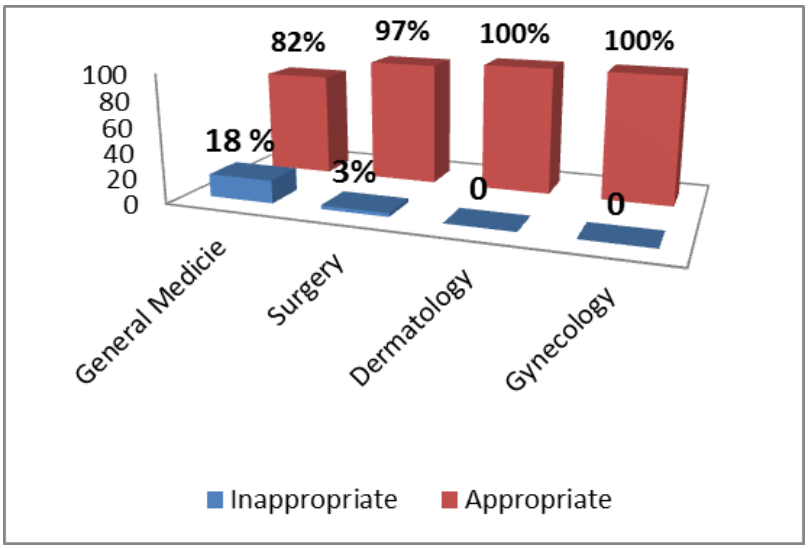


Graph 4: Indication Wise Distribution Of Drugs In Each Department.

The above table shows 34% indications of drugs in Gynecology are inappropriate followed by General Surgery 32%, General Medicine 26% and Dermatology 8%. The probability is< 0.05% and it indicates significant. It was statistically significant (P<0.05%).

Table 5: Dose Wise Distribution Of Drugs In Eah Department.

S. No.	Dose	General Medicine	Surgery	Dermatology	Gynecology	Mean
1	Inappropriate	7(18%)	1(3%)	0(0%)	0(0%)	
2	Appropriate	31(82%)	37(97%)	38(100%)	38(100%)	0.947
Mean		0.816	0.974	1.000	1.000	
						SE-0.034
						P-0.00032***

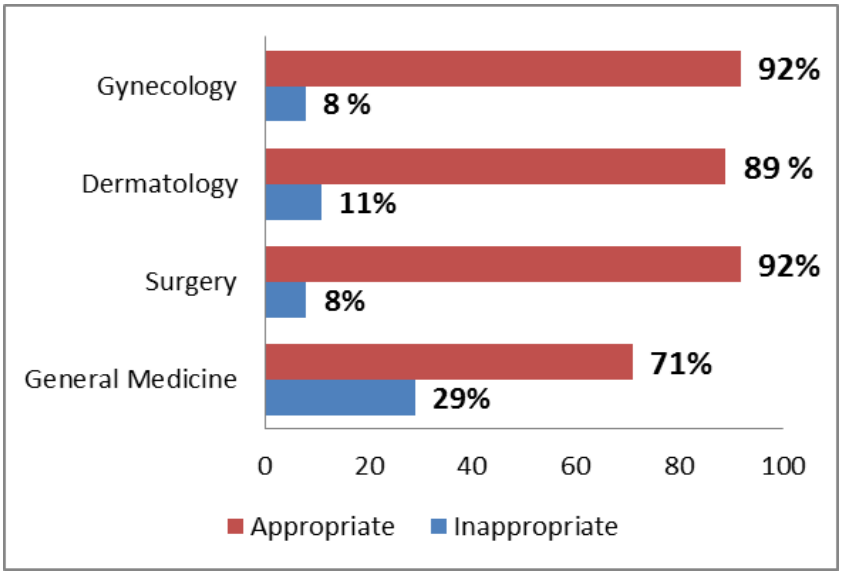


Graph 5: Dose Wise Distribution Of Drugs In Each Department.

More number of inappropriate dose administrations was observed in General Medicine (18%) followed by General Surgery (3%). Appropriate dose administrations was observed in Gynaecology (100%), Dermatology (100%) followed by General Surgery (97%) and General Medicine(82%).

Table 6: Duration Wise Distribution Of Drugs In Each Department.

S. No.	Duration	General Medicine	Surgery	Dermatology	Gynecology	Mean
1	Inappropriate	11(29%)	3(8%)	4(11%)	3(8%)	
2	Appropriate	27(71%)	35(92%)	34(89%)	35(92%)	0.864
Mean		0.711	0.921	0.895	0.921	
						SE-0.055
						P-0.01864*

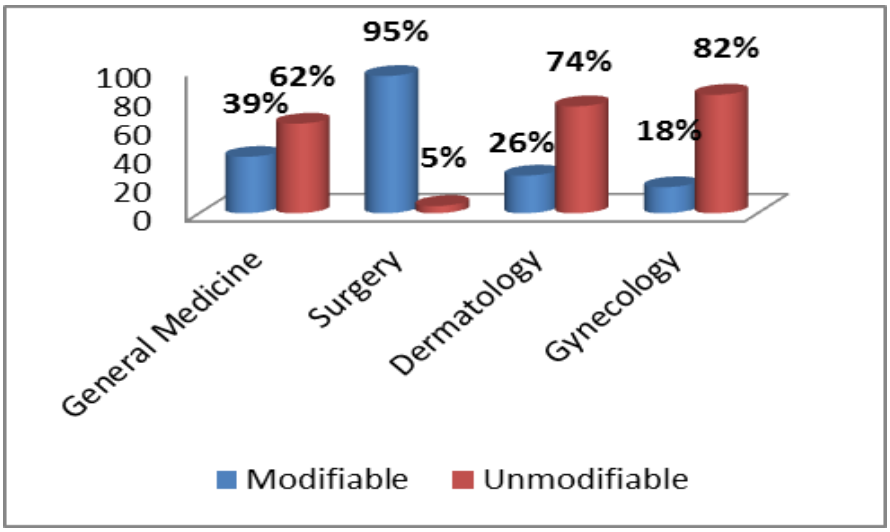


Graph 6: Duration wise distribution of drugs in each department.

The above table indicates 29% duration of drugs in General Medicine are inappropriate followed by Dermatology 11%. Gynecology & General Surgery 8%. The probability is <0.05% and it indicates significant.

Table 7: Distribution based on pharmaco economic cosiderations in each department.

S. No.	PE	General Medicine	Surgery	Dermatology	Gynecology	Mean
1	Modifiable	15(39%)	36(95%)	10(26%)	7(18%)	
2	Unmodifiable	23(62%)	3(5%)	28(74%)	31(82%)	0.553
Mean		0.605	0.053	0.737	0.816	
						SE-0.65
						P-0.0000***

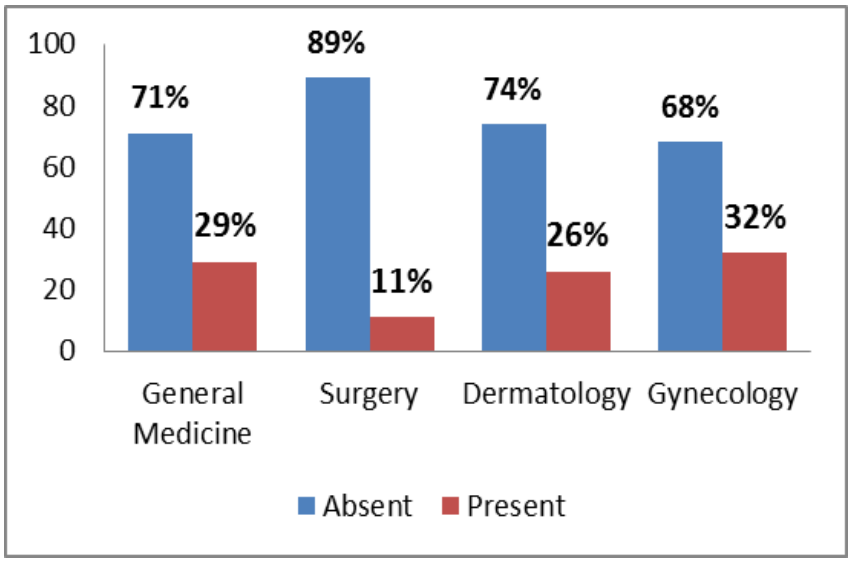


Graph 7: Distribution based on pharmaco economic considerations in each department.

The above table indicates 95% cases can be modifiable based on Pharmacoeconomic considerations in General Surgery followed by General Medicine 39%, Dermatology 26% and Gynecology 18%. The probability is< 0.05% and it indicates extremely significant.

Table 8: Identification Of Presence Of Fever In Each Department.

S. No.	Fever	General Medicine	Surgery	Dermatology	Gynecology	Mean
1	Absent	27(71%)	34(89%)	28(74%)	26(68%)	
2	Present	11(29%)	4(11%)	10(26%)	12(32%)	0.243
Mean		0.289	0.105	0.263	0.316	
						SE-0.69
						P-0.13802

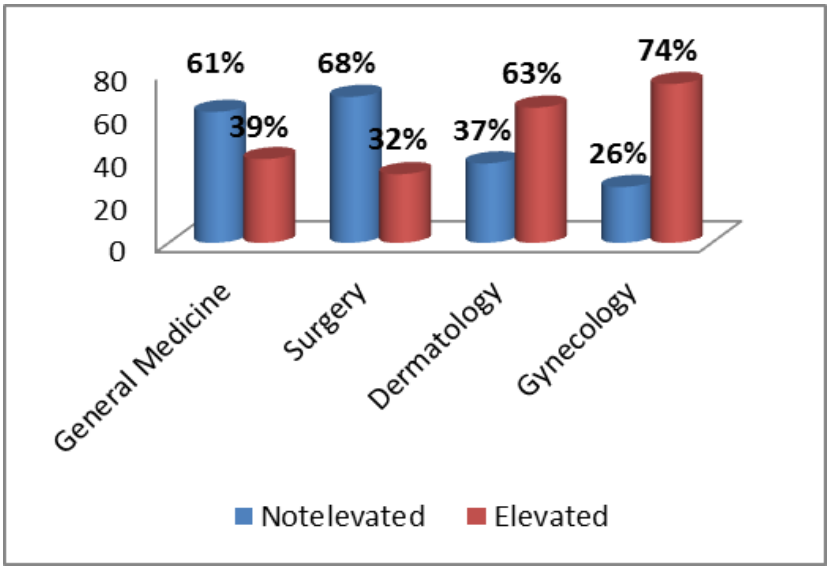


Graph 8: Identification of presence of fever in each department.

The above table indicates 32% of Gynecology cases are associated with fever followed by General Medicine 29%, Dermatology 26% and General Surgery 11%. The probability is >0.05% and indicates it's not significant.

Table 9: Identification of presence of wbc cells in each department.

S. No.	WBC	General Medicine	Surgery	Dermatology	Gynecology	Mean
1	Not Elevated	23(61%)	26(68%)	14(37%)	28(26%)	
2	Elevated	15(39%)	12(32%)	24(63%)	10(74%)	0.401
Mean		0.395	0.316	0.632	0.732	
						SE-0.077
						P-0.00505**

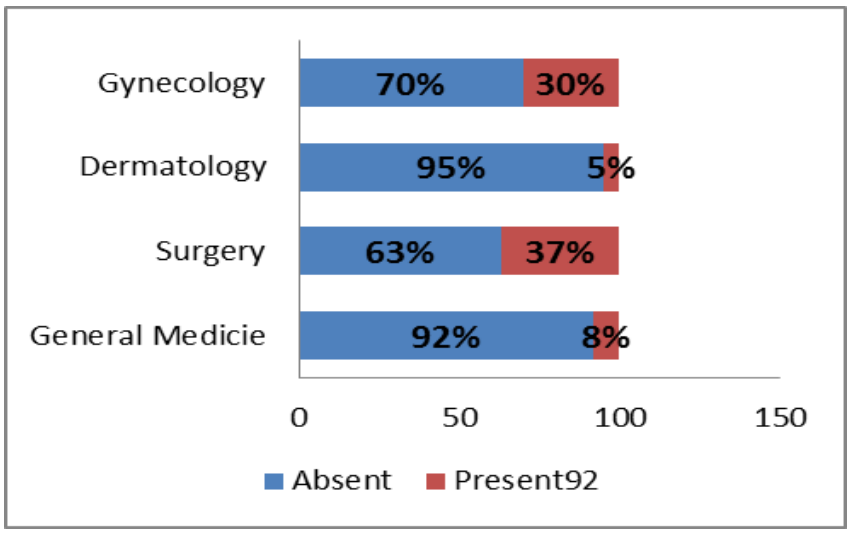


Graph 9: Identification Of Presence Of Wbc Cells In Each Department.

The above table shows 74% Gynecology cases have elevated WBC followed by Dermatology 63%, General Medicine 39% and General Surgery 32% The probability is <0.05% and indicates its significant.

Table 10: Identification of Presence of Pus Cells In Each Department.

S. No.	PUS Cells	General Medicine	Surgery	Dermatology	Gynecology	Mean
1	Absent	35(92%)	24(63%)	36(95%)	27(70%)	
2	Present	3(8%)	14(37%)	2(5%)	11(30%)	0.197
Mean		0.079	0.368	0.053	0.289	
						SE-0.062
						P-0.00042***

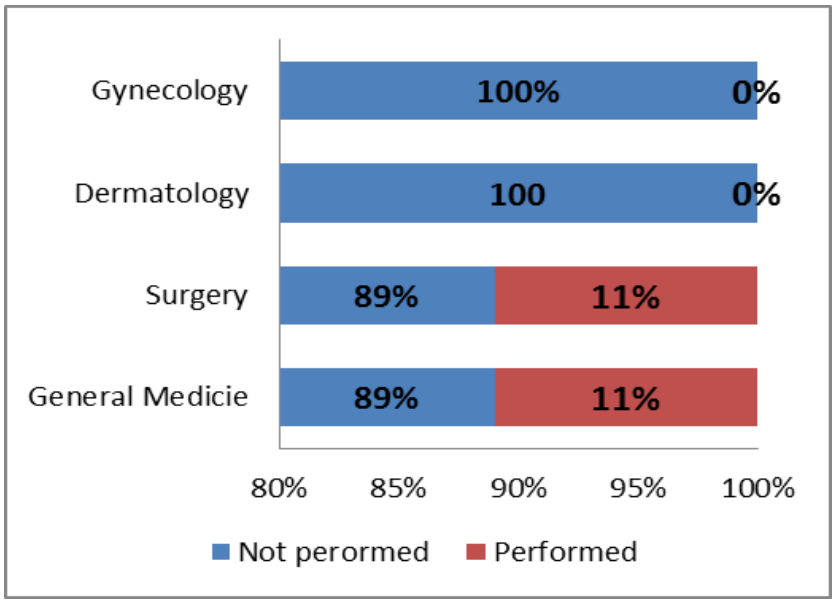


Graph 10: Identification of Presence of Pus Cells In Each Department.

The above table shows 37% General Surgery cases have Pus cells present in it followed by Gynecology 30%, General Medicine 8% and Dermatology 5%. The probability is <0.05% and it indicates extremely significant.

Table 11: Identification of cases undergone cultural sensitivity test in each department.

S. No.	CST	General Medicine	Surgery	Dermatology	Gynecology	Mean
1	Not performed	34(89%)	34(89%)	38(100%)	38(100%)	
2	Performed	4(11%)	4(11%)	0(0%)	0(0%)	0.53
Mean		0.105	0.105	0.000	0.000	
						SE-0.36
						P-0.03694*

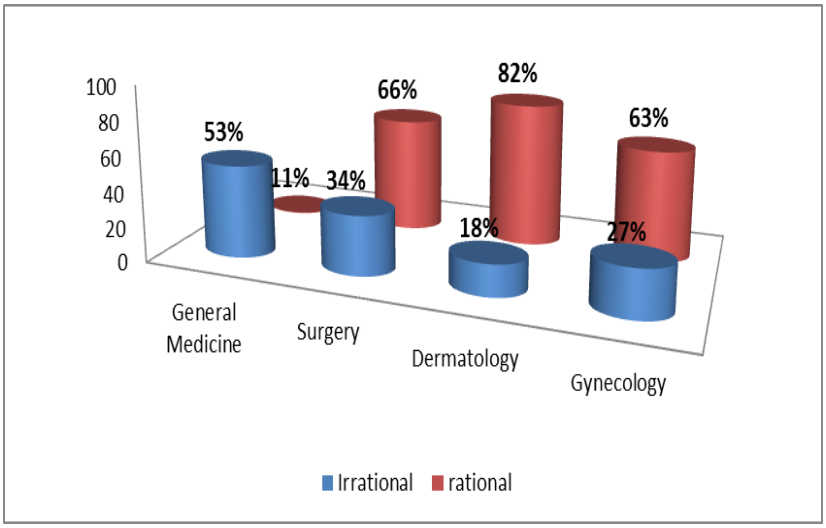


Graph 11: Identification of cases undergone cultural sensitivity test in each department.

The above table shows 11% f cases in General Medicine and General Surgery have undergone CST and 0% cases in Gynecology and Dermatology. The probability is <0.05% and it indicates significant.

Table 12: Distribution Based On Rationality In Each Department.

S. No.	Rationality	General Medicine	Surgery	Dermatology	Gynecology	Mean
1	Irrational	18(53%)	13(34%)	7(18%)	14(27%)	
2	Rational	20(47%)	25(66%)	31(82%)	24(63%)	0.658
Mean		0.468	0.658	0.816	0.632	
						SE-0.76
						P-0.00000***



Graph 12: Distribution Based On Rationality In Each Department.

The above table shows irrationality in General Medicine 53% is predominant than other departments General Surgery 34%, Gynaecology 27% and Dermatology 18%.The above table indicates The probability is >0.05% and indicates extremely significant.

DISCUSSION

In this study a total no. of 152 cases were collected and analyzed from General Medicine, General Surgery, Dermatology and Gynecology.

In this study it was observed that males 53(%) in General Medicine were predominant. Females 87(%) were predominant in Dermatology.

In the collected 152 cases the number of antimicrobials prescribed for each department is 2, 3, 2, 3 respectively in departments of General Medicine, General Surgery, Dermatology & Gynecology. This was contradicted by Reji S (2015) which reports single Anti-Microbial use. The same study was conducted by Farhan et al (2013) and the results were prove to be significant (P-0.00364).[28]

In this study we observed that length of stay in hospital is 7, 11, 9, 10 respectively in departments General Medicine, General Surgery, Dermatology, Gynecology and the results were proved to be significant (P-0.00135). This was similar to the studies conducted by Marcelo Carneiro et al.., (2011).

In this study we observed that Irrationality in General Medicine 53(%) is predominant than other departments, General Surgery 34(%), Dermatology (18%), Gynecology 37(%).

Irrationality of the Antimicrobial Prescriptions considered based on the parameters such as Indication, Dose, Duration and Pharmaco Economical considerations. The results were proved to be significant(P-0.00). The same study was performed by Farhan et al (2013).[29]

In this study we observed that 11(%) of cases in General Medicine and General Surgery have undergone cultural sensitivity tests and 0(%) of cases in Dermatology and Gynecology have performed Cultural sensitivity test and the results were proved to be significant (P-0.03694). This was Similar to the studies conducted by Marc Lipsitch and Matthew H. Samore 2012.[30]

In this study we observed that Indications of Drugs in Gynecology 34(%) are Inappropriate followed by General Surgery 32(%), General Medicine 26(%) and Dermatology 8(%). The results were proved to be significant (P-0.00). The same study was performed by B Rajaligam et al (2016).

In this study we observed that inappropriate dose administrations in general medicine department 18(%), are predominant followed by General Surgery 3(%) and 100(%) Appropriateness in Dose Administration is there in Gynecology and Dermatology. The results were proved to be significant (P-0.00032). The same study was performed by B Rajaligam et al (2016).

In this study we observed that inappropriate duration of therapy observed in general medicine department 29(%) are predominant followed by Dermatology 11(%) and Gynecology, General Surgery 8(%). The results were proved to be significant (P-0.01). The same study was performed by B Rajaligam et al (2016).[31]

In this study we observed that 95(%) cases can be modifiable based on Pharmaco Economical considerations in General Surgery followed by General Medicine 39(%), Dermatology 26(%) and Gynecology 18(%). The results were proved to be significant (P-0.00). Pharmaco Economical considerations were assessed according to ASHP Therapeutic guidelines, Nancy van Eyk, MD (2012).[32]

As per the standard guidelines identification of irrationality is based on presence of fever, pus cells and increased WBC count.[33]

In this study we observed that 32(%) of gynecology cases are associated with fever followed by General Medicine 29(%), Dermatology 26(%) and general surgery 11(%). The results were not significant (P-0.138).

In this study elevated WBC count was observed in Gynecology cases 74(%), followed by Dermatology 63(%), General Medicine 39(%), General Surgery 32(%). The results were proved to be significant (P- 0.005).

In this study more number of pus cells were observed in General surgery cases (37%), followed by Gynecology 30(%), General Medicine 8(%) and Dermatology 5(%).

CONCLUSION

The present study was an observational study performed in various departments in a tertiary care hospital. The irrationality was found in the General Medicine followed by General Surgery, Dermatology and Gynecology. The irrationality was observed based on elevated WBC's, Pus Discharge and Fever. The results were statistically significant.

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