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A Prospective observational Study on Use of Antimicrobials in The Department of Dermatology, Venereology And Leprosy At Rajah Muthiah Medical College Hospital

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Abstract : *Antimicrobials are probably one of the most successful forms of chemotherapy in the history of medicine. New resistance mechanisms emerge and spread globally threatening our ability to treat common infectious diseases, resulting in death and disability of individuals. In this context, this prospective observational study observes the use of antimicrobials in the department of DVL at RMMCH, Annamalai university, Tamil nadu, period of study 6 months; Between November 2015 and April 2016.The sample size comprised of 500 patients, who satisfied the inclusion and exclusion criteria. The objectives of the study are to observe the usage of antimicrobials, including duration and route of administration, the empirical antimicrobials prescribed, drug utilization studies, and incidence of adverse events .The study also includes incidence of prevalent pathogens and the pattern of resistance. 2000 patients were screened and out of this 510 patients were found to be exposed to Antimicrobial drug therapy. Our study shows that Male patients and patients of the age group 13-25 were mostly affected with dermatological disorders. Majority of the patients were diagnosed with fungal infections. Combination therapy were preffered. The Major organism isolated were Staphylococcus aureus. 53 patients experienced Adverse Drug Reaction, most being diarrhea.*
Keywords: *Antimicrobials, Antifungals, Dermatology, Resistance, Sensitivity*

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I. Introduction

Antimicrobials are probably one of the most successful forms of chemotherapy in the history of medicine. The inevitable consequence of widespread use of antimicrobial agents has been the emergence of antibacterial resistance pathogens, fueling an ever increasing need for new drugs and contributing to the rising costs of medical care. Moreover, the pace of antimicrobial drug development has dramatically slowed during the last decade, with only a handful of new agents[(1)]. The use and misuse of antimicrobial drugs accelerates the emergence of drug-resistant strains. Antibiotics have a significant role in dermatology, treating a wide range of diseases, including acne, rosacea, inflammatory skin conditions, and skin structure infections, such as cellulitis, folliculitis, carbuncles, and furuncles [(2)].The dermatology, venereology & leprosy department is an area of health care which essentially needs antimicrobials to fight infectious diseases. The study observes the current prescribing pattern of antimicrobials in the DVL department .Growing antimicrobial resistance is a global concern and the resistant strains must be identified to hamper the spread of resistance[(3)]. So the study also observes the major pathogens and their resistance pattern against the antimicrobials prescribed. This helped to give an insight of the organisms that have show 100% resistance towards the medication and also the pathogens that are gaining resistance slowly, with such information the prescribing pattern can be more effective for the patient. Optimal use of antimicrobials is essential in the face of escalating antibiotic resistance, and requires cooperation from all sectors of the health care system[(4)]

II. Methods And Materials

The study was conducted in the Department of dermatology, venereology and leprosy, Rajah Muthiah Medical College Hospital, a 1260 bedded multi-specialty tertiary care teaching hospital, Tamil Nadu. It is a non-invasive study.The period of study was 6 months from November 2015 to April 2016. The data required was collected from the patients and their prescriptions (from inpatients and outpatients) of dermatology, venereology and leprosy Department in RMMCH. Various tool used includes Data collection form and Voluntary ADR reporting form. Ethically approved.

Inclusion criteria
- ❖ Patients of all age group
- ❖ Patients of both the genders

Exclusion criteria:
- ❖ Pregnant and lactating women
- ❖ Patients not willing to cooperate
- ❖ Immunosuppressive patients.

III. Results

For this study we have screened 2000 patients and out of this 510 patients were prescribed with antimicrobials in the Department Of Dermatology, Venereology and Leprosy who were enrolled into the study based on the selection criteria after obtaining their consent.

Table 1: Prevalence Of Antimicrobial Drug Usage

Total Population Screened	2000
Study Population Exposed To Amd	510

Figure 1: Prevalence Of Antimicrobial Drug Usage

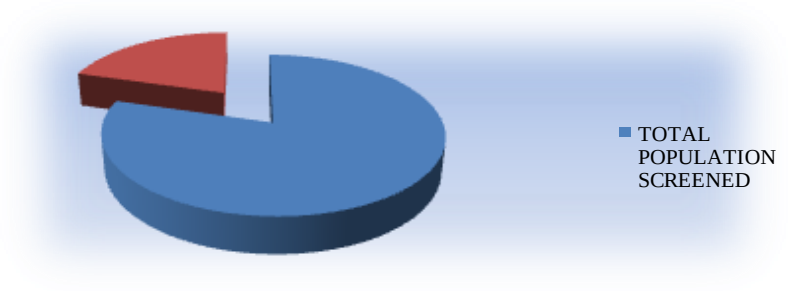

Table 2: Gender Wise Distribution

Gender	No. Of Patients	Percentage
Male	294	57.6%
Female	216	42.3%
Total	510	100%

Table 3: Age Wise Distribution

AGE GROUP	NO. OF PATIENTS	PERCENTAGE (%)
0-12	66	12.9%
13-25	186	36.4%
26-45	128	25.0%
46-60	93	18.2%
60 ABOVE	37	7.25%
TOTAL	510	100%

Table 4: Disease Distribution

DISEASES	NO. OF PATIENTS	PERCENTAGE (%)
Fungal Infections	146	28.6%
Dermatitis and Eczema	92	18%
Scabies	77	15%
Papulosquamous and Skin Appendage Disorders	63	12.30%
Bacterial Infections	35	6.80%
Leprosy	21	4.10%
Viral Infection	18	3.50%
Urticaria	15	1.10%
Bullous Disorder	6	2.90%
Insect Bite	4	0.70%
Ulcer	4	0.70%
Vaginal Disorder	2	0.30%
STD	1	0.10%

Miscellaneous	26	5%
TOTAL	510	100%

Figure 2: Distribution Of Antimicrobials In Diseases

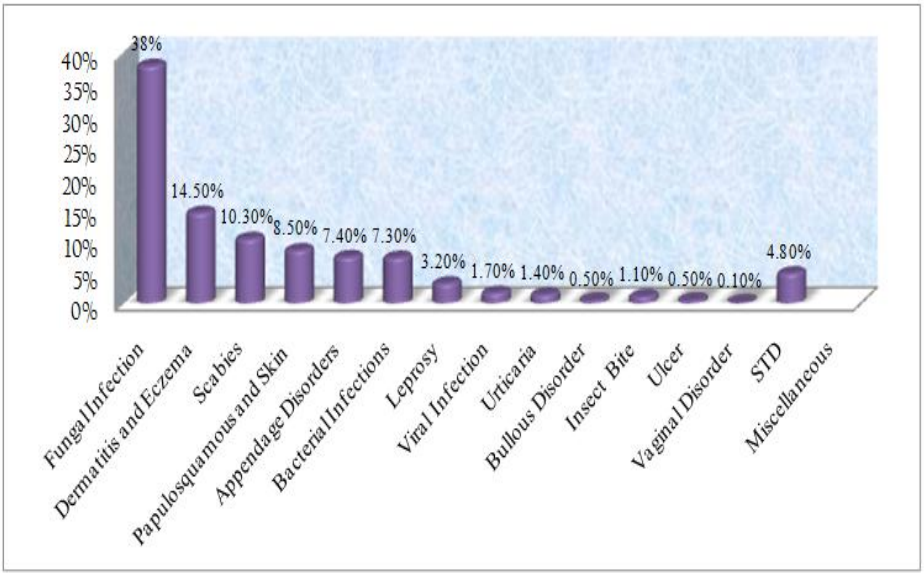

Table 5 : Number Of Antimicrobial Drugs Per Prescription

Number Of Antimicrobials	Number Of Prescription	Percentage(%)
Monotherapy	221	43%
Combination Therapy	289	56.5%

Table 6 : Route Of Administration Of Antimicrobials

	Oral	Topical	Parenteral
No.of drugs	515	384	37
Percentage	54.8%	40.9%	3.9%

Table 7: Duration Of Antimicrobial Therapy In Dvl

Duration	No. Of Drugs	Percentage(%)
Less Than 5 Days	1	2.4%
5-6 Days	10	24.3%
7-14 Days	23	56%
More Than 15 Days	7	17%

Table 8: Distribution Of Drugs Along With Antimicrobials

Drug Categories	No. Of Drugs	Percentage (%)
Antimicrobials	936	43.5%
Antihistamines	352	17.67%
Haematinics	159	7.9%
Emollient & Skin Protectants	120	6.0%
Antiulcerants(Proton Pump Inhibitors & H2 Receptor Antagonist)	108	5.4%
Scabicides	94	4.7%
Corticosteroids	65	3.2%
Topical Antipruritic Agent	54	2.7%
Acne Treatment Preparations	37	1.8%
Analgesics & Antipyretics	36	1.8%
Immunosuppressents	35	1.7%
Antihypertensives	18	0.9%

Others	45	2.2%
Total	1991	100%

Table 9: Distribution Of Antimicrobials

Antimicrobial	No. Of drugs	Percentage (%)
Antifungals	278	29.7%
Topical antifungals	222	23.7%
Antibiotics	222	23.7%
Topical antibiotics	113	12%
Antileprotics	58	6.1%
Antivirals	21	2.2%
Anti-tuberculotics	16	1.7%
Antimalarials	1	0.1%
Antiprotozoals	5	0.5%
Total	936	100%

Figure 3: Empirical Antimicrobials Prescribed

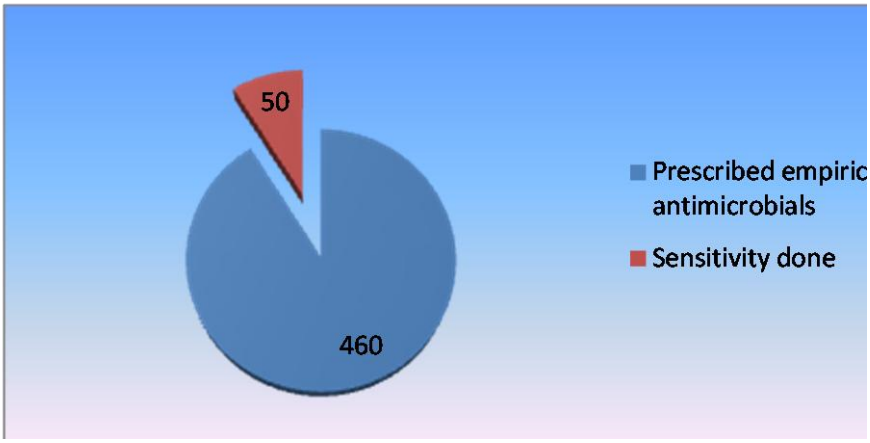

Table 10: Daily Defined Dose Of Commonly Used Antimicrobials

Antimicrobials	Atc Code	Prescribed Strength		Ddd(Mg) (Atc)	Total Ddds (Mg)	Total Ddds/Ddd(Atc)	Ddd/510 Patients
Fluconazole	J02ac01	150mg		0.2g	99750	498.75	0.97
Terbinafine	D01ba02	250mg		0.25g	126500	506	0.99
Ciprofloxacin	J01ma02	500mg	250mg	1g	200200	200.2	0.39
Dapsone	J04ba02	100mg		50mg	62500	1250	2.45
Cefotaxime	J01dd01	1000mg		4g	379	94.75	0.18

Table 11: Prevalance Of Pathogens

ORGANISM	NO. OF PATIENTS	PERCENTAGE (%)
S. aureus	16	32%
Pseudomonas	10	20%
E. coli	9	18%
MRSA	7	14%
Klebsiella	4	8%
P. mirabilis	4	8%
TOTAL	50	100%

Tab 12: Susceptibility Pattern Of *Staphylococcus Aureus*

NAME OF DRUG	SENSITIVITY (%)	RESISTANCE(%)
Vancomycin	87.5%	0%
Amikacin	62.5%	12.5%
Gentamicin	56.2%	0%
Tetracycline	43.7%	0%

Ciproflaxacin	37.5%	43.7%
Linezolide	37.5%	0%
Oxacillin	31.2%	62.5%
Clindamycin	25%	18.7%
Ofloxacin	25%	31.2%
Ceftriaxone	18.7%	18.7%
Ampicillin	0%	43.7%
Nalidixic Acid	0%	18.7%

Figure 4: Susceptibility Pattern Of *Pseudomonas*

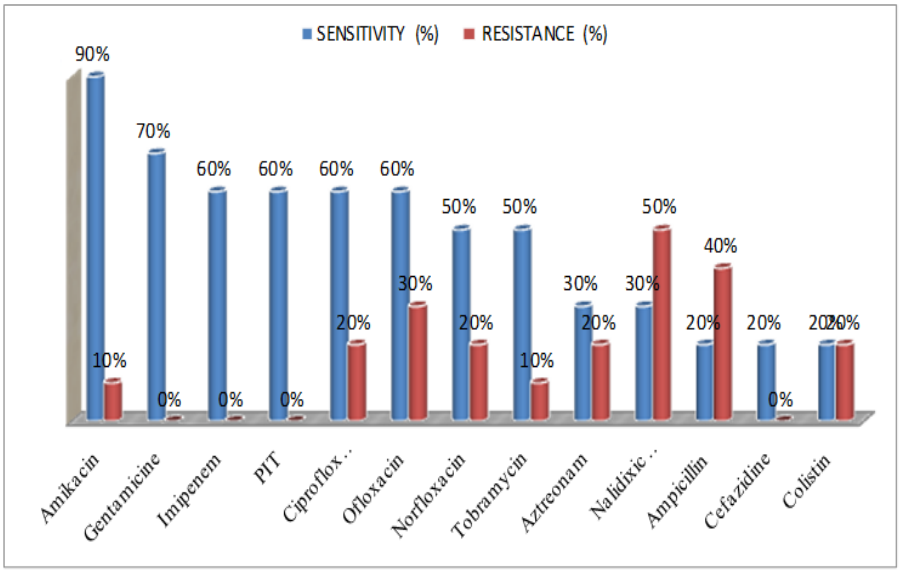

Figure 5: susceptibility pattern *of escherichia . Coli*

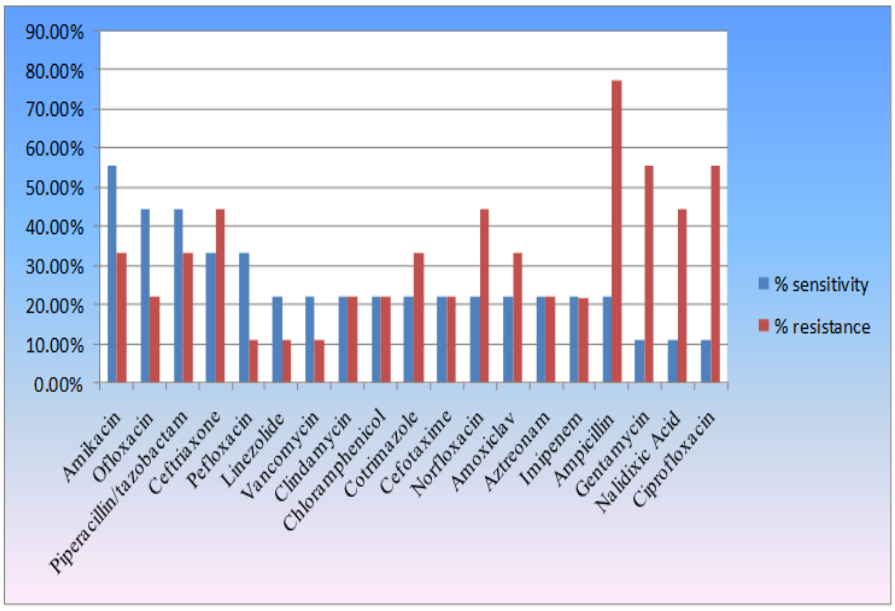

Table 13: Susceptibility Pattern Of *Mrsa*

NAME OF DRUG	SENSITIVE(%)	RESISTANCE(%)
Amikacin	71.4%	0%
Ciprofloxacin	52.1%	0%
Erythromycin	52.1%	14.2%
Linezolid	42.8%	28.5%
Cotrimazole	42.8%	0%
Ofloxacin	28.5%	28.5%
Gentamicin	28.5%	0%

Piperacillin /Tazobactam	28.5%	0%
Ceftriaxone	28.5%	28.5%
Tetracycline	28.5%	28.5%
Cefotaxime	28.5%	0%
Pefloxacin	28.5%	28.5%
Chloramphenicol	14.2%	28.5%
Ampicillin	0%	52.1%

Table 14: Susceptibility Pattern Of *Klebsiella*

NAME OF DRUG	SENSITIVE(%)	RESISTANCE(%)
Ofloxacin	100%	0%
Ceftriaxone	100%	0%
Amikacin	50%	0%
Ampicillin	0%	100%
Nalidixic Acid	0%	100%
Gentamicin	0%	100%
Cefotaxime	0%	50%
Norfloxacin	0%	75%
Amoxiclav	0%	100%
Pefloxacin	0%	100%

Figure 6: Susceptibility Pattern Of *P.Mirabilis*

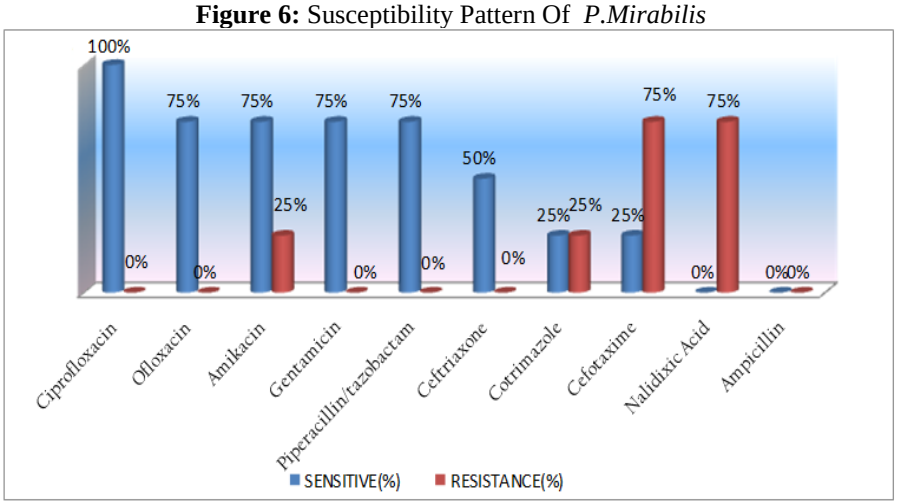

Table 15: Adverse Drug Reaction

Total number of patients	number of adrs
510	53(10.3%)

Table 16: Types Of Adverse Drug Reaction

S.No	Name Of Antimicrobial Drug	Adverse Drug Reaction	No.Of Patients
1	Cefotaxime	Exfoliative Dermatitis	3
2	Amoxicillin/Clavulanic Acid	Diarrhoea	3
3	Erythromycin	Diarrhoea	2
4	Amoxicillin	Diarrhoea	2
5	Ciprofloxacin	Diarrhoea	1
6	Cefixime	Diarrhoea	1
7	Cefotaxime	Diarrhoea	1
8	Azithromycin	Nausea	2
9	Miconazole	Burning	3
10	Dapsone	Headache	7
11	Acyclovir	Pruritis	4
12	Rifampicin	Pruritis	2
13	Fluconazole	Abdominal Pain	8
14	Ciprofloxacin	Constipation	1
15	Clotrimazole	Erythema	3
16	Ampicillin	Rashes	2
17	Ketoconazole	Stinging	4

IV. Conclusion

The aim of the study was to observe the use of antimicrobials and their prescription pattern in the department of Dermatology, Venereology & Leprosy from the sample size. Among the patients who visited the DVL Department , 2000 patients were screened and out of this 510 patients were found to be exposed to AMD. Thus the prevalence of exposure to AMD at the given point of time was found to be 0.25% or 255/1000 patients.(TABLE 1& FIGURE 1)

4.1Patient Demographics:

We observed that in our sample population, 57.6% were Male while 42.3% were Female, which complies with the study by Khan NA et al.(2009) in the same hospital ,we can see an decrease of male patients and slight increase of female patients when the studies are compared[(4)](TABLE 2). The Age distribution shows that maximum number of patients belongs to the Age Group 13-25,accounting for 36.4% of the total(TABLE 3).

4.2Prescribing pattern of antimicrobials:

Most of the patients in the Study Population were diagnosed with fungal infections (28.6%) followed by Dermatitis and Eczema (18%)which is similar to the study by GS Rao et al.(2002)[(5)] (TABLE 4). Geographical factors such as season and climate contribute to the high incidence of fungal infection in this population. High incidence of scabies (15%) can be explained due to the overcrowding, poor resistance, poverty and also poor living standards of these patients. Out of 936 Antimicrobials prescribed , 35.6% of antimicrobials were prescribed for fungal infections . Average number of Antimicrobials prescribed per prescription was found to be 1.83(FIGURE 1),this is much lower when compared to the study by Mohammed et.al[(8)], which is 2.46.Out of 510 patients 43% of the patients were prescribed with Antimicrobial Monotherapy while Combination therapy of Antimicrobials was prescribed to 56.5% of patients(TABLE 5). So we can conclude that Combination Therapy was used More when compared to Monotherapy, this conclusion is similar with the study by Khan NA et al.(2006)[(4)].

Most of the antimicrobial drugs were prescribed Orally followed by topical .Parenteral administration was the least. This is similar to Khan NA et al.[(4)] and C.M.Diyashanthi et al.(2014)[(6)].Cefotaxime (2.8%)was mostly prescribed in parenteral while fluconazole (14.9%)and ketoconazole(14.7%) dominates in oral and topical route. Most of the antimicrobials in this study was prescribed with a duration of 7-14 days (56%).The duration of therapy, less than 5 days was noticed only in 1 patient(TABLE 7) In our study we Observed That Antihistamines (17.67%) were prescribed more along with antimicrobials followed by haematinics(7.9%).Among the antimicrobials prescribed most of the drugs belong to the Category of Antifungals (49.5%) followed By Antibiotics (30.6%) 936 antimicrobials were prescribed during our study period , there was an increased use of antimicrobials when compared with Khan NA et.al(2006). While considering the empirical antimicrobials prescribed cefotaxime was prescribed mostly in In patients while fluconazole tops the chart in Out patients. Sensitivity test were done only for 50 patients.

4.3Defined Daily Dose

As a part of over study, DDD/510 patients were calculated according to DTC (Drugs and Therapeutic Committee - guide) with Reference from WHO Recommended ATC Classification and found that DDD/510 patients was highest for Dapson(2.45).This indicates that Dapson is most frequently used in this department, and the dosage is similar to the doses recommended by WHO.

4.4Study Of Sensitivity Pattern Of Microorganism

During the Study a Prospective Analysis was conducted to Check the Sensitivity Pattern of microorganism to Antibiotics. A total of 50 cases were analysed.The Major organism isolated were ***Staphylococcus aureus*** (32%), ***E. coli*** (18%) ,***MRSA (14%) Kleibsiella*** (8%),***P. mirabilis*** (8%).Staph. aureus is the major organism isolated which is similar to the pattern of organism isolated in study conducted by Arthur et al.

The Study shows that ***staph. aureus*** was sensitive to Vancomycin (87.5%) and have developed resistance to Ciprofloxacin. Sensitivity pattern shows that ***Pseudomonas*** was highly sensitive to amikacin and have Started Developing resistance to Nalidixic acid. ***E.coli*** was moderately sensitive to Amikacin (55.5%) and Ofloxacin (44.4%) and have developed Resistance to Ampicillin (77.7%). ***MRSA*** was sensitive to Amikacin(71.4%) and Developed resistance to Ampicillin(52.1%) .In our study Ofloxacin and Gentamicin were Highly sensitive to ***klebsiella*** and is completely resistant to Ampicillin and Gentamicin. In the case of ***P. mirabilis*** , it depicted high rates of sensitivity towards Ciprofloxacin (100%) ad 75% of Resistance towards Cefotaxime

It can be seen that the three microorganism, Pseudomonas ,MRSA and e.coli are highly sensitive towards Amikacin. Staph aureus is highly sensitive towards vancomycin, while klebisiella and P.mirabilus shows high senstivity towards ciprofloxacin and ceftriaxon .The most recent worldwide estimates of global antibiotic resistance, published by the World Health Organization (WHO) in 2014, list *Escherichia coli*, *Klebsiella pneumoniae*, and *Staphylococcus aureus* as the three agents of greatest concern[(8)], and from our data we concluded that *klebsiella* has evolved completely resistance towards Gentamicin, Nalidixic acid,ampicillin,Amoxiclav and PF. While *staph aureus* has started evolving resistance towards Oxacillin and *E.coli* towards Ampicillin.

4.5Adverse Drug Reaction

Out of 510 Patients 53 patients experienced Adverse Drug Reaction. The most common ADR observed was Diarrhoea , and the observed drug reaction was rated as 'PROBABLE ' on the NARANGO'S Scale For Causality Assesment. Skin diseases in developing countries have a serious impact on people's quality of life, it is more so in Indiawhere climate, socio-economic status, religions and customs are widely varied in different parts of the country[(9)] In our study population Males were more in number with Mycoses being diagnosed the most.Among the prescribed antimicrobials antifungals were the highest.Oral was the preferred route of administration.The statistics shows that antimicrobials are the most prescribed drugs in DVL, which implies that antimicrobials plays a pivotal role in treating dermatological disease, and in the case of therapy considered, Combination Therapy is preferred for treating skin diseases. Unfortunately, we have come to expect that antibiotics will offer an answer for practically every symptom, ailment or concern. We have used these "miracle" drugs far too indiscriminately and inappropriately .We now understand all too well that this casual behavior, including misuse and overuse, has helped those microbes adapt and survive in new and less treatable forms.

4.6Limitation of The Study:

Treatment responses and long term side effects of the treatment could not be assessed because of the limited follow up period. Up to 80% of the population contracted with skin problems may not seek medical help

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