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TO DETERMINE THE RATIONAL USE OF ANTIBIOTICS; A CASE STUDY CONDUCTED AT MEDICAL UNIT OF HAYATABAD MEDICAL COMPLEX, PESHAWAR

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ABSTRACT

Rational use of a drug means when the patients receive the drug which is appropriate, in doses that meet their individual requirement, for an adequate period of time at the lowest cost both to them and the community [1] and irrational use of Medicine is that when one or more of the above condition is not met. It has calculated that half of the drugs are sold, dispensed inappropriately [2, 3].and also half of the patient fails to take the medicines as prescribed by the physician [4]. Irrational use may include Poly pharmacy, over use of antibiotics, and injection failure to prescribe in accordance With clinical guide lines or wrong guideline. It is a global problem of wrong use of drugs, Some countries taking action to make correct the problem [5]. The study was conducted at the medical unit of Hayatabad Medical Complex Peshawar, from October 2011 to January 2012.The aims of this study is to determine the rationale of antibiotics use in various patients suffering from the various diseases. Besides this to evaluate drug-drug interactions, drug food interactions and polypharmacy that are prescribed to the patients. The Data was collected on random basis containing 20(76.92%) male and 06(23.07%) female patients. Most i.e. 23.07% the patients were in the range of 10-20 years and 11.53% in the age range of 41-50 years. In most of the cases reported the irrational use of antibiotics. For the successful pharmacotherapeutic plans and rational use of antibiotics proper knowledge about the drugs is required in order to eliminate or to decrease the chances of drug interactions in the prescribed drugs to the indoor patients. It will be in the better interest of the patients to provide proper knowledge to the Health professionals and the patients regarding the drugs, to induce clinical pharmacists at the wards level to ensure the rational use of drugs.

The efficient use of existence antibiotic should be done so that to ensured the long term use of drugs (antibiotics) in bacterial infection [16].

KEYWORDS: Antibiotic, Rational, Irrational

INTRODUCTION

Rational use of a drug means the appropriate drug receive by patients, in doses that meet individual requirements, for an adequate period of time at the lowest cost [1]. Irrational use of antibiotics is harmful for both patient and society. The irrational antibiotics are one of the top ten cause of mortality and morbidity around the world [6, 7]. It has been documented that it costs 5.6 million US Dollars per year per hospital [8, 10]. And as a result of continuous use of antibiotics the estimated resistance increasing day by day and it also costs 9000 million pound per year in Europe [11, 12]. Due to this reason if an antibiotic become ineffective the morbidity rate increases and leads to premature mortality [13, 14, 15]. The irrational use of antibiotics is practicing in both developed and underdeveloped countries [17]. In developed countries over the counter practice is also present for antibiotics which is strictly prohibited. The use of antibiotics for short period of time is also irrational practice that is done in most countries [18, 19]. Presently antibiotics are the widely used class of drugs all over the world [20]. According to the world heath report the irrational use of antibiotics was 50% while the misuse and overuse was

up to 100% in URTIs. a study was launched on the use of antibiotics in 13 low, middle and high income countries during 1993-1996, the study showed that approximately 30% cases of UTIs were incorrectly prescribed for antibiotics [21,22]. In a survey carried out in USA showed that 51% of the patients having urinary tract infection and cold receiving antibiotics found that 20% of the antibiotics prescribed were irrational [23].

It has been reported that 36% Children show symptoms like diarrhea and acute respiratory infections after receiving antibiotics treatment for 2 week [25]. The antibiotics usage in developing country is alarming because more than 90% of antibiotics used in surgical prophylaxis were found to be inappropriate [26]. So it is concluded from above study that the anti bionics usage in developing country is alarming First started from Pakistan that what is percentage of irrational anti biotic usage. In Pakistan 3.5 is the average no of drug per prescription. In which 76% of the drugs prescribed was antibiotics. And 75% was given in perenteral dosage form. A study was also conducted in rural areas of Pakistan it is find that 78% of the patient receiving anti biotic in which 74% was in injection dosage form. in children at age if 1-15 the antibiotic prescription was high up to 84%.

In Indonesia a study was conducted by WHO it is find that 43% of antibiotics was over use. And only 46% of children fewer than five years received ORS for management of diarrhea and 73% received antibiotics. While for children more than five years the respective percentage was 36% and 91%[27]. While for minor upper respiratory infection 75-86% of the patient received anti biotic. In china a study was conducted it is reported that in 1998 that in upper respiratory tract infection 97% of anti biotic were prescribed [28]. As irrational use of antibiotics lead to resistance so what is resistance. And why antimicrobial resistance is global problem. AMR can be defined as. When microbial growth is not halt by maximal level of that antibiotics at a concentration which are tolerated by the host. There are various mechanisms of resistance.1. genetic alteration lead to resistance. For example spontaneous mutation of a DNA, transfer of resistance from one bacteria to other ,2.altered expression of proteins in drug resistance organisms, target modification, decrease accumulation, enzymic inactivation.

- **Anti Microbial Resistance is a Global Problem**

As a result of resistance infection become fail to respond to standard treatment so as result prolonged illness and increase risk of death anti microbial resistance lead to decrease effect of effective antibiotic and infection is remain for prolonged period of time and communicate to other. When microorganisms become resistance to first line antibiotics more expensive antibiotics are prescribed which increase cost of the therapy and increase hospital stay [29].

- **Examples of Antimicrobial Resistance**

Modification of target site. Strep pneumonia resistance to beta lactam antibiotic involve alteration one or more of the penicillin binding proteins, result of which decrease binding of antibiotics to binding site. Enzymatic inactivation. The beta lactamase producing bacteria inactivate the beta lactam anti biotic these enzymes hydrolysis the beta lactam ring result of which loss of it activity. It is necessary for anti biotic to diffuse inside to microorganism and perform its function. In resistance organism such is bacteria the antibiotics is not concentrated inside bacteria and does not produce it action. In quinalones the DNA gyrase enzymes is mutated and result quinalones is not attach to such specific protein responsible for it mechanism of action so does not show it effect. In amino glycoside the plasmid mediated acetyl Tran’s ferase inactivate the amino glycoside and which result loss of its effect [30].

Phases of Antibiotics Prescription

Prescribing an antibiotics consist of several phases

- Is antibiotics necessary?
- What should be the most correct or proper choice of antibiotics.
- What are the most correct route, dose, frequency and duration of antibiotic needed?
- Is the treatment is effective?

Is an Antibiotic is Necessary

Are we known that antibiotics are only necessary for bacterial infection and not all illness are due to infection or all infection are not only cause by bacteria. Most of the infection caused by viruses and the antibiotic are neither treat viral infection nor prevent secondary bacterial infection in such patient. If the infection is due to bacteria then it is not necessary to prescribed antibiotics because most of the minor bacterial infection are resolved spontaneously itself [31].

Local antiseptic may be used in minor superficial infection. in abscess the pus should be surgically drained to remove the pus and if sufficiently drained then there is no need of antibiotics.

Choice of Antibiotics

There are various factors which should be considered before selecting antibiotics. As we know fruited outcome from antibiotic depend upon proper selection of antibiotic. There are three main factor, determination of microbial agent, the patient and the antibiotics.

Antibacterial Indications

- **Definitive Therapy:** This is for accurate diagnose bacterial infection. Antibiotic are effective against bacteria and it is important to restricted only for treatment of bacterial infections. So it is important that first take the sample either blood, fluid secretion and tested it on the basis of clinical testing i.e. cst testing microorganisms should be recognizes and narrow spectrum, least toxic and cheap antibiotics should be prescribed.
- **Empirical Therapy:** Blind or empirical therapy of antibiotics should be given in certain critical condition where immediate use of antibiotics is very necessary before any laboratory findings available for example sepsis syndrom,becterimia, raise ESR, neutrophilic leukocytosis, hectic temperature etc. in such critical condition the most appropriate class of anti biotic should be prescribed mostly broad spectrum antibiotics should be use such is combination of amoxicillin+gentamicin both gram positive and gram negative microorganism are covered.
- **Prophylactic Therapy:** Prophylactic antibiotic should be given to patient having risk of infection for example antiburcular drugs to T.B patient, propylacsis such is anti rheumatic, propylacsis for patient having heart deases. [37].

Demographic and Other Clinical Presentations Data of All Patients

1. **Characteristics Number of Patients % of Total**

   All patients 26 100

   Gender (males/females) 20/6 76.92%/23.07%

2. **Main Cause of Hospitalization Number of Patients % of Patients**

   Diebetic foot 6 23.02%

   Typoid fever 3 11.53%

Resoiratory track infection 5 19.23%

Hemorhagic strok 4 15.83%

Dilated cardiomyopathies 1 3.84%

Liver cirhosis 5 19.23%

penumonia 2 7.69

- **Concurrent Diseases**

Total patients with concurrent ailments 10/26

38.46%

Diabetes mellitus 4 15.38%

Hypertension 2 07.69%

Hepatitis 2 07.69%

SOB 2 07.69 %

Concurrent Diseases

Table 1

Presentations	Numbers of Patients	% of Total
Total patients with concurrent ailments	47/72	58.3%
Diabetic mellitus	04	5.5%
Hypertension	14	19.4%
Hepatitis	04	5.5%
SOB	3	4.16%
Rheumatic Joints pain	3	4.16%
General body pains	10	13.88%
T.B	4	5.55%
CCF	5	6.94%
Malaria	3	4.1%
Acute Pancreatitis	1	1.38%
Epilepsy	1	1.38%
Constipation	2	2.77%

3. Total patients =26

Age in years of the reported cases. Group range= 10-80

Age group reported Number of patients % age

Total patients=26

Table 2

Age(s) Ranges	Numbers of Patients	% of Total
10-20	06	23.07%
21-30	02	07.69%
31-40	01	03.84%
41-50	03	11.53%
51-60	02	07.69%

61-70	01	03.84%
71-80	09	34.6%

Table 3

Case No	Gender	Age (Years)	Main Cause of Hospitalization	Concurrent Ailment/Disease
01	M	50	Fever,loss of concioius	HTN
02	M	16	Fever,nausea,vomiting	T.B
03	M	34	Jaundince,Anorexia	HTN
04	M	75	Fever,Pnemonia	DM
05	M	75	SOBs,chest tightnes	T.B
06	M	60	Toe infection	D.M
07	M	55	Diabetic foot,bullus lesion	D.M
08	M	15	Fever,nausea,vomiting	Typiod
09	M	12	Coughing,sneezing	Bronchitus
10	F	12	SOBs,Body weaknes	Cardiomyopathy

Table 4: Drug Interactions Reported in Cases

Drugs Interacted	Remarks	Occurrence	%Age	Case Number
Diclofenac sodium +Amlodipine	Diclofenac sodium antagonize the hypotensive effect of amlodipine[37]	1	3.84%	1
Corticosteriod+ Salbutamol	Hypokalemia can occur when Corticosteriod is given along with Salbutamol	1	3.84%	5
Provastatin+ Clarithromycin	Plasma concentration of Provastatin is increased by Clarithromycin	1	3.84%	6
Cimetidine +Quinine	Cimetidine decrease the metabolism of Quinine	1	3.84%	8
Spironolactone +aspirin	Diuretic effect of spironolactone is antagonise by aspirin,increase risk of hyper kalemia when spironolactone is given along with ACE inhibitor.enhance hypotensive effect when diuretic given with beta blocker	1	3.48%	10
Cimetidine+ Chlordiazepoxide	Cimetidine increses the plasma half life of Chlrdiazepoxide thus increses the concentration and may leads to toxicity [17].	1	1.38%	5
Cimetidine+ Amlodipine	Amlodipine increases the antiulcer effect of Cimetidine and thus produces synergestic effect **[17]**	7	9.7%	7,15,4,21 ,47,5 ,2
Cimetidine+ Bromazepem	Cimetidine decreases the metabolism of Bromazepam [17].	1	1.38%	8
Sucralfate+ Ciprofloxicin	Sucralfate decreases the absorption of Ciprofloxicin[17].	1	1.38%	9

Table 5: Irrational Prescribed Antibiotics

Antibiotic Prescribed	Another Antibiotic/Ailment	Consequence
Augmentin	Claritromycin	Destroy the normal flora.
Claritromycin	Ciprofloxicin	Initially used Qunonlines
Ceftriaxone	Jaundice	Secreted in bile
Amoxil	Claritromycin	Irrationaly used antibiotics
Ceftriaxone	Amoxicilin+Clavalanic acid	Destroy normal flora.
claritromycin	Tetracyclin	Irrationally prescribed antibiotics

RESULTS AND DISCUSSIONS

Looking at Tables (1,2,3), in the community Majority of these patients have concurrent ailments along with

infection like DM (15.38%), hypertension (07.69%) and SOB (07.69%),,hepatitis(07.69%), however the age groups 71-80 years and 10-20 years also represent a large number of patients i.e. 34.61% and 23.79% respectively admitted to hospital.

CONCLUSIONS

After evaluation of The above histories I concluded that for the achievement of Rational use of antibiotic for manegment of infection cause by micro organisums.first of all culture sensitivity testing is very necessory to recognizes the orgainsum and select the apropriate anti biotic.so by this way one can decrease the chance of resistance and decrease cost of the therapy as well as decrease hospital stay. so by providing awairness one should minimizes those problems which are common at ward level, like irrational use, drug interactions, Side effects, ADRs,Compliance and poor patient education.

Counseling should be performed at ward level. Awareness programs should be launched and seminars should be conducted. News Letters and Drug bulletons about the rational use of antibiotics and its effect on community. cost effective prescribtion should also be encouraged. all these fact are possible when Clinical Pharmacist work along with the physician at ward level.

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