



Assessment and Interventional Study of Common Antibiotics Prescribing Errors at Public Hospital of Karachi, Sindh

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Abstract:

Objective: The objective of current study was to evaluate the frequency of errors in medical orders that are generated by doctor particularly containing antibiotics.

Methodology: The descriptive evaluation based study was carried out at a renowned charitable hospital of Karachi for duration of 3 months. A total of 150 medication orders/sheets were evaluated on the basis of objective. The data were compared with approved standards and analyzed descriptively.

Results: Out of 150 medication orders/sheets, majority of patients age were between 1 day to 5 years and frequency was 47. The most common antibiotics were Piperacillin+Tazobactam and the frequency was 22. Further drug related problems were also assessed and it was found that in 38 samples, the most common problem was low Dose as per body weight. There are 2 types of drugs prescribed based on therapeutic window and the most common was broad spectrum and the frequency was 101 and based on route the most common route was parenteral and the frequency was 102. Moreover the cost of therapy was also reduced by intervention and the frequency was 51 and 99 samples were improves the quality of health care.

Conclusion: It was concluded that by implementing the stewardship program in hospitals the cost of therapy and to increase the quality of health care noted so it should be in all major hospitals.

Keyword: Antibiotics, Public, Assessment, Karachi

1. **INTRODUCTION**

Antibiotic was derived from Greek word i.e., Anti-means against and Bios means life. These are the agents / drugs use to treat infections and have an ability to kill or stop the growth of micro-organisms without harming the host cells (Roger Walker and Lippincotts reviews). The antimicrobial Stewardship is the set of advanced strategies to improve the use of antimicrobials with the goal of increase patient outcomes, decrease resistance to antimicrobials and to select appropriate antimicrobial drug for treating the infection[American Guidelines 1997]. We can say that antibiotic stewardship is process/program in which antibiotics prescribe accurately, in response of right dose, to the right patient, at right time , at right frequency / scheduling and select accurate route to administer the antibacterial agents. Further it also give advice to patient for proper use of antibiotics at proper and perfect time duration in conjunction with antimicrobial infection either therapeutic, empiric or it may be prophylaxis use (Hospital Pharmacist Guide 2007). There are mainly two goals of antibacterial stewardship program i.e. primary goal or secondary goal, the primary goal of this strategy / program is to optimize clinical outcomes and minimize unintended consequences of antibiotic use , including toxicities , the selection of antibiotics against

pathogens such as clostridium difficile and other microbes while secondary goal of antibiotic stewardship program is to reduce the health care cost of hospitality without adversely impacts on quality care (Antimicrobial Guidelines 2015)

Antibiotic stewardship program has multiple benefits like to control the resistance from certain microbes which has direct impact on clinical outcomes, avoid adverse effects and it may be cost effective from excess use of medications. It also determines the rational use of antibiotics, how to control the resistance, and inappropriate prescribing trends of antibiotics specially large spectrum antibiotics (Pakyz *et al* , 2014).

The aims of Antibiotics stewardship program has to improve the quality care of patients from unwanted medications (antibiotics), to decrease unwanted consequences due to misuse / over use of antimicrobials agents and to decrease the stay of hospitality (Drekonja *et al* , 2015). Although this program has been shown to improve microbial susceptibility patterns and decrease drug toxicities and minimize the poly therapy (multiple drugs).It is proved that inappropriate usage of medicines specially of antimicrobial agents contributes to the rising cost of health care , the emergence of multi drug

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resistance. On other hand antibiotic stewardship program provide standard, evidence based approaches to increase judicious use of antibiotics. The continuous indiscriminate and excessive use of antimicrobials can cause increase risk of resistance, morbidity and mortality (Berenholtz *et al* 2011). So implementation of an antibacterial stewardship program at health care systems helps to decrease use of unwanted antimicrobial agents , improve patient care and clinical outcomes . It is important for prescribers that antibiotics should be prescribed as per organizational protocols to obtain maximum benefits and to save the patients from unusual cost of therapy (Hospital Pharmacy Review 2013). This program can be utilized in practice settings of health care systems to develop quality care and minimize the unintended consequences of antibacterial use. Misuse and over use of antimicrobials is one of the world's largest public health threat , so this program is proved to be a best tool to promote the appropriate use of antimicrobial agents (Manual of Antibiotic Therapy 2013). Antimicrobial resistance has been also declared as a major threat by WHO due to lack of new antibiotics and multidrug resistance of pathogens becoming untreatable, so it is important to control the infections in hospital settings (Manual 2006). There are two broad strategies, one is antibiotic stewardship program and second one is hospital infection control program, which have been applied globally to control the problems related the frequently usage of medicines specially antimicrobials (Tooth *et al* 2010 and Davidson 2012).

2. METHODOLOGY

The Evaluation based study was conducted to evaluate Antibiotics Stewardships at Indus Hospital Karachi for a period of 3 months duration. Prescriptions of patient's age from by birth up to 75 years are the inclusion data and medication chart / prescriptions of Immune compromised patients suffering from all types of cancer Prescriptions and patients suffering from dental diseases are the exclusion data. Among the source population all the data collected with consent to ethical committee (IRD). Since it is a hospital based study so in order to intend the designed objectives of this research study "The Indus Hospital" was selected as a potential study site. "The Indus Hospital" is the general hospital which is located in Karachi Sindh Pakistan. This institute is 150 bedded trusted organization with in

and Out patient , Emergency, and rehabilitation center and paed oncology setup .Prior approvals were taken from "The Indus Hospital" for the conduct of the research study for a designed period of time. Selection of patient's profiles was done who had admitted to the study site during the specified time period when study was operative. Total 150 profiles/ prescriptions (computerized) have been evaluated by screen shot and manual patient's profiles / prescriptions. Intervention form was designed which was approved by the competent authorities. Finally all data evaluated and compared with international standards i.e. Micromedix (Software), Laxicomp (hand book of medicine), and British National Formulary (BNF).

3. RESULTS AND DISCUSSION

Table-1 showed the predictors i.e. categorization of patients. Out of 150 samples, 47 (31.33%) were paed, 43 (28.6%) were child, 33 (22%) were adolescent, 9 were adults (6%) and 18 (12%) were geriatrics. Further the ages were also mentioned in (**Table-1**).

Table: 1 Predictors of Study

S#	Name of Variable	Description	Type of Variable	Frequency	Proportion
1	Paeds	(Age 1D- 5 Y)	Category Of Patients	47	31.33%
2	Childs	(Age 5Y-12 Y)	Category Of Patients	43	28.6%
3	Adolescents	(Age12 Y-18Y)	Category Of Patients	33	22%
4	Adults	(Age18 Y-50Y)	Category Of Patients	9	6%
5	Geriatrics	(Age>50 =75 Y)	Category Of Patients	18	12%

Table-2 showed the medications prescribed during the study period to 150 samples. According to medication sheets, Azithromycin was prescribed to 5 patients, Amikacin to 13 patients, Ceftriaxone to 2 patients, Co-Amoxiclav to 6 patients, Cefixime to 4 patients, Colistrimithate to 8 patients, Co-Triamxole to 4 patients and remaining were also described in (**Table-2**).

Table: 2 Medications prescribed

S#	Name of Variable	Description	Type of Variable	Frequency	Proportion
1	Antibacterial Drugs	Azithromycin	Categorization of Drug	5 / 150	3.33%
2	Antibacterial Drugs	Amikacin	Categorization of Drug	13 / 150	8.66%
3	Antibacterial Drugs	Ceftriaxone	Categorization of Drug	2 / 150	1.33%
4	Antibacterial Drugs	Co-Amoxiclav	Categorization of Drug	6 / 150	4%
5	Antibacterial Drugs	Cefixime	Categorization of Drug	4 / 150	2.66%
6	Antibacterial Drugs	Colistrimithate	Categorization of Drug	8 / 150	5.33%
7	Antibacterial Drugs	Co-trimaxazole	Categorization of Drug	4 / 150	2.66%
8	Antibacterial Drugs	Ciprofloxacin	Categorization of Drug	5 / 150	3.33%
9	Antibacterial Drugs	Imipenam	Categorization of Drug	11 / 150	7.33%
10	Antibacterial Drugs	Levofloxacin	Categorization of Drug	1 / 150	0.66%
11	Antibacterial Drugs	Meropenem	Categorization of Drug	7 / 150	4.66%
12	Antibacterial Drugs	Gentamicin	Categorization of Drug	4 / 150	2.66%
13	Antibacterial Drugs	Piperacillin+Tazobactam	Categorization of Drug	22 / 150	14.66%
14	Antibacterial Drugs	Ticoplanin	Categorization of Drug	15 / 150	10%
15	Antibacterial Drugs	Linazolid	Categorization of Drug	6 / 150	4%
16	Antibacterial Drugs	Vancomycin	Categorization of Drug	8 / 150	5.33%
17	Antibacterial Drugs	Ampicillin	Categorization of Drug	7 / 150	4.66%
18	Antibacterial Drugs	Erythromycin	Categorization of Drug	7 / 150	4.66%
19	Antibacterial Drugs	Ofloxacin	Categorization of Drug	10 / 150	6.66%
20	Antibacterial Drugs	Cefuroxime	Categorization of Drug	5 / 150	3.33%

During Antibiotic Stewardship study, there are so many errors are found such as high dose prescribed by the physician in 34 samples, low dose per body weight in 38 samples, wrong frequency in 35 samples, wrong drug in 4 samples, wrong route in 8 samples and some others also mentioned in below mentioned table.

Table: 3 Drug Related Problems

S#	Name of Variable	Description	Type of Variable	Frequency	Proportion
1	High Dose prescribed by physician	High Dose	Drug related problem	34 / 150	22.66%
2	Low Dose as per body weight	Low Dose	Drug related problem	38 / 150	25.33%
3	Wrong frequency as per recommendation	Wrong Frequency	Drug related problem	35 / 150	23.33%
4	Wrong drug as per need of patient	Wrong drug	Drug related problem	4 / 150	2.6%
5	Wrong route of administration	Wrong Route	Drug related problem	8 / 150	5.3%
6	Drugs prescribed with excess or less time duration	Wrong Duration	Drug related problem	5 / 150	3.3%
7	Unnecessary Medications	Unnecessary	Drug related problem	9 / 150	6%
8	Duplication of antimicrobials agents of same therapeutic effects	Duplication	Drug related problem	12 / 150	8%
9	Medications prescribed with wrong / no measuring units	Wrong Unit	Drug related problem	7 / 150	4.6%
10	Wrong drugs prescribed as per C/S report	Wrong Drug	Drug related problem	31 / 150	20.6%
11	Drug-Drug interactions	DDIs	Drug related problem	7 / 150	4.6%
12	Therapeutic drug monitoring not monitors	TDM	Drug related problem	20 / 150	13.3%

Based on activity, out of 150 samples 101 (67.33%) were belonged o broad spectrum and remaining 49 (32.66%) were belonged to narrow spectrum.

Table: 4 Spectrum of Antibiotics

S#	Name of Variable	Description	Type of Variable	Frequency	Proportion
1	Broad Spectrum	Antibiotic which is kill/stop two or more type of microbes	Spectrum of Antibiotics	101 / 150	67.33%
2	Narrow Spectrum	Antibiotic which is kill/stop particular type of microbes.	Spectrum of Antibiotics	49 / 150	32.66%

Based on type of Antibiotic, out of 150 samples 102 (68%) were of parenteral and remaining 48 (32) were oral antibiotics.

Table: 5 Kind of Antibiotics

S#	Name of Variable	Description	Type of Variable	Frequency	Proportion
1	Parenteral	I/V and I/M	Route of Administration	102 / 150	68%
2	Orals	Syrups, Suspensions, tablets, capsules	Route of Administration	48 / 150	32%

(Table-6) showed the cost saved during the study, there are 4 variables i.e. Average cost saved per patient, cost saved/patient, cost saved/month and total cost

saved in total 51 samples further quality of health care was also improved by the intervention in 99 samples i.e. 73%.

Table: 6: Cost Saved During Study and Quality of health care improved

S#	Description	Name of Variable	Frequency	Proportion
1	Cost of therapy decreased through study	Average Cost Saved per patient	51	8419PKR
		Cost Saved /Patient (Max)		30,000PKR
		Cost Saved / Month (Approx)		1,43134PKR
		Total Cost Saved		4,29404PKR
2	Quality of health care improved	With correct the drug related problems	99	73%

4. CONCLUSION

Antibiotics stewardship program is effectively implemented organizationally. It so important for all health care setup because through this strategy quality of health care of patients increased and cost of therapy decreased.

Conflict of Interest

There is no any Conflict.

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