

**RESEARCH ARTICLE****Prescribing pattern of antibiotics:
A Comparative survey in public and private hospital Malaysia****Saminathan Kayarohanam^{1,2}, Bino Kingsley¹ and Dr. M.R.Asoken²**

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Key words:Antibiotics, Prescription, Public,
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The objective of the present study is to evaluate the prescription pattern of antibiotics in public and private hospitals in Malaysia. Totally 6000 prescriptions were collected from public and private hospitals. Based on the collected prescription the frequency of penicillin combination with β -lactamase is prescribed frequently compared single penicillin. The percentage of third generation of cephalosporin's are frequently prescribed in public hospital, but in the case of public hospital, fourth generation of cephalosporin's are prescribed. The aminoglycoside antibiotics are frequently prescribed in the public hospital but in private hospital fluroquinolones are frequently prescribed. The present study is to know the physicians' prescription pattern of private and public hospitals in Malaysia.

*Copy Right, IJAR, 2013., All rights reserved.***Introduction**

Antibiotics are the most common prescribed group of drugs. The overuse of antibiotics is global issue. Unnecessary use of antibiotics by health professionals and public may increase the risk of side effects, resistance and additional cost (1-4). Overuse of antibiotics increases antimicrobial resistance and the number of medicines that are no longer effective against infectious disease. Many surgical procedures and cancer therapies are not possible without antibiotics to control infection. Overuse and insufficient dose of antibiotics has been prescribed in African, South American and Asian countries (5-9). The guiding principle of Antibiotics Smart Use (ASU) is that antibiotics should not be used to treat non-bacterial infections. This notion derives from a fundamental precept of the rational use of medicines: that these should be used appropriately, in accordance with clinical needs. (10, 11) Prescribing practices will reflect the health professionals' abilities to differentiate among the various choices of drugs and determine the drugs that will most benefit their patients (12).

There is a positive correlation between antimicrobial resistance and consumption of antibiotics (13-15). Antimicrobial resistance poses a serious threat to human health and welfare and undermines national economies worldwide. Annual losses stemming from antimicrobial resistance are estimated to range from 21 000 million to 34 000 million dollars in the United States of America (16) and about 1500 million Euros in Europe (17). Antibiotic usage tends to be costly, has the potential to cause various side effects and may also result in emergence and increase of bacteria resistance to antibiotics (18, 19). In addition to the global situation of antibiotic resistance, problems in individual countries needs to be monitored and managed locally (20). The proper use of antibiotics has led to decline in morbidity and mortality rate due to various infections. Prescribing pattern survey may help to understand the physician prescribing behavior and to improve the antibiotic rational drug use. The aim of the present study is to find out the prescription pattern of antibiotics between public and private hospitals in Malaysia.

Methodology

Prescriptions were collected from inpatients from Taiping public hospital and Pantai private hospital Malaysia. Both the hospitals are tertiary care hospitals which are from different districts of Malaysia. The present study includes 'inpatients prescription' which is written to the patients who has stayed for at least one night in either of the hospitals. These two hospitals are both from the private sector and public sector with microbiological investigational facilities. Antibiotics prescribed for patients in hospitals are to treat infections, preoperative, post operative and prophylaxis purpose. Each time when a patient was admitted to a department he/she was considered as a new patient. The prescription survey was conducted between Jan – August of 2012. Totally 6000 prescriptions with antibiotics were collected from private and public hospital, among the 6000 prescriptions, in which 3000 prescriptions are from private hospital and 3000 prescriptions from public hospital. There were various departments in each hospital out of which 8 departments were comparable. The mode of investigation on clinical data prescription which includes antibiotic, frequency, and duration of the drugs are compared between public and private hospitals.

Statistical Analysis

Statistical analysis of the collected data was done using SPSS and Excel. Frequencies and percentages were calculated for categorical variables, frequency, means, and standard deviation. The t-test was used to compare the data between the private and public hospitals for the significant.

Results

Table: 1 Antibiotic combination used in private and public hospital

	Private		Public	
Number of Antibiotic prescribed in single prescription	Number of prescription	Percentage	Number of prescription	Percentage
1 antibiotic	3000	42.56	3000	41.16
2 antibiotic	2280	32.35	2784	38.19
3 antibiotic	1532	21.73	1376	18.88
More than 3 antibiotic	237	3.36	129	1.77
	7049	100	7289	100

Table 1 show the number and percentage of antibiotics prescribed in private and public hospital. 6000 prescription were collected from public and private hospitals. Among the 6000 prescriptions 3000 prescriptions are from private hospital and 3000 from public hospital. 3000 prescriptions are from private hospital and the percentage of one antibiotic prescribed is 42.56%. The percentage of two antibiotics prescribed is 32.35%. The percentage of three antibiotics prescribed is 21.73 % and the percentage of more than 3 antibiotics prescribed is 3.36%. The prescriptions collected from public hospital are 3000. 41.16% prescription is prescribed with one antibiotic, 38.19% with two types of antibiotics, 18.88% with three types of antibiotics and 1.77% with more than three antibiotics.

Table 2: Distribution of antibiotics in public and private hospital

Antibiotics	Private Hospital	Frequency (%)	Public Hospital	Frequency (%)
Penicillins	2019	28.64	2904	39.84
Amoxicillin	137	6.79	82	2.82
Amoxicillin/Clavulanic acid	421	20.85	49	1.69
Ampicillin	255	12.63	350	12.05
Bacampicillin	37	1.83	15	0.52
Ampicillin/Sulbactam	624	30.91	767	26.41
Cloxacillin	474	23.48	672	23.14

Piperacillin/Tazobac	28	1.39	568	19.56
Benzathine penicillin (P)	31	1.53	163	5.61
Phenoxyethylpenicillin (V)	12	0.59	238	8.20
Cephalosporins	2528	35.86	1644	22.55
First generation				
Cephalexin	47	1.86	108	6.57
Second generation				
Cefuroxime	911	36.03	425	25.85
Third generation				
Cefotaxime	3	0.12	75	4.56
Cefoperazone	27	1.07	311	18.92
Cefoperazone + sulbactam	27	1.07	212	12.90
Ceftazidime	53	2.1	332	20.19
Ceftriaxone	604	23.89	108	6.57
Fourth generation				
Cefepime	856	33.86	73	4.44
Aminoglycosides	120	4.75	1057	14.50
Streptomycin	35	29.17	301	28.48
Amikacin	15	12.5	299	28.29
Fosfomycin	11	9.17	5	0.47
Gentamycin	23	19.16	244	23.08
Kanamycin	8	6.66	16	1.51
Netilmycin	3	2.5	7	0.66
Mitomycin	2	1.67	5	0.47
Vancomycin	23	19.17	180	17.03
Fluroquinolones	1082	15.35	64	0.88
Ciprofloxacin	463	42.79	21	32.81
Norfloxacin	153	14.14	12	18.75
Ofloxacin	296	27.36	17	26.56
Levofloxacin	50	4.62	8	12.50
Moxifloxacin	120	11.09	6	9.38
Macrolides	307	4.35	257	3.53
Azithromycin	110	35.83	127	49.42
Clarithromycin	163	53.09	12	4.67
Erythromycin	34	11.08	118	45.91
Tetracycline	308	4.36	84	1.15
Tetracycline	9	2.92	42	50.00
Doxymycin	285	92.53	21	25.00
Tigecycline	14	4.55	21	25.00
Carbapenems	174	2.47	226	3.10
Imipenam/cilastatin	5	2.87	190	84.07
Ertapenem	5	2.87	18	7.96
Meropenem	164	94.26	18	7.96
Miscellaneous	511	4.22	1053	14.45
Sulphonamide	46	0.65	369	5.06

Chloramphenicol	11	0.16	7	0.10
Metronidazole	420	5.96	637	8.74
Polymyxin	2	0.03	4	0.05
Clindamycin	7	0.1	21	0.29
Other	25	0.35	15	0.21

Table 2 shows the frequency of antibiotic used to treat infections for pre operative, postoperative and prophylaxis treatment. In private hospital the percentage of prescribed antibiotics are Cephalosporin's 35.86%, Penicillin's 28.64% and Fluroquinolones 15.35%. In the public hospital the percentage of prescribed antibiotics are Penicillin's 39.84%, Cephalosporin's 22.55% and Aminoglycosides 14.50%.

Table 3 Distribution of mean and standard deviation of antibiotics in public and private hospital

Antibiotics	Mean		Standard deviation	
	Private hospital	Public hospital	Private hospital	Public hospital
Penicillins	224.33	322.67	230.60	282.96
Cephalosporins	316.00	205.50	402.69	135.73
Aminoglycosides	15.00	132.13	11.38	137.65
Fluroquinolones	216.4	12.8	121.68	104.11
Macrolides	102.33	85.67	64.84	63.96
Tetracycline	102.67	28.00	157.93	12.12
Carbapenems	58.00	75.33	91.80	99.30
Miscellaneous	85.17	175.50	164.80	267.53

Table 3 shows the mean and standard deviation of antibiotics prescribed in private and public hospital.

Table 4: Statistical significance of antibiotics prescribed in public and private hospital by t-Test

Antibiotics	Non-Significant	Significant
Penicillins	0.265	
Cephalosporins	0.475	
Aminoglycosides		0.036
Fluroquinolones		0.045
Macrolides	0.834	
Tetracycline	0.514	
Carbapenems	0.87	
Other	0.183	

Table 4 shows Aminoglycosides and fluroquinolones antibiotics were found to be significant and other antibiotics are non significant

Discussion and Conclusion

Amoxicillin, ampicillin and cloxacillin are the most frequently prescribed penicillin's. The frequency of penicillin combination with β -lactamase is more frequently prescribed compared to single penicillin antibiotic. The frequency of penicillin prescription is higher in public hospital when compared to private hospital but in the case of cephalosporin's prescription pattern, it is the reverse. The percentage of second generation antibiotics are highly prescribed in public hospital but third and fourth generation antibiotics are slightly more in the private hospital. The major finding of the present study is that aminoglycoside antibiotics are frequently prescribed in public hospital and in case of private hospital fluoroquinolones are prescribed more. Aminoglycoside antibiotics streptomycin, amikacin and gentamycin are the drugs most frequently prescribed. There are not many differences between public and private hospitals in prescribing macrolides, tetracycline, cabapenems and miscellaneous antibiotics. Overall, from the comparison in study of antibiotics prescription, we came to know that cephalosporin's are more frequently prescribed antibiotics. Improper prescription pattern of antibiotics may increase the side effects, cost of the therapy and resistance of antibiotics. Further study is required to develop the policy and procedure to promote the rational antibiotics usage in private and public hospitals.

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