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RESEARCH ARTICLE

PHARMACY PRATICE

EFFECT OF REGULATIONS ON THE APPROPRIATE USE OF ANTIBIOTICS

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ABSTRACT

The study was conducted to evaluate the effect of restriction on the appropriateness of the antibiotic use. It was performed before and after the restricted use of antibiotics in all the hospitalized patients in the medical ward. The uses of all antibiotics were regulated and uses of certain antibiotics were restricted. It was observed that the appropriateness was increased after restriction. The culture based treatment also increased. The causes for inappropriate use also studied. All the important parameters showed significant reductions after the regula tion.

KEY WORDS

Antibiotics, Inpatients, Regulations, Appropriate use.

INTRODUCTION

Antibiotics have been frequently used for decades world wide for effective treatment of a variety of bacterial infections.[1] However it is generally accepted that most of them are unnecessarily prescribed.[2,3] The widespread use and misuse have given rise to an increased risk of side effects, drug toxicity, and makes the treatment more expensive. Moreover, the inappropriate use of antibiotics leads to the development of bacterial resistance to antibiotics.[2,3,4,5] The development of multi drug resistant organisms and increasing expenditure on broad spectrum antimicrobials have lead many hospitals to implement strategies to control or prevent them.[6,7,8,9]Various programs to improve rational antibiotic prescription have been implemented in many hospitals which include initiating continuing education, regulating the practices, restricting the prescriptions, dispensing controls etc. However it is vivid that a multidisciplinary approach is required to be more effective.[10, 11, 12]

MATERIALS AND METHODS

A prospective study was conducted for all the adult cases admitted in the general medicine ward during a period of two years. All the individual medical records were studied with respect to demographic data, indication for initiation of treatment, source of infection, period of stay in the hospital, number of medicines prescribed, number of antibiotics used, total doses of antibiotics consumed, microbiological reports including bacterial identification, sensitivity as well as resistance towards the antibiotic prescribed. The study was approved by the Hospital Ethical Committee and informed consent was obtained from all patients before the commencement. Adherence to the hospital formulary was strictly followed during the period of study. Restrictions were imposed on the antibiotic prescription pattern for a period of one year. Intervention letters were issued to all physicians regarding the regulation in antibiotic prescription; thereby prescriptions of expensive antibiotics as well as certain injections were restricted.

RESULTS

Out of 4897 patients admitted in the general medicine ward before the regulation, 2375 (48.5%) received antibiotics. After implementing the regulation on the antibiotic prescription, the study showed that out of 6765 patients admitted, 2425 (35.8 %) received antibiotics.
Among 2375 patients on antibiotic before the restricted use, 290 (12.2%) was for prophylactic and 2085(87.8%) for curative treatment. Out of the 2085 curative cases, 392 (18.8%) were culture based while1693 (81.2%) were empiric. (Table-1) Inappropriate use of antibiotics was observed in 760 patients (32.0 %). Out of this, antibiotics used in 40 cases (13.8%) were prophylactic, 639 (37.7%) were empiric and 81(20.7%) culture based .(Table-1)

Out of the 2425 patients on antibiotics after the restricted use, 78 (3.2%) were prophylactic and 2347 (96.8 %) for curative treatment. Among 2347 curative cases, 728(31%) were culture based and 1619(69%) empiric. (Table-1) Inappropriate use was observed in 254 (10.5%) cases. Among this, 5 (6.4%) were prophylactic, 235 (14.5%) cases empiric and 14 (1.9%) culture based. (Table-1)

The most frequent causes of inappropriate use of antibiotics were also studied before and after the restricted use. (Table-2)

Table – 1
Summary of Appropriateness of Antibiotic Use

Particulars	Before Restricted Use of Antibiotics n (%)	After Restricted Use of Antibiotics n (%)
Total Number of Admissions (n)	4897	6765
Number of patients used Antibiotics	2375(48.50)	2425(35.85)
A. Prophylactic	290(12.21)	78(3.22)
B. Treatment	2085(87.79)	2347(96.78)
a) Empiric	1693(81.20)	1619(68.98)
b) Culture Based	392(18.80)	728(31.02)
Appropriate	1615(68.00)	2171(89.53)
Inappropriate	760(32.00)	254(10.47)
1. Prophylactic	40(13.79)	5(6.41)
2. Empiric	639(37.74)	235(14.52)
3. Culture Based	81(20.66)	14(1.92)

**p-value calculated using Chi-square test (two tailed, a = 0.05) and all values showed p<0.001*

Table- 2
Summary of Sources of Inappropriate use of antibiotics

Classification	Number of Cases Before Restricted Use of Antibiotics (n = 760) n(%)	Number of Cases After Restricted Use of Antibiotics (n = 254) n(%)
No Indication	141(18.55)	31(12.20)
Improper Dose or Dosage Interval	160(21.05)	98(38.58)
Incorrect Choice of Antibiotic	65(8.55)	8(3.15)
Unnecessary or Improper Combinations	166(21.84)	36(14.17)
Expensive or Toxic Drugs	149(19.61)	28(11.02)
Improper Beginning or Duration of Treatment	79(10.39)	53(20.87)

****p-value calculated using Chi-square test (two tailed, a = 0.05) and all values showed p <0.001***

DISCUSSION

Drug utilization studies are important to measure the pattern and quality of drug use which facilitate the rational use of drugs. Rationalization of antibiotics requires appropriateness, safe and cost effective prescribing pattern. The use of drugs in our hospital was found to be irrational and expensive. With the introduction of hospital formulary we could enforce a regulation on the prescription pattern and use of antibiotics. But, adherence to the hospital formulary alone did not improve the appropriateness of antibiotic use. Therefore, we have introduced restriction in the prescribing pattern. The prescribers' behaviour changed significantly after the intervention. The use of antibiotics were reduced by 26.07% (48.50% to 35.85 %) after the intervention. This effect can be attributed to the strict monitoring of antibiotic use and the increased patient care.

Most of the time antibiotics were prescribed empirically. This may be due to the critical condition of the patients which require an urgent treatment. But the percentage of prescriptions for empirical use of antibiotics decreased during the post intervention period indicating the influence of the intervention on the prescribing pattern of clinicians. Culture based treatment was increased by 64.89 % (from 18.80% to 31.02%) during the post intervention period indicating an appropriate treatment. After the culture and sensitivity

tests the antibiotic treatment was revised changed or discontinued in most of the cases. This resulted in a significant decrease of empirical use of the antibiotics by 15.02 % (from 81.2% to 68.98%).

The increase in the rate of appropriate use from 68% to 89.53% and a decrease in the inappropriate use from 32% to 10.47% indicated the effectiveness of intervention as well as the cooperation of all health personnel, the better follow up system and of course the support of the policy maker.

Inappropriate use of antibiotics was studied on different categories. There was a significant reduction in the “no indication” focused treatment after the restricted use of antibiotics by 34.23%. Use of drug combination has become a regular practice in the modern drug therapy. This was prevalent in our hospital also. After the intervention it was significantly reduced by 35.11%.

The cost of the drug is an important concern for the patient, where antibiotics have a major role. It was generally observed that expensive drugs were prescribed when drugs of the same class with affordable price were available. The situation was quite same in our hospital too. But after the study period there was a remarkable decrease of 43.8% in the prescription of expensive antibiotics.

There was no much improvement on improper dose or dosage interval as well as improper start and duration of treatment category after intervention.

CONCLUSION

The study proved that restricted use of antibiotics improved the appropriate and effective use of antibiotics to the patients. The research work emphasizes that strict regulation on the use of antibiotics is essential to promote rational use.

REFERENCES

1. David L Paterson, The Role of Antimicrobial management Programs in Optimizing Prescribing within Hospitals, Clinical Infectious Diseases,42: 590-595,(2006).
2 Sturiz R.E and Carbon C .Antibiotic use in developing countries. Infect Control Hosp Epidemiol, 21:394-403,(2000).
3. Tunger O,Dinc G,Ozbakkaloglu B, et al Evaluation of rational antibiotic use.Int J Antimicrob Agents,15:131-135,(2000).
4. Tenover FC, Mechanisms of antimicrobial resistance in bacteria. Am.J Med, 119:3-10 &62-70,(2006).
5. Russell AD Tattawasart U, Maillard JY et al. Possible link between bacterial resistance and use of antibiotics and biocides. Antimicrob Agents Chemother, 42:2151,(1998).
6. ArasonVA,SigurdssonJA,Erlendsdottir et al. The role of antimicrobial use in the epidemiology of resistant peumococci a 10 year follow up. Microb Drug Resist,12:169-76,(2006).
7. New HC The crisis in antibiotic resistance,.Science, 257:1064-73,(1992).
8. Lifang Dong, Hong Yan, and Duolao Wang, Antibiotic prescribing patterns in health clinics across 10 provinces of Western China. Journal of Antimicrobial Chemotherapy,62:410-415, (2008).
9. Goldmann DA,Weinstein RA,Wenzel RPet al.Stategies to prevent and control the emergence and spread of antimicrobial resistant microorganisms in hospitals A challenge to hospital leadership.JAMMA,275:234-40,(1996).
10. Marr JJ,Moffet HL,Kunin CM,Guidelines for improving the use of antimicrobial agents in hospitals A statement by the infectious Disease Society of America. J Infect Dis,157:869-76, (1988).
11. English S and Scott E Empiric therapy for treatment of infection and the influence of antibitotic guidleline on outcomes IntJ Pharm Practice,3:231-35, (1995).
12. Gyssens IC,Blok WL,Van den Broek Pj et al Implementation of an educational program and an antibiotic order form to optimize quality of antimicrobial drug use in a pepartment of internal medicine. Eur.J Clin Microbiol Infect Dis, 16:904-12, (1997).