International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

Trends of Antibiotic Use Among the Indoor Patients of Medicine and Pediatric Ward at A Tertiary Care Hospital

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Abstract: ***Introduction: Antibiotics are one of the most frequently used drugs in outpatient and inpatient care, and their irrational use is considered to be an important risk factor for the development and spread of antimicrobial resistance. Material and methods: A cross sectional study was conducted where information about patient's age, gender, and different groups of antibiotics was collected from the medicine and pediatric indoor wards in a tertiary care hospital and was analysed. Results: Analysis was carried out on 367 patients. Number of antibiotics prescribed per patient was 1.2. A total of 19 types of antibiotics were prescribed to 323 patients. Conclusion: The study has provided baseline knowledge about the ongoing trends of antibiotic prescription among the indoor patients. It highlights the need to introduce guidelines for prescribing antibiotics based on high prescribing rates calculated in the study***

Keywords: Anti-bacterial agents, hospitals, tertiary health care, medicine, pediatrics.

1. Introduction

Prescribing medicines is a complex skill that depends on a sound knowledge of drugs, an understanding of the principles of clinical pharmacology as well as the ability to make judgments concerning benefits and adverse effects of drugs[1]. The importance of modern therapeutic agents for diagnostic, curative and preventive purpose and their contribution to health care requires no emphasis. However, it is important to realize that every medicine is potentially hazardous[2]. Antibiotics are one of the most frequently used drugs in outpatient and inpatient care, and their irrational use is considered to be an important risk factor for the development and spread of antimicrobial resistance[3]. Antibiotic consumption in India has increased between six and seven per cent annually in the past 5 years[4]. Various surveys have been conducted in India showing increase in use of antibiotics especially cephalosporins[5,6]. Antimicrobial resistance, a global problem, is particularly pressing in developing countries where the infectious disease burden is high and cost constrains the replacement of older antibiotics with newer, more expensive ones[7].It is estimated that 20-50% of all antibiotics use is inappropriate, resulting in an increased risk of side effects, higher costs and higher rates of AMR in community pathogens [6].Every time an antibiotic is used - whether appropriately or not, in human beings or in animals- the probability of the development and spread of antibiotic-resistant bacteria is increased[7].The analyses indicate that the time scale for emergence of resistance under a constant selective pressure is typically much shorter than the decay time after cessation or decline in the volume of drug use and that significant reductions in resistance require equally significant reductions in drug consumption[8]. To tackle bacterial resistance, the World Health Organization proposed, among numerous interventions, that prescribers adopt and use protocols or guidelines based on strong evidence for the use of antibiotics for community infections[9]. The problem still remains far away from being an ideal situation. The present study was carried out to determine prescribing pattern and utilization of antibiotics in the medicine and paediarics indoor patients at tertiary care Hospital in North India.

2. Materials and Methods

2.1 Study Design

Cross-sectional study

2.2 Study Period

2 months (from May-2014 to June- 2014)

2.3 Study Setting

The study was conducted in the Patiala district of Punjab. The data was collected from the medicine and pediatric indoor wards at Rajindra Hospital which is a government tertiary care Hospital in Patiala. These are the hotter months of the year when infectious diseases such as diarrhoea are more frequent. The study included all ‘inpatients’, defined as patients who stayed for at least one night. Each time a patient was admitted to a department he/she was considered as a new patient. In this study an inpatient that was prescribed one or more antibiotics at any stage during their hospital stay is defined as an ‘antibiotic patient’. 250 patients from medicine ward and 117 patients from pediatric ward were included in the study, regardless of clinical presentation & diagnosis.

2.4 Study Procedure

Information about patient's age, gender, and different groups of antibiotics was gathered. Data on antibiotic use was collected by reviewing medical charts of all patients hospitalized during the study period. After getting the required data, the average age of patients, average number of antibiotics per patient and frequently used antibiotic in medicine and pediatric wards was calculated.

2.5 Exclusion Criteria

Anti-tuberculous drugs were excluded from analysis

2.6 Ethics Approval

Approval of the Institutional Ethics Committee was obtained prior to commencement of the study.

2.7 Consenting Procedure

Consent was taken from the doctor-in-charge and from the patient prior to recording of data.

2.8 Statistical Analysis

The results were summarized in the tables and computer based analysis was used for processing the data.

3. Results

Analysis was carried out on 367 patients. 250 patients were from the medicine department and 117 were from pediatrics department.

Mean age of patient in medicine ward was 49.24 years and in pediatric ward was 37. 29 months. Out of 367 patients, 323 (88%) patients received antibiotic therapy. 221 (68.4%) patients were given single antibiotic, while 80(24.7%) received two antibiotics, 22(0.07%) received 3 or more than 3 antibiotics.

Antibiotic prescribing rate was 84.8% in medicine ward, while in paeditaric ward it was 94.9%. Number of antibiotics prescribed per patient was 1.2. A total of 19 types of antibiotics were prescribed to 323 patients.

The most frequently used antibiotics were Ceftriaxone alone (31.4%), followed by ceftriaxone and sulbactam (12.6%). The total ceftriaxone used was 44.1%.

Distribution of commonly prescribed Antibiotics and their groups is described in Table 1 and Figure 1 respectively.

Table 1: Analysis of prevalence of antibiotics based upon the class of the drug used

S. No.	*Class of antibiotic used*	*No. of patients*	*Percentage use of the antibiotic*
1	Ceftriaxone only	139	31.4%
2	Ceftriaxone + sulbactam	56	12.6%
3	Cefotaxime	28	6.3%
4	Amikacin	27	6.1%
5	Meropenems	25	5.6%
6	Vancomycin	21	4.75%
7	Amoxycillin + Clavulanic acid	20	4.5%
8	Azithromycin	20	4.5%
9	Cefixime	20	4.5%
10	Piperacillin + tazobactam	19	4.2%
11	Metronidazole	16	3.6%
12	Ciprofloxacin	12	2.7%
13	Ofloxacin	12	2.7%
14	Linezolid	08	1.8%
15	Ceftazidime	06	1.3%
16	Levofloxacin	05	1.1%
17	Ampicillin	04	0.9%
18	Cefopodoxime	02	0.4%
19	Cotrimoxazole	02	0.4%

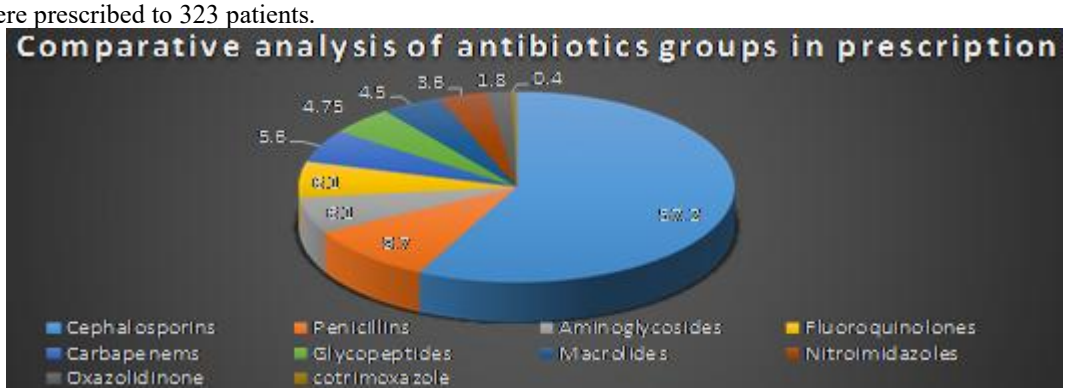

Figure 1: shows comparative analysis of Antibiotic groups

4. Discussion

The bacterial disease burden in India is among the highest in the world. Consequently, antibiotics will play a critical role in limiting morbidity and mortality in the country[7].There is much ad-hoc information about the inappropriate consumption of antibiotics, over-the-counter availability, and inadequate dosage leading to antibiotic resistance[6]. Knowing that antibiotic resistance is a reality in India and knowing that the prevalence of resistant bacteria will rise over time, no serious constituencies can oppose acting to slow its spread. As with all interventions, preventing the spread of antibiotic resistance will have costs as well as benefits and will not be achieved without deliberate effort[7]. The current worldwide increase in antimicrobial resistance (AMR) and, simultaneously, the downward trend in the development of new antibiotics have serious public health and economic implications[6].

Our study confirms that 88% of total indoor patients received antibiotics regardless of diagnosis and clinical presentation, which is comparable to a study conducted at sheikh zayed hospital[10] which showed 81.2% antibiotic consumption. It is also comparable to a study at KTH, peshawar[11] which

showed 78.7% antibiotic consumption. Same pattern was observed in a study conducted in India which showed 82% in the Teaching hospital (TH) and 79% in the Non-teaching hospital (NTH)[12]. Where 94.9% of our pediatric patients received antibiotics, only 66% was the prescription rate in a study conducted in Guwahati on pediatric patients[13]. But our figure is much higher than other parts of Asia, Europe or USA[14-16]. This percentage was 71.1% in Bangladesh[17] , 45.8% in Bahrain, Jordan 60.9%[18] , Sudan 63%[19] & 56.2% in Saudi Arabia[20].

The mean single antibiotic prescribed per patient in our study was 1.2 which is low in comparison to most studies. It was 1.8 in a study held in pakistan[10], 3.3 in Bahrain[21] which is the highest among many other countries. In the Asir region of Saudi Arabia[20], the mean number of antibiotics prescribed per patient was 1.44.

In our study, the most commonly used drug was Ceftriaxone(ceftriaxone with sulbactam included) (44.1%). In a study at Rajaram Hospital and trauma hospital, Panki, the most commonly prescribed antibiotic was amoxicillin and clavulanic acid[22]. Much higher percentage was shown in a study in India (82%)[23] and in pakistan(65.3%)[10]. whereas another study in India showed comparable levels of ceftriaxone (21%), ceftriaxone with sulbactam (9%)[12] compared to our study ie 31.4% and 12.6% respectively. Another study at Bangladesh showed 30.2% consumption of Ceftriaxone[17].

Amikacin(6.1%) which stood at 3rd position in our study has comparable usage according to a study in non teaching Hospital in India(8%)[12]. Metronidazole(3.6%) showed much lower levels than 49.3% in a study in pakistan[12]. Quinolones utilization was 6.1% which is less than utilization in a study at sheikh zayed college in pakistan[12] and comparable to another study at KTH Peshawar(9.7%)[11], whereas rates were 23% in a teaching hospital in India[12].

5. Conclusion

Where older antibiotics are saying farewell to us, and newer antibiotics either highly expensive or still in their trial periods, a day is not so far when people of our own kind will be succumbing to minor infections. The common prescription patterns observed in hospitalized patients reflect the need for implementing actions.

The news of vancomycin resistant staph aureus in hospitals has already rung the warning bells. This study has successfully reflected the trends of ongoing practices which will surely take us to that stage. Though we did not evaluate the appropriateness of antibiotic use, the study highlights the need to introduce guidelines for prescribing antibiotics. There is a need of jotting down the guidelines for the use of antibiotics by doctors themselves. If not today, than tomorrow shall never come. This study has provided the baseline knowledge about the ongoing trends of antibiotic prescription among the indoor patients. This may in future become the trend of antibiotic resistance.

Medical representatives try all means to fulfill their sale targets, thus there is a need of surveillance of antimicrobial use in hospitals and therefore important to curb this ill practice and also identify areas for improvement. Time has come to take steps to prevent the new epidemic of antimicrobial resistance.

References

[1] Robert Likic, Simon R. J. Maxwell. Prevention of medication errors: teaching and training. Br J Clin Pharmacol 2009; 67(6):656–61.
[2] Sneha Susanna George, Shereen Rachel Varghese, Clarence J Samuel. Evaluation of antibiotic prescribing patterns among medical practitioners in North India. Indian Journal of Basic & Applied Medical Research 2013; 8(2):952-7.
[3] Goossens H, Ferech M, Vander Stichele R, Elseviers M, ESAC Project Group. Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. Lancet 2005; 365:579-87.
[4] Antibiotic resistance in India high: survey. http://www.thehindu.com/sci-tech/health/policy-and-issues/antibiotic-resistance-in-india-high-survey/article2512475.ece
[5] Kotwani A, Holloway K, Roy ChaudhuryR. Methodology for surveillance of antimicrobials use among out-patients in Delhi. Indian Journal of Medical Research 2009; 129:555-60.
[6] Kotwani A, Holloway K. Trends in antibiotic use among outpatients in New Delhi, India. BMC InfectiousDiseases2011;11:99.
[7] Global Antibiotic Resistance Partnership (GARP) - India Working Group, Rationalizing antibiotic use to limit antibiotic resistance in India, Indian J Med Res. Sep 2011; 134(3): 281–294.
[8] D. J. Austin, K. G. Kristinsson, and R. M. Anderson, The relationship between the volume of antimicrobial consumption in human communities and the frequency of resistance, Proc Natl Acad Sci U S A. Feb 2, 1999; 96(3): 1152–1156.
[9] Khaled M Alakhali, Asif Ansari Shaik Mohammad. Prescribing Pattern of Antibiotics in Pediatric Patients in the Jazan Region, Kingdom of Saudi Arabia. RGUHS J Pharm Sci 2014; 4(3):106-19.
[10] Abdul Karim , Moazzam Ali Atif , Maida Irshad , Fareeha Khalid. Survey of antibiotic utilization at sheikh zayed hospital. J Sheikh Zayed Med Coll 2011; 2(2);168-70.
[11] Farooqi RJ, Afridi MZ, Raeesa I. A survey of antibiotic use in hospitalized adult patients in Khyber Teaching Hospital Peshawar Pakistan. Pak J Chest Med. 2005; 11(1):5-10.
[12] Megha Sharma , Bo Eriksson, Gaetano Marrone, Suryaprakash Dhaneria and Cecilia Stålsby Lundborg,Antibiotic prescribing in two private sector hospitals; one teaching and one non-teaching: A cross-

sectional study in Ujjain, India,BioMed Central Ltd. 2012; 12:155.
[13] Choudhury DK andBezbaruah BK. Antibiotic Prescriptions Pattern in Paediatric In-Patient Department Gauhati Medical College and Hospital, Guwahati. J App Pharm Sci 2013; 3 (08): 144-148.
[14] Chang S-C, Chang H-J, Lai M-S. Antibiotic usage in primary care units in Taiwan. Interl J of Antimicrobial Agents 1999; 11:23-30.
[15] Vaccheri A, Bjerrum L, Resi D, Bergman U, Montanaro N. Antibiotic prescribing in general practice: Striking differences between Italy and Denmark (Funen). J of Antimicrobial Chemotherapy 2002; 50:989-997.
[16] Larson E, Lin SX, Gomez- Duarte C. Antibiotic Use in Hispanic Households, New York City. Emerging Infectious Diseases 2003; 9(9):1096-1102.
[17] Fahad bm, antibiotic usage at a primary health care unit in Bangladesh. Australasian Medical Journal, june 6, 2010; 3(7):414-21.
[18] McKee MD, Mills L, Mainous AG III. Antibiotic use for the treatment of upper respiratory infections in a diverse community. j farm pract 1999, 48; 993-6.
[19] O'Brien TF. The global epidemic nature of antimicrobial and the need to monitor and manage it locally. Clin Infect Dis 1997; 24(Suppl 1):2-8.
[20] Bouza E, Cercenado E. Klebsiella and Enterobacter:Antibiotic resistance and treatment implications. Semin Respir Infect.2002; 17: 215-23016.Metlay JP, Shea JA, Crossette LB, Asch DA. Tensions in antibiotic prescribing: Pitting social concerns against the interests of individual patients. J Gen Intern Med 2002; 17:87-94.
[21] Otoom S, Culligan K, Al-Assoomi B, Al-Ansari T. : Analysis of drug prescriptions in primary health care centres in Bahrain. East Mediterr Health J 2010;16 **(**5**)**:511-5.
[22] wal pranay, wal ankita, Srivastava Rishabh, Rastogi Prateek, Rai. Awani K. antibiotic therapy in pediatric patients. Research J. Pharma and Tech 2010; 3(1):118-120.
[23] Harugeri A, Joseph J, Parthasarathi G, Ramesh M, Guido S. Prescribing patterns and predictors of high-level Polypharmacy in the elderly population: A prospective surveillance study from two teaching hospitals in India. Am J Geriatr Pharmacother. 2010; 8(3):271-80.

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