A step towards antibiotic stewardship - Evaluation of antimicrobial usage among patients of rural teaching hospital of Telangana

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Abstract

Background: Antimicrobial resistance is a global, multifactorial problem. A few hospital studies of antimicrobial use suggest that they are often prescribed in an incorrect dose, frequency and duration. Overprescribing and overuse are seen in all sectors: public and private hospitals, clinics and pharmacies. Assessment of prescription for antibiotic use provides useful information to health care providers and policy makers. With this background, the study was carried out with the aim of identifying prescription pattern of antibiotics and its rationality in a teaching hospital. **Material and Methods:** Antimicrobial agents (AMA) containing prescription of patients visiting OPD of General Medicine, General Surgery , Paediatrics and OBGY departments were included in the study. Details of all the eligible prescriptions were noted down in a case record sheet. Data analysis was done based on demographic profile, diagnosis of patients, antibiotics prescribed and quality of prescription. **Results:** Out of the 300 patients screened, 44.4% were men and 55.6% patients were women. Provisional diagnosis as acute febrile illness / acute tropical fever (32%), and fever with body ache (28%) were the leading diagnosis for which antibiotics were prescribed. The most commonly prescribed antibiotics were Cefexime (68%), followed by Augmentin (46%) and Ofloxacin - ornidazole (42%).The most common inappropriate use was no outlook for culture sensitivity or susceptibility pattern not defined. **Conclusion:** Antibiotics are prescribed unnecessarily for acute febrile illness and fever with body ache where clinical picture is more likely to be viral fever. Broad spectrum antibiotics and FDC's are commonly prescribed agents. Change in the initial empirical therapy needs to be done as per culture sensitivity reports. The practice of sending specimens for culture and sensitivity needs to be emphasized by activities like conducting CME programs/ sensitization on antimicrobial stewardship.
Key Words: Antibiotics, prescription, antimicrobial resistance, FDCs

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INTRODUCTION

Antimicrobials, regarded as miracle drugs and magic bullets of 20th century saved countless lives of patients suffering from deadly infections. The necessity and use of antimicrobials has gradually transferred into abuse leading to the development of antimicrobial resistance crisis.[1,2,3] In 2010, India was the world's consumer capital of antimicrobials for human health at 12.9 x 109 units (10.7 units per person).[4] The Centers for Disease Control and Prevention (CDC) estimates that more than two million people are infected with antimicrobial-resistant organisms, resulting in approximately 23,000 deaths annually.[5] World Health Organization in 2011, addressing this concern selected the theme- "Combat antimicrobial resistance- No action today, no cure tomorrow".[6] ICMR states that, up to 50% of antimicrobial use is inappropriate in Indian hospitals.[7] A few hospital studies of antimicrobial use suggest that they are often prescribed in an incorrect dose, frequency, duration, are unnecessary or have the potential for adverse interactions with other

drugs.[8,9] Studies have mentioned an inappropriate indication for antimicrobial use like upper respiratory tract infections.[10] Overprescribing and overuse are seen in all sectors: public and private hospitals, clinics and pharmacies.[11] Approximately 45 to 80 per cent of patients with symptoms of acute respiratory infections and diarrhea are likely to receive antimicrobials, even though it will not be effective if they have a viral illness rather than a bacterial one.[12,13] Resistance to antibiotics is on the rise but the development of newer antibiotics is in decline. [12, 13] Of the 18 largest pharmaceutical companies, [15] abandoned the antibiotic field due to lesser economic dividend and stringent regulatory issues.[14] With no newer antibiotics in pipeline and emergence of new resistant strains like Methicillin Resistant Staphylococcus Aureus (MRSA), Vancomycin Resistant Staphylococcus Aureus (VRSA) or Vancomycin Resistant Enterococci (VRE), further necessitates rational prescribing of antimicrobials. [15] Improvement in antibiotic use by adopting "Antibiotic Stewardship Programs (ASPs)" can standardize the treatment of infections and reduce antimicrobial misuse. [16,17] Assessment of prescription for various parameters like antibiotics for a particular infection in correct dose and duration, obtained cultures and sensitivity prior to treatment provides useful information to health care providers and policy makers. With this background, the study was carried out with the aim of identifying prescription pattern of antibiotics and its rationality in a teaching hospital.

OBJECTIVE

To determine antimicrobial use and rationality of prescription in patients attending out-patient clinical departments of a rural teaching Hospital of Telangana.

MATERIAL AND METHODS

Type of Study: The present study was a prospective observational study carried out for the period of two months in the departments of Medicine, Pediatrics, and Obstetrics and Gynecology (OBGY) outpatient unit. Approval for the study was obtained from the Institutional Ethics committee. Due co-operation request from respective head of the departments was obtained. Informed oral consent was obtained from the patients before including their prescription in this study.

Study setting: General Medicine, General Surgery, Pediatrics and OBGY outpatient unit of Mahavir Institute of Medical Sciences (MIMS), Vikarabad, Telangana.

Study Population: Study subjects were selected from patients visiting OPDs of above departments of MIMS during the study period after applying following inclusion and exclusion criteria.

Inclusion criteria: Antimicrobial agents (AMA) containing prescription of patients visiting OPD of General Medicine, General Surgery , Paediatrics and OBGY departments during the study period .

Exclusion criteria: AMA Prescriptions of In-patients admitted in the hospital and severe life threatening cases with complication (critical care unit admitted cases).

Data collection: Details of all the eligible prescriptions were noted down in specialized case record sheet. The OPD slip or prescription note was the source for data collection with regard to antibiotic prescription. At the end of the study, all the individual patient data is transferred to master excel sheet for analysis.

Data analysis: It was done based on demographic profile, diagnosis of patients, antibiotics prescribed and quality of prescription.

RESULTS

In this present study, we screened 300 patients from various departments who were prescribed antimicrobials as mentioned in Table 1. The prescription patterns of these patients were studied and analyzed for various details. Out of the 300 patients screened, 44.4% were men and 55.6% patients were women. Maximum numbers of patients were in the age group of 17–40 years..

Table 1: Department wise distribution of total prescriptions

S.no	Department	Total prescriptions
1.	General medicine	114 (38%)
2.	Gynecology and obstetrics	112 (37.4%)
3.	General surgery	44 (14.6%)
4.	Paediatrics	30 (10%)
	Total	**300**

Table 2: Demographic profile of patients

Age group (years)	Male	Female	Total
0-16	20	10	30
17-40	54	88	142
41-60	52	64	116
61-80	07	05	12
Total	**133 (44.4%)**	**167 (55.6%)**	**300**

Provisional diagnosis as acute febrile illness / acute tropical fever (32%), and fever with body ache (28%) were the leading diagnosis for which antibiotics were prescribed. The most commonly prescribed antibiotics were Cefexime (68%), followed by Augmentin (46%) and Ofloxacin - ornidazole (42%).The percentage of other antimicrobials is as mentioned in Table 4. Prescription analysis revealed inappropriate use of antibiotics as mentioned in Table.5. The most common inappropriate use was no outlook for culture sensitivity or susceptibility pattern not defined.

Table 3: Diagnosis /indication for antibiotic treatment

S.no	Diagnosis /indication	No. of patients (%)
1.	Acute febrile illness/acute tropical fever	32 %
2.	Fever With body ache	28%
3.	URTI	12%
4.	Vaginitis	8%
5.	Enteric fever	5%
6.	Cellulitis	5%
7.	Tonsillitis	4%
8.	UTI	4%
9.	Others *	2%
	Total	**100%**

Table 4: Percentage of antimicrobials prescribed

S.no	Antibiotics	Percentage of antibiotics prescribed
1	Cefexime	
2	Augmentin	46%
3	Ofloxacin ornidazole	42%
4	Metronidazole	22%
5	Amoxicillin	18%
6	Ofloxacin	18%
7	Ciprofloxacin	12%
8	Doxycycline	10%
9	Azithromycin	10%
10	Cefodoxime	03%
11	Cefuroxime	02%
12	Norfloxacin	02%

Table 5: Prescriptions analysis for inappropriate use

S.no	Prescription details of antibiotic	Number of prescriptions (%)
1.	Susceptibility pattern not defined	292 (97.3%)
2.	Frequency of administration not mentioned	22 (7.3%)
3.	Dose not mentioned	10 (3.3%)
4.	Duration not mentioned	08 (2.6%)

DISCUSSION

World Health Organization's 2014 report on global surveillance of antimicrobial resistance proves that antibiotic resistance is no longer a future issue but already existing globally. Resistance to common bacteria has reached alarming levels in many parts of the world indicating that many of the available treatment options for common infections in some settings are becoming ineffective.[18] Overuse plays an important role in the emergence of AMR. Paradoxically, underuse through inappropriate choice, inadequate dosing, poor adherence to treatment, and substandard antimicrobials, also plays an important role in the emergence and spread of AMR. [19] The 5 D's of Antimicrobial Stewardship include correct Diagnosis, Drug selection, Dose optimization, Duration of therapy, De-escalation after initial therapy. In the

present study, maximum prescriptions mentioned provisional diagnosis as acute febrile illness / acute tropical fever, and fever with body ache. Very few prescriptions clearly mentioned specific infection which needed treatment with antibiotic. Monitoring the quality of antimicrobial prescriptions is needed to ascertain whether the clinical picture is compatible with an infection. Also mentioning a valid indication for treatment with antibiotics is necessary as per standard treatment protocol. In the present study, maximum patients with clinical picture of fever with body ache assumed to be viral fever were prescribed antibiotics which are an inappropriate indication. Overuse, misuse, and over prescription of antibiotics lead to antibiotic resistance. Antibiotics are intended for diseases with bacterial origins. However, at least 75% of adults in the US being treated for infections like bronchitis generally caused by a virus, are prescribed antibiotics. [20] Community studies have concluded that approximately 70 % of patients are given antibiotics for infections like diarrhoea and fever, which are principally caused by viuses. [21] Cefexime was the most commonly prescribed agent which is a broad spectrum agent. Antibiotic fixed-dose combinations (FDCs) were second leading prescribed agents. Use of narrow-spectrum antibiotics where possible is an important strategy of antimicrobial stewardship activity. FDCs are combinations of two or more active antibiotics in a single dosage form. Antibiotic FDCs should be prescribed when the combination has a proven advantage over single compound administered separately in therapeutic effect, safety, or compliance. [22] However, in India, antibiotic FDCs are unnecessarily prescribed contributing to increased drug sales of antibiotics. [23] Lack of diagnostic accuracy due to unavailability of diagnostic services has resulted in increased use of FDCs in India. [22] Injudicious use of antibiotic FDCs could lead to emergence of bacterial strains resistant to multiple antibiotics. Culture sensitivity was not recommended and also not done in the present study (97.3%) for majority of patients. Culture was done only for 5 cases of enteric fever and 3 cases of UTI. CDC recommends that every hospital implement a program to help improve prescribing practices. It is recommended that physicians who prescribes antibiotic reassess their patients after 48hours after initiation to see whether the dose, duration or antibiotic needs to be tailored as per culture and sensitivity. Antibiotics are often started empirically in hospitalized patients while diagnostic information is being obtained. However, providers often do not revisit the selection of the antibiotic after more clinical and laboratory data including culture results become available. An antibiotic "time out" prompts a reassessment of the continuing need and choice of antibiotics when the clinical picture is clearer and more diagnostic information is available. [24, 25, 26,27]

CONCLUSION

Antibiotics are prescribed unnecessarily for acute febrile illness and fever with body ache where clinical picture is more likely to be viral fever. Broad spectrum antibiotics and FDCs are commonly prescribed. Change in the initial empirical therapy needs to be done as per culture sensitivity reports. The practice of sending specimens for culture and sensitivity needs to be emphasized by activities like conducting CME programs/ sensitization on antimicrobial stewardship. Further, the study will assist in formulation of antibiotic policies in accordance with local data of antibiotic usage as per recommendations. Appropriate use of antibiotics will help to decrease the antimicrobial resistance and improve the effectiveness of treatment. It is essential to have surveillance data on antibiotic use in the hospital. This is an indispensable tool in the strategy to contain antimicrobial resistance. Hence it is a must that all the hospitals should generate a valid data on antibiotic prescriptions. This practical approach will help for development and implementation of hospital antibiotic policy and standard treatment guidelines.

REFERENCES

1. Akkerman AE, Kuyvenhoven MM, van der Wouden JC et al. Determinants of antibiotic overprescribing in respiratory tract infections in general practice. J Antimicrob Chemother 2005; 56: 930–6.
2. Dekker ARJ, Verheij TJM, van der Velden AW. Inappropriate antibiotic prescription for respiratory tract indications: most prominent in adult patients. Fam Pract 2015; 32: 401–7.
3. World Health Organization. Global action plan on antimicrobial resistance. [Last Accessed on 2018 Jan 20]. Available from: http://www.who.int/antimicrobial-resistance/global-actionplan/en/
4. Van Boeckel TP, Gandra S, Ashok A, Caudron Q, Grenfell BT, Levin SA, et al. Global antibiotic consumption 2000 to 2010: an analysis of national pharmaceutical sales data. Lancet Infect Dis. 2014; 14(8):742–50.
5. Centers for Disease Control and Prevention. Antibiotic resistance threats in the United States, 2013 Atlanta, GA: CDC; 2013.
6. World Health Organization. World Health Day – 7 April 2011 [Last Accessed on 2018 Jan 20]. Available from: http://www.who.int/world-health-day/2011
7. Swaminathan S. Treatment guidelines for antimicrobial use in common syndromes. Indian Council of Medical Research Department of Health Research New Delhi, India 2017; Page1.
8. Basu S, Chatterjee M, Chandra PK et al. Antibiotic misuse in children by the primary care physicians an Indian experience. Niger J Clin Pract 2008; 11(1):52–7.

9. Salunkhe SD, Pandit VA, Dawane JS *et al*. Study of over the counter sale of antimicrobials in pharmacy outlets in Pune, India: a cross sectional study. Int J Pharma Bio Sci 2013; 4(2):P616 –22.

10. Moorthi C, Rachel Paul P, Srinivasan A *et al*. Irrational use of antibiotics in paediatric prescriptions: a pilot study at community pharmacy in Erode city. Pharm Lett 2011; 3(3):171 –7

11. Kotwani A, Holloway K. Trends in antibiotic use among outpatients in New Delhi, India. BMC Infect Dis. 2011; 11:99.

12. Kotwani A, Roy Chaudhury R, and Holloway K. Conference Paper: Prescribing antibiotics for acute respiratory tract infections by primary care physicians in New Delhi, India. International Society of Pharmacoeconomics and Outcomes Research. 2010

13. Kumar R, Indira K, Rizvi A, Rizvi T, Jeyaseelan L. Antibiotic prescribing practices in primary and secondary health care facilities in Uttar Pradesh, India. J Clin Pharm Ther. 2008; 33:625–34.

14. Ventola CL. The Antibiotic Resistance Crisis: Part 1: Causes and Threats. Pharmacy and Therapeutics. 2015; 40(4):277-283.

15. Bartlett JG, Gilbert DN, Spellberg B. Seven ways to preserve the miracle of antibiotics. Clin Infect Dis. 2013; 56(10):1445–1450.

16. Davey P, Brown E, Charani E, *et al*. Interventions to improve antibiotic prescribing practices for hospital inpatients. The Cochrane database of systematic reviews. 2013; 4:CD003543.

17. Malani AN, Richards PG, Kapila S, Otto MH, Czerwinski J, Singal B. Clinical and economic outcomes from a community hospital's antimicrobial stewardship program. American journal of infection control. Feb 2013; 41(2):145-148.

18. World Health Organization .Antimicrobial resistance: global report on surveillance. 2014

19. Spellberg B, Bartlett JG, Gilbert DN. The future of antibiotics and resistance. N Engl J Med 2013; 368: 299–302.

20. Fauci AS, Marston HD. The perpetual challenge of antimicrobial resistance. JAMA 2014; 311: 1853–1854.

21. Kumari Indira KS, Devi R, Pillay R *et al*. Antibiotic prescribing pattern (APP) and related factors in primary and secondary health care facilities of government and private settings. INCLEN-USAID consolidated technical report. INDIACLEN infectious disease initiative final report [cited 2008 Aug 31]. Available from: http://www.indiaclen.org/app_report_july12_04.doc.

22. Gautam, Chandler S., and Lekha Saha. Fixed dose drug combinations (FDCs): Rational or irrational: A view point. British Journal of Clinical Pharmacology 2008; 65(5): 795-796.

23. Ahmad, Akram, Muhammad Umair Khan, and Rajesh Balkrishnan. Fixed-dose combination antibiotics in India: Global perspectives. The Lancet Global Health 4.8 (2016): e521.

24. 24.Gerber JS, Kronman MP, Ross RK, *et al*. Identifying Targets for Antimicrobial Stewardship in Children's Hospitals. Infection control and hospital epidemiology: the official journal of the Society of Hospital Epidemiologists of America. Dec 2013; 34(12):1252–1258.

25. Bornard L, Dellamonica J, Hyvernat H, *et al*. Impact of an assisted reassessment of antibiotic therapies on the quality of prescriptions in an intensive care unit. Medecine et maladies infectieuses. Sep 2011; 41(9): 480–485.

26. Kaye KS. Antimicrobial de-escalation strategies in hospitalized patients with pneumonia, intra-abdominal infections, and bacteremia. Journal of hospital medicine: an official publication of the Society of Hospital Medicine. Jan 2012; 7 Suppl 1:S13–21.

27. Pardo J, Klinker KP, Borgert SJ, Trikha G, Rand KH, Ramphal R. Time to Positivity of Blood Cultures Supports Antibiotic De-escalation at 48 Hours. Ann Pharmacother. 2014 Jan; 48(1):33-40. doi: 10.1177/1060028013511229.

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