STUDY OF ASSESS THE APPROPRIATE USE OF ANTIBIOTICS IN MEDANTA-THE MEDICTY, GURGAON

Internship Training
at
Medanta-The Medicity, Gurgoan

By
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Under the guidance of
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MBA Hospital & Health Management
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Institute of Health Management Research
Jaipur
2015

INSTITUTE OF HEALTH
MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

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TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Kanchan Raghuwanshi** student of MBA Hospital and Health Management from IIHMR University, Jaipur has undergone internship training at **Medanta – The Medicity- Gurgaon** from **15th Feb,2015** to **31st March, 2015**

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

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INTERNSHIP COMPLETION LETTER

This is to certify that Dr. Kanchan Raghuwanshi, student of MBA (Major in Hospital & Healthcare Management), Batch 2013 -15 Indian Institute of Health Management Research, Jaipur has successfully completed her internship with us.

- Project Title - A Study to Assess Appropriate Use of Antibiotics
- Project Duration - 16th Feb 2015 to 31st March 2015

During the period of her internship programme with us she was found to be punctual, hardworking and inquisitive.

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SENIOR VICE PRESIDENT & HEAD - HUMAN RESOURCES

INSTITUTE OF HEALTH
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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled "A Study to Assess the Appropriate Use of Antibiotics" submitted by Dr.Kanchan Raghuwanshi. Enrollment No.1450 under the supervision of Dr. Suresh Joshi for award of MBA Hospital and Health Management of the university carried out during the period from 15th February, 2015 to 31st March, 2015. Embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Signature

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Preface

Dissertation is an integral part of the MBA in Health and Hospital management programme & for this purpose I had undergone dissertation at Medanta- the Medicity hospital which is a multispecialty tertiary care hospital in Gurgaon, Haryana.

During the dissertation period I was posted in the Infection control and Antibiotic Stewardship team for its management and was involved in handling of the day to day operational problems, system tracer audits and policy formulations. This was an opportunity for me to not only identify but dive deep into the problems that were existing and come up with their possible solutions. There were a host of problems and to begin with I chose a problem that existed across the hospital, and that was of inappropriate use of antibiotics. The hospital currently has around 960 beds functional and average monthly admission of 5000 out of which 50 -60 percent patients were on antibiotics and in these there were around 8-10 percent patients were prescribed restricted group of antibiotics. This necessarily warrants a very efficient stewardship program to keep a check on the use of antibiotics and reducing the development of antibiotic resistance so that more options remain available for treating patients in future.

The first chapter of this document includes study background, study problem, study objectives and study methodology. Chapter two is study findings. Chapter three is summarization of research findings & suggestion. The project ends with the annexure which includes the list of restricted antibiotics and other data analysed during the study.

Thanking You

Dr. Kanchan Raghuwanshi

Acknowledgement

There are many individuals in each person's professional life who contribute in enriching the experience by stimulating and influencing intellectual development. A sense of indebtedness to such people comes from within. Ordinarily this feeling is expressed in customary gesture of acknowledgement. Therefore, it seems right to acknowledge my gratitude with sense of venerates to the almighty God and all those people who helped me during the course of project work. Their valuable guidance and wise direction have enabled me to complete my project in a systemic and smooth manner.

The project report on **"A study to assess the appropriate use of antibiotics in a tertiary care hospital"** has been compiled involving the hard work of many. Now is the time to express my heartiest gratitude towards them.

Firstly, I would like to thank **Mr. Pankaj Sahni (COO- Medanta-the Medicity hospital**) who allowed me to work on this topic, my project guide **Dr. Sharmila Sengupta (HOD Microbiology Department Medanta-the Medicity hospital**) who provided me with necessary support, guidance and encouragement whenever required, my mentor **Dr. Sonali Sethi (Infection Control and Antibiotic Stewardship program- manager- Medanta-the Medicity hospital)** who was there to share his valuable suggestions and thoughts on the topic and provide relevant criticism which helped me do a more rigorous analysis.

Furthermore, completion of this project would not have been possible without the valuable suggestions of my faculty guide **Dr. Suresh Joshi (Professor- The IIHMR University),** who began guiding us on how to go about the dissertation and helped me sail through many hurdles, I

am sincerely thankful to him. **Dr. Ashok Kaushik (Dean, Academic and Student Affairs- The IIHMR University)** for his prompt responses and invaluable inputs whenever required, **Mr. Dalbir Singh (Placement Officer- The IIHMR University)** for facilitating my training at Medanta the Medicity. I would like to thank my college, **The IIHMR University** , for providing me with an opportunity to learn from and work with the best personnel in the Hospital Industry, and for helping me gain an appreciation of where I currently stand as an administrator and how much work I would need in order to meet the quality specifications that the hospital industry seeks.

Last but surely not the least, from the bottom of my heart I wish to thank my family and my friends for being who they are. Without their support and encouragement I could not have attained all that I have so far.

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1. Executive summary

This study was carried out in Medanta- the medicity , Gurgaon. The hospital currently has around 960 beds operational and average monthly admission of 5000 out of which 50 -60 percent patients were on antibiotics and out of these around 8-10 percent patients were prescribed restricted group of antibiotics. This necessarily warrants a very efficient stewardship program and strict adherence to hospital's antibiotic policy to ensure the appropriate use of antibiotics and reduce the development of antibiotic resistance so that more options remain available for treating patients in future and to understand the doctor's knowledge and practice regarding antibiotic policy and factors which influence their decision while prescribing antibiotics.

To restrict the study only to the dissertation period, I could not go on with all the patients on antibiotics and all groups of antimicrobials and had to choose a specific group of antimicrobials.

The antimicrobials are classified on the basis of their current sensitivity in hospital's antibiogram as:

I. Restricted
II. Un restricted

The group of antimicrobials under consideration for this study are the restricted antimicrobials**.** A sample of 160 patients (both from IPD and ICU) and 50 doctors was taken. After analysis it was found that out of 160 patients, cultures were sent for 82percent (132) patients. Out of these 132 patients culture reports were available for 91percent (120) patients and out of these 120 only 52percent (62) prescriptions were in alignment with the culture sensitivity reports. Taking into

consideration the clinical conditions of the patients and as a result of microbiologist and antibiotic champions (doctors of antibiotic stewardship team) discussion on non compliant cases, it was found out that only 48percent (76) out of 160 antibiotic prescriptions were appropriate. After analysis of data for doctors practice and knowledge with respect to hospital's antibiotic policy and factors influencing decision of antibiotic prescription it was found that out of 50 doctors only 64percent doctors know about the hospital's current antibiotic policy, only 20percent doctors always prefer to take opinion from microbiologists in case of doubts, 44percent doctors always prefer to send cultures to microbiology lab for identification of causative organism and 62 percent doctors always prefer to review their prescription once the culture sensitivity reports become available. Out of these 50 doctors 58percent doctors said they always takes patients age sex etc into consideration , 40percent doctors said they always considers patients past medical history while prescribing antibiotics. 22percent doctors said they never prescribe high end antibiotics for better clinical outcomes in shorter duration of time, 9percent said they never give antibiotics to their patients if they can rule out the presence of bacterial infection whereas 0percent doctors prefer to avoid antibiotics in case of suspected unclear diagnosis. On comparing the data between IPD and ICU the compliance to policy and seems to be better in ICU.

2. INTRODUCTION:

Medanta- the medicity, is a 1250 bedded super specialty tertiary care hospital in Gurgaon, Haryana. On an average 5000 patients get admitted per month and out of this 5000 patients around 50-60percent patients are prescribed with antibiotics i.e. majority of hospitalized patients receive antimicrobials for therapy or prophylaxis during their in-patient stay. A group of concerned doctors and microbiologists in the hospital in December 2014 performed a point prevalence study and as a result the study it was came out that huge number of patients are receiving unnecessary antimicrobials therapy. Thus under the guidance of specialty HODs, infectious disease consultants and microbiologists the antimicrobial policy was formulated to ensure the appropriate use of antibiotics.

The antimicrobial policy was based on the antibiogram prepared based on prevalence of organisms. Inappropriate prescription of antibiotics not only leads to increase in cost of healthcare, both for the organization as well as patients, but also results in super-infection with multi-drug resistant nosocomial pathogen, opportunistic fungi and may increase the likelihood of an adverse drug reaction. Antibiotic resistance is now a major concern confronting healthcare across the country, and thus it is now very important to ensure that every patient on antimicrobials gets appropriate and optimal therapy.

Thus to keep a check on antibiotic usage the compliance to antibiotic policy becomes mandatory and assessing the compliance to policy along with analysing the doctors perception regarding antibiotic prescriptions will lead to assessment of appropriate use of antibiotics.

3. REVIEW OF LITERATURE:

Antibiotic drugs have reduced the burden of common infectious diseases and become essential for many medical interventions.[2][3] However, antibiotic-resistant pathogens have emerged and spread among human and animal populations worldwide.[4][5] Pathogens such as meticillin-resistant Staphylococcus aureus (MRSA)[6] and carbapenem-resistant Enterobacteriaceae (CRE)[7] have become a global problem. The loss of efficacy against common pathogens has not only led to a shift towards more expensive antibiotic drugs in high-income countries, but also to increased morbidity and mortality in low-income and middle-income countries, where affordability of second-line drugs restricts their use .[8]

Between 2000 and 2010, consumption of antibiotic drugs increased by 36percent (from 54 083 964 813 standard units in 2000 to 73 620 748 816 standard units in 2010). India was the largest consumer of antibiotics in 2010 with $12{\cdot}9 \times 10^{9}$ units followed by China and USA.

76percent of the overall increase in global antibiotic consumption between 2000 and 2010 was attributable to BRICS countries. Meanwhile, only 33percent of the overall increase in global population occurred in BRICS countries between these years [8] with India being the major shareholder.

Hospital based studies on antibiotic use have shown that antibiotics are often prescribed in irrational or inappropriate ways in India; that is, the drugs are prescribed at an incorrect dose, frequency, or duration, are redundant, or have the potential for adverse interactions with other drugs.[9] Overprescribing and overuse are seen in all settings: public and private hospitals, clinics and pharmacies.[10]

Study results indicate that 30percent to 60percent of antibiotics prescribed in ICUs are unnecessary, inappropriate, or suboptimal.[11]

Review of prescriptions by a senior colleague was reported to occur less than half the time by 65.3percent (252/386) of the respondents. Nearly one third (29.8percent; 115/386) agreed with the statement that unnecessary prescriptions of antibiotics do no harm.[12]

4. RESEARCH QUESTION:

Are antibiotics being used appropriately in the hospital?

5. OBJECTIVE(S):

- To understand the hospital antibiotic policy for prescribing antibiotics.
- To assess the compliance of antibiotic prescription with hospital policy.
- To understand and analyse the doctors perception with respect to antibiotic prescription.

6. METHODOLOGY:

Duration of study: 2 months

Type of study: Quantitative cross- sectional study.

Data collection: Primary data was collected by HIS, patient's file , hospital's doctors dashboard and through doctor interviews. The data was collected only for the patients who were on restricted antibiotics keeping in mind the given time constraints for the study.

Data requirement:

i) List of patients on restricted antibiotics on daily basis.

ii) All the culture reports of the above mentioned patients.

Method: Tracking the patients on restricted antibiotics with respect to check points of the hospital's antibiotic policy. The tracking involved the following points:

1) Culture should be sent before prescribing restricted antibiotics in the last 7 days (as blood culture reports take 3-5 days to come)

2) Culture report should be available suggestive of restricted antibiotic prescription.

3) Prescription should be as per culture sensitivity report

4) In case of non compliance to the above mentioned 3 points discussion with antibiotic champions and microbiologist to know whether the prescription was appropriate or not.

The doctors were interviewed to under their perception with respect to antibiotic prescription and data was collected with the help of a questionnaire .

Data collection tool:

- An excel tracker sheet was used to capture data regarding patients on restricted antibiotics.
- A questionnaire was used for doctors.

Universe/Frame*:*

- All ICU and IPD patients on restricted antibiotics during the study period.

Sample Size:

50 doctors

• Consultants	OPD/ICU	15
• Resident doctors	IPD/ICU	19
• Medical officers	IPD	16

- Exclusions: Patients on antitubercular treatment (Rifamcin) and localized use of vancomycin.
- Inclusions: Patients prescribed with restricted antibiotics during the study period.

7. Analysis and Results:

An Overview of Hospital's Antibiotic Policy:

The super specialty hospital's antibiotic policy is a comprehensive document which is based on following parameters:

1. Local antibiogram
2. Current literature reviews
3. International and national (where available) guidelines

The contents of the antibiotic policy are as follows:

I. Classes of antimicrobials
   - Class
   - Generic name of the drug
   - Usual adult dose
   - Route of administration
   - Duration of therapy

II. List of Restricted Antimicrobials

III. Hospital formulary for antimicrobials

IV. Broad Indications for antimicrobial prescription

- Blood Stream Infection (BSI)
- Urinary Tract Infection
- Respiratory Tract Infection
- Soft Tissue Infection
    - ♦ Antibiogram for Wards and ICU (based on microbiology data)
    - ♦ Patient stratification (based on Carmeli's score)
    - ♦ Escalation and de escalation protocols

V. Specialty specific use of antimicrobials

VI. Surgical prophylaxis policy (specialty specific)

- Pre operative
- Peri operative
- Post operative.

Policy Compliance Criteria:

I. Samples for culture need to be sent as per the protocol before starting antimicrobial therapy.

II. Restricted antibiotics cannot be prescribed in Empiric therapy without any recent supportive report.

III. On availability of culture sensitivity report review of antibiotic therapy needs to be done.(for Escalation or De escalation of antibiotic therapy).

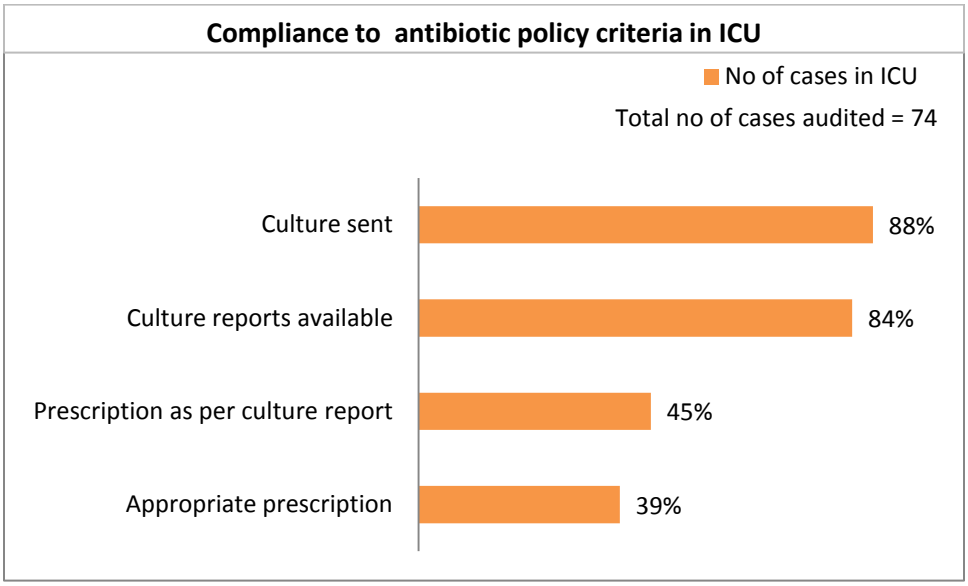
IV. In Case of doubt consultation with assigned microbiologist and assigned antibiotic champion needs to be done.

The appropriate use of antibiotics was assessed with respect to above mentioned policy criteria:

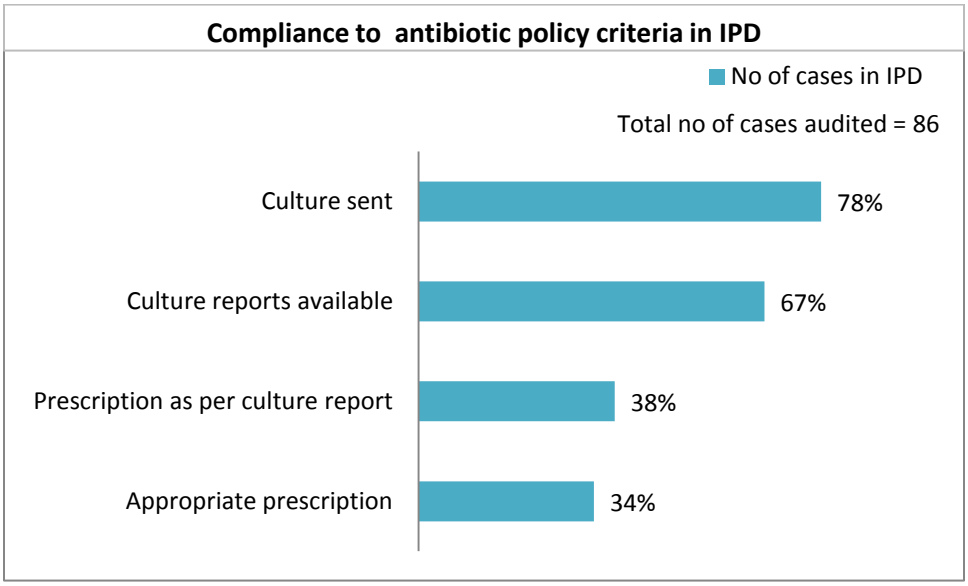
The first compliance criterion says - Samples for culture need to be sent as per the protocol before starting antimicrobial therapy. Out of 160 cases the culture was being sent for 132 cases i.e. compliance to 1st criterion is 82.5 percent and 17.5 percent non compliance.

The second criterion says - Restricted antibiotics cannot be prescribed in Empiric therapy without any recent supportive report. Out of 160 cases culture sensitivity was available for 120 cases i.e. 75percent compliance and 25 percent non compliance. Out of 120 cases for which culture reports were available only 52percent (62) prescriptions were in alignment with the culture sensitivity reports. Taking into consideration the clinical conditions of the patients and as a result of microbiologist and antibiotic champions (doctors of antibiotic stewardship team) discussion on non compliant cases, it was found out that only 48percent (76) out of 160 antibiotic prescriptions were appropriate.

Graph.1 Distribution of compliant cases in ICU with respect to policy criteria.



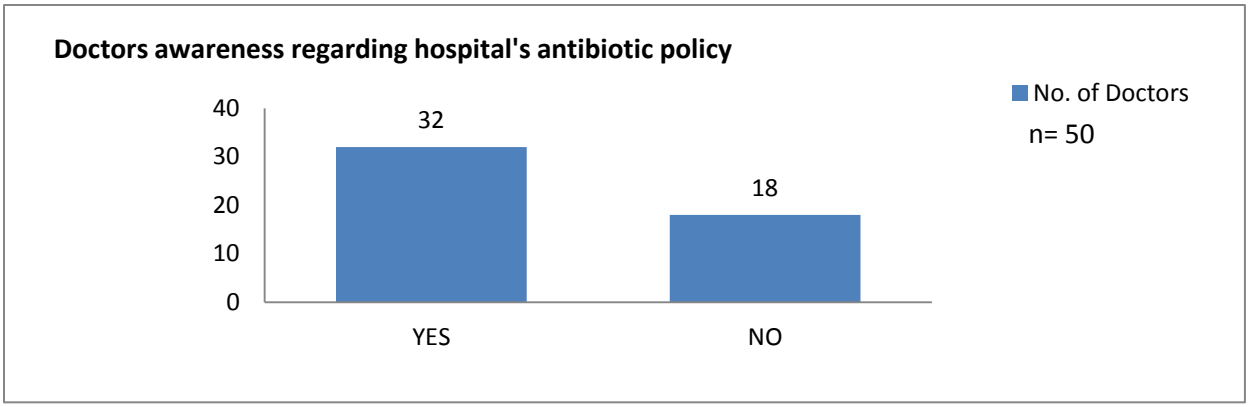
Graph: 2 Distribution of compliant cases in IPD with respect to policy criteria



As shown in the above graph 1 and 2 the compliance to policy criteria are better in ICU than IPD. The practice of sending culture and evidence based prescription of antibiotics seems to be better in ICU than in IPD.

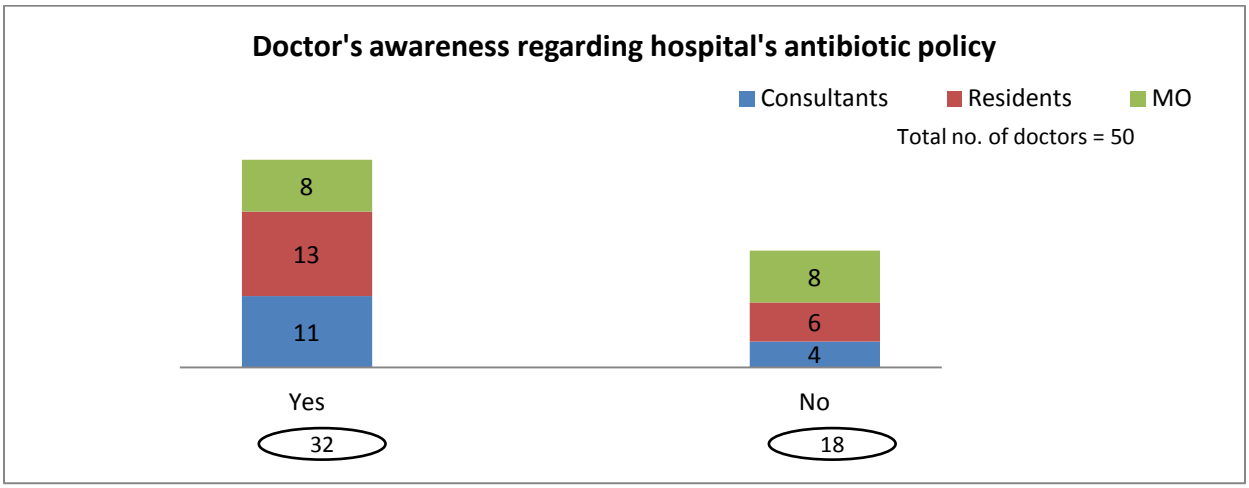
The results of the doctor's knowledge, practice and factors influencing the decision of antibiotic prescription related data are illustrated in the form of graphs below:

Graph: 3 showing the extent of dissemination of the hospital's antibiotic policy and its awareness among the doctors prescribing antibiotics.



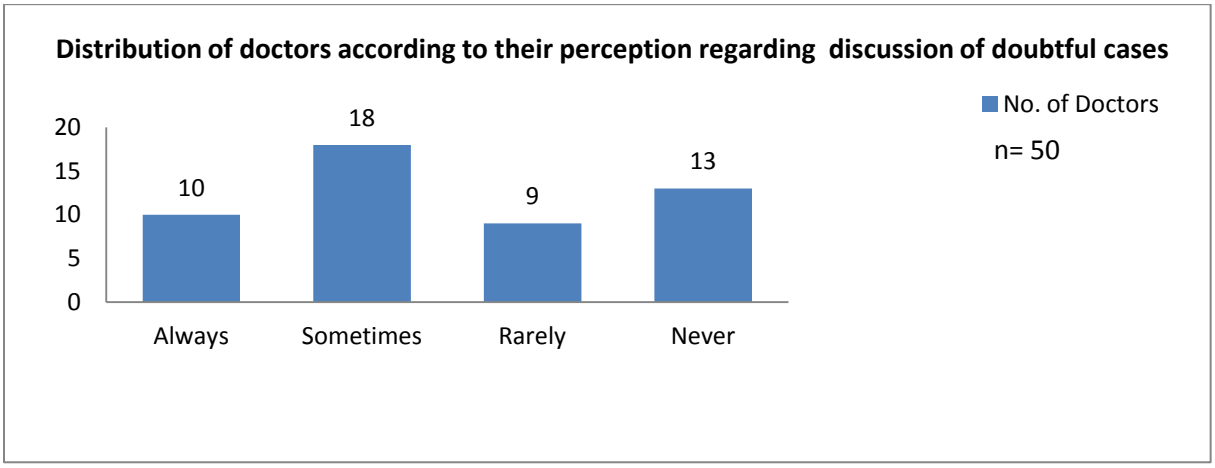
Out of 50 doctors 32 doctors (64percent) knows about the policy whereas 36percent doctors don't have the knowledge of the policy.

Graph 5:



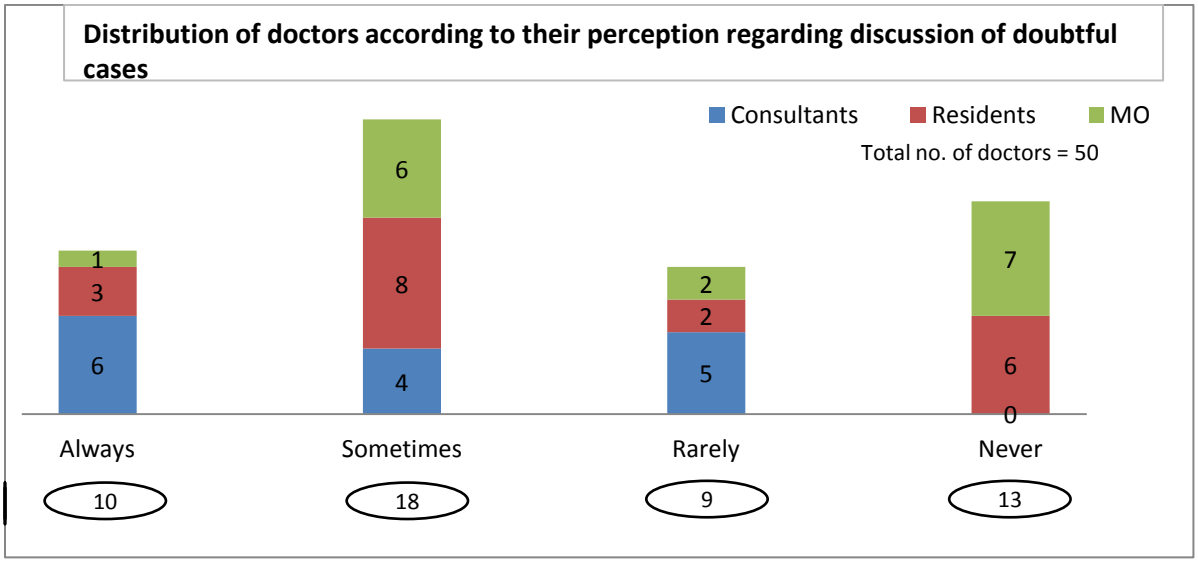
As shown in the above graph the awareness seems to be high among consultants than in residents and the least among medical officers.

Graph: 5 showing doctors preference to discuss doubtful cases with microbiologists for antibiotic prescription.



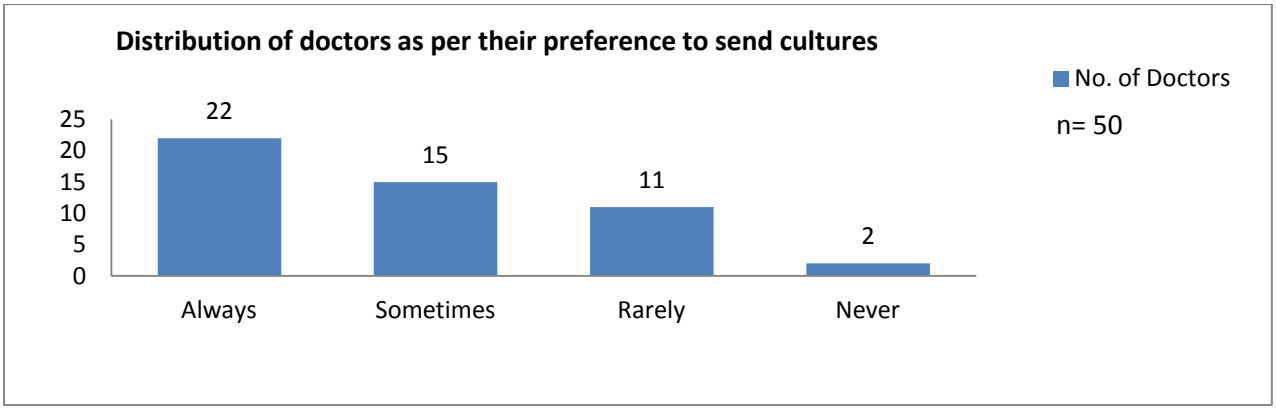
Out of 50 doctors 20percent (10) doctors said they always prefer to discuss, 36percent (18) doctors said sometimes whereas 18percent (9) said rarely and 26percent (13) said they never prefer to discuss. Thus only 20 percent doctors strictly believe in discussing and then deciding the appropriate antibiotic for their patients.

Graph: 6



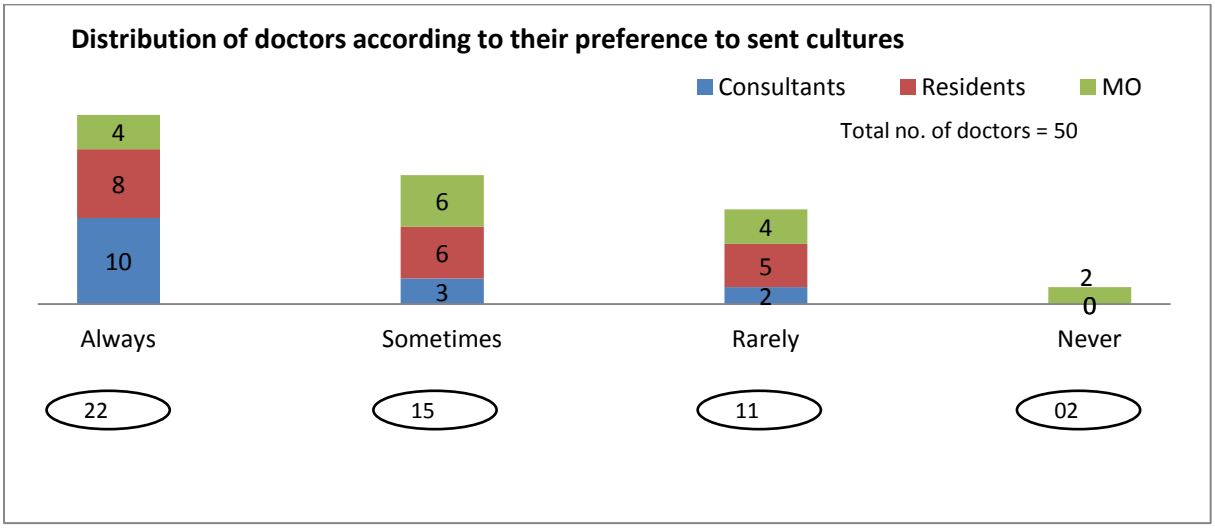
As per the above shown graph consultants were more inclined to discuss doubtful cases with microbiologist as compared to that of resident doctors and medical officers.

Graph: 7 showing the doctor perceptions towards practice of sending culture before prescribing restricted antibiotics.



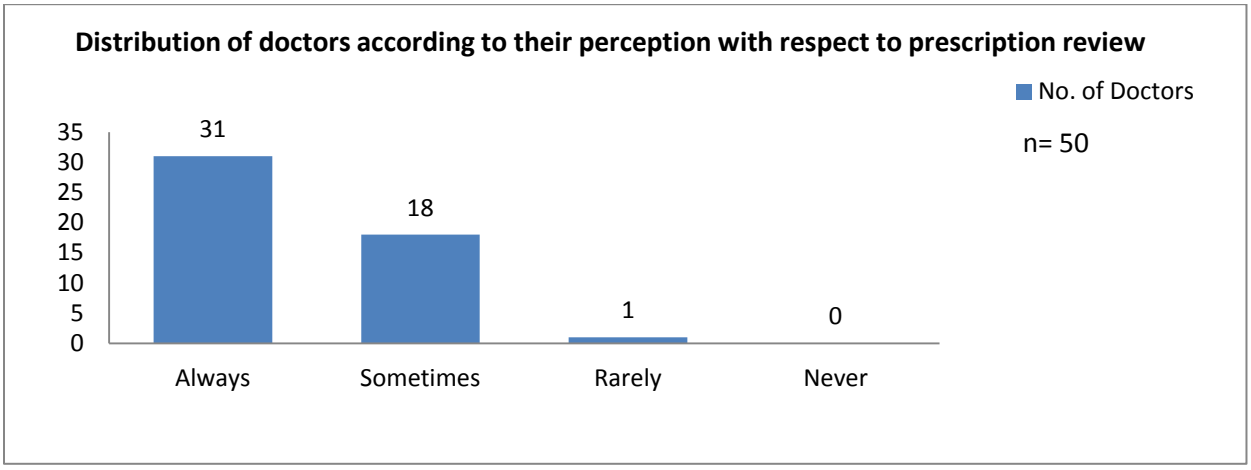
Out of 50 doctors only 44percent (22) doctors said they strictly follow the practice of sending culture, 30percent (15) doctors said they do sent cultures but not always, 22percent (11) doctors said they rarely send cultures whereas about 4percent (2) who said they don't send cultures every time before prescribing restricted antibiotics and this means 56percent non compliance to policy is there which may lead to inappropriate antibiotic prescription.

Graph: 8



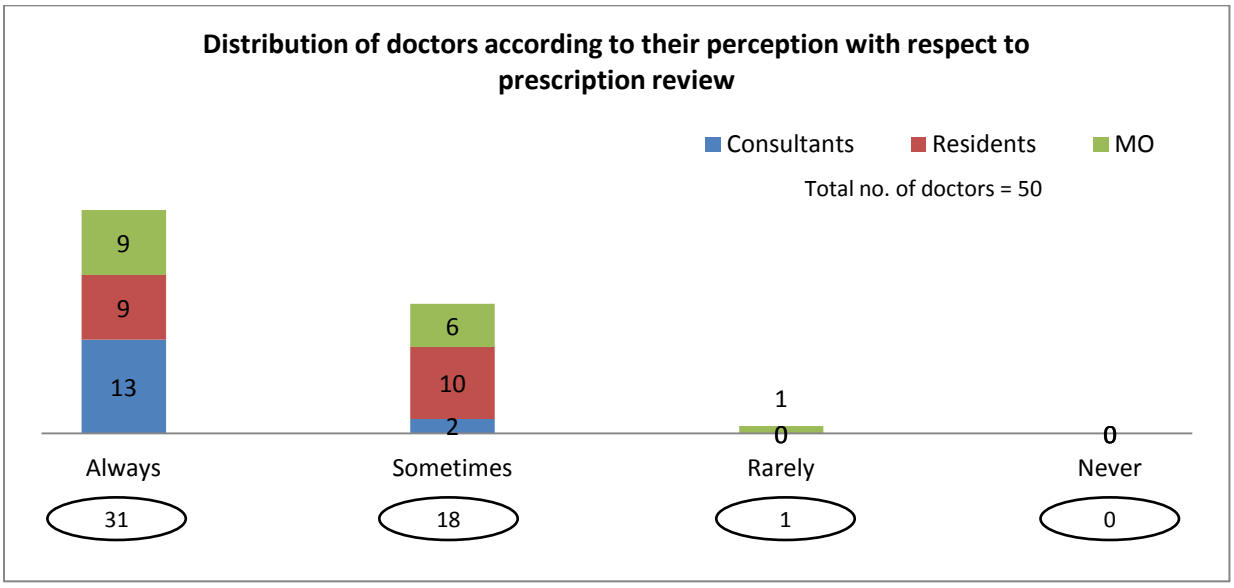
As per above graph consultants and residents seems to prefer the practice as compared to medical officers.

Graph: 9 showing doctors' perception with respect to the review of antibiotic prescription once the culture reports are available.



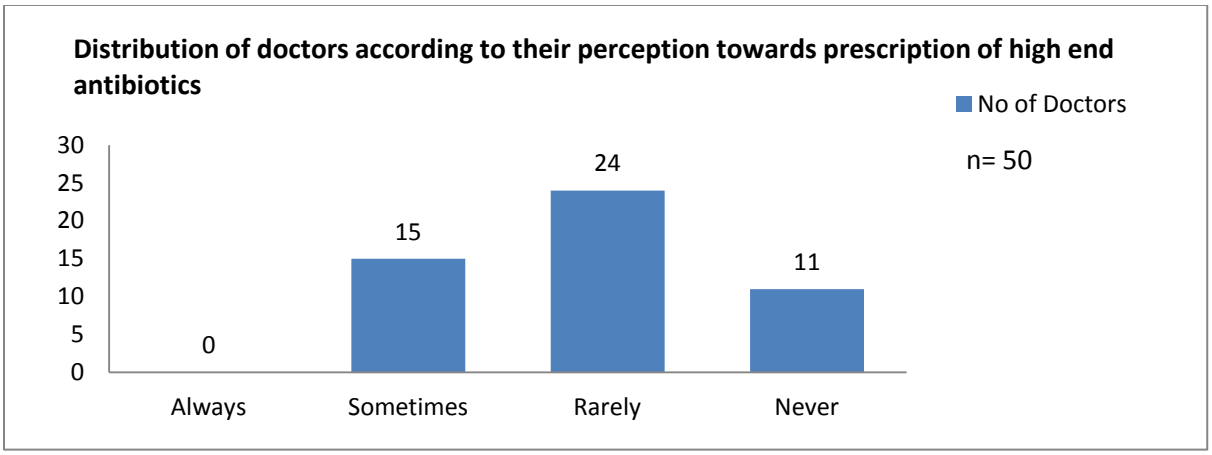
Out of 50, 62percent (31) doctors said that they always review the prescriptions of their patients, 36percent (18) doctors said that they sometimes review whereas only 2percent (1) said that they rarely review and none of them said that they never review.

Graph: 10



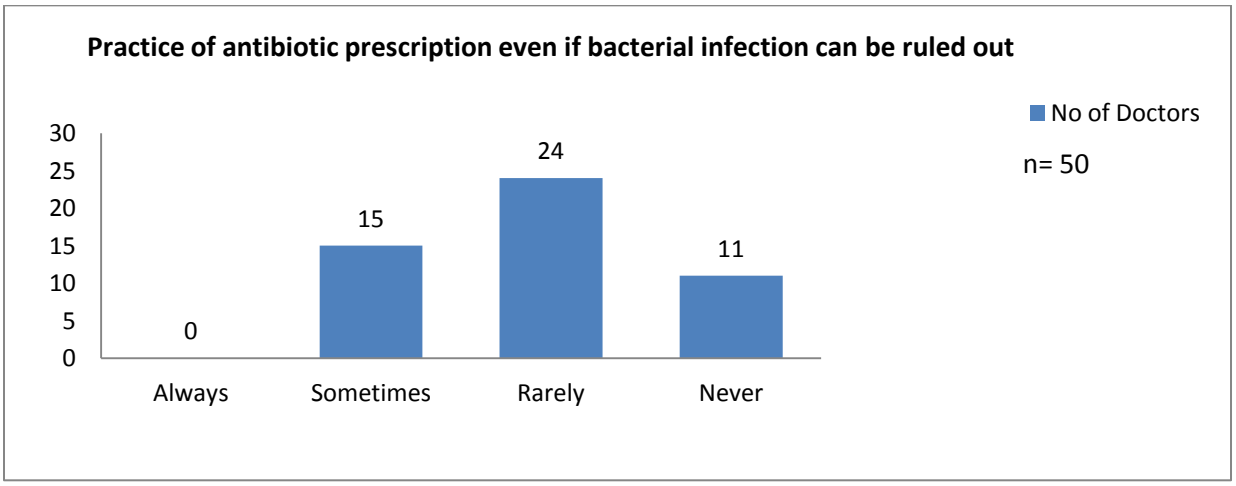
Consultants' perception towards prescription review seems to be more positive as compared to medical officers and resident doctors but absolute no for the practice was not found among any category of doctors.

Graph: 11 showing doctors perception towards prescription of high end antibiotics for better clinical outcomes in shorter duration of time.



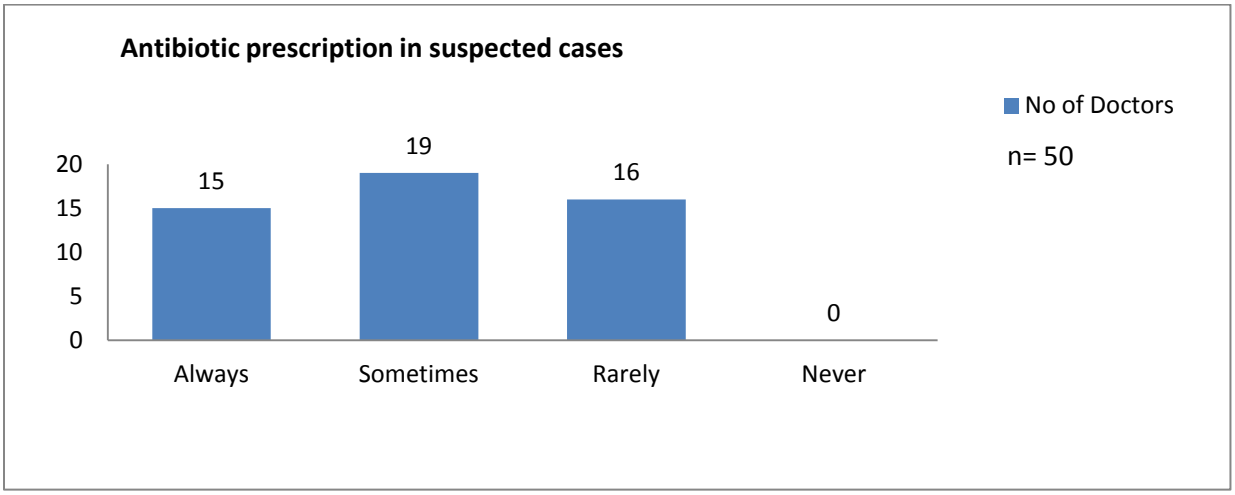
Out of 50, 30percent (15) doctors said they sometimes prefer to prescribe high end antibiotics, 48percent (24) doctors said that they rarely prescribe and 22percent (11) doctors said that they never prescribe high end antibiotics for shorter period early outcomes.

Graph: 12 showing how frequently doctors prefer to prescribe antibiotics even if they can rule out the presence of bacterial infection.



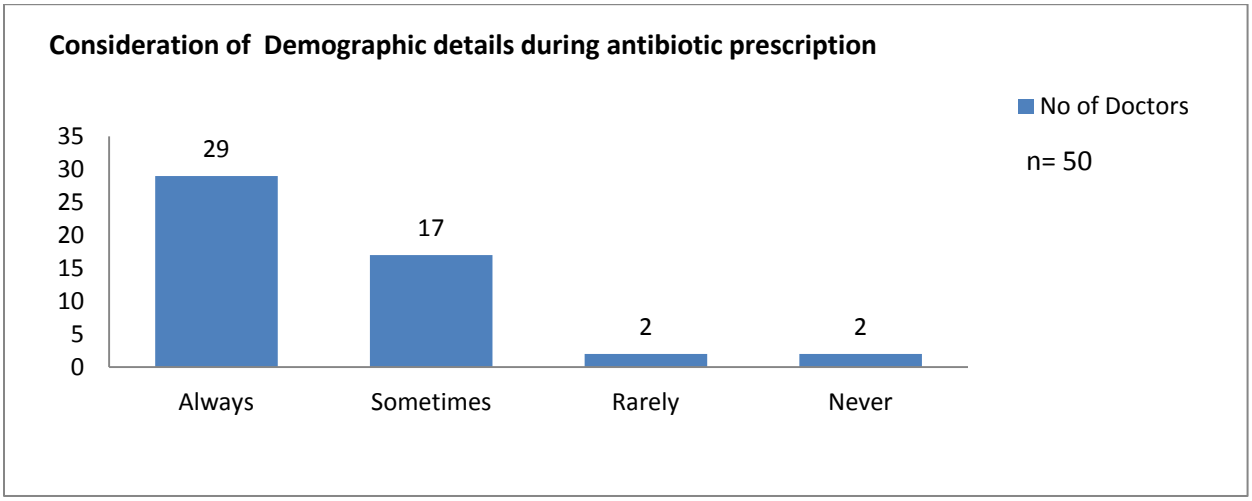
Out of 50, 30percent (15) doctors said that they sometimes tends to prescribe antibiotics even if they can rule out the presence of bacterial infection, 48percent (24) doctors said they rarely prescribe whereas 22percent (11) said that they never prescribe antibiotics in such situations and 0percent doctors said that always prescribe antibiotics.

Graph: 13 Distribution of doctors according to their perception towards prescription of antibiotics in suspected cases when diagnosis is not clear.



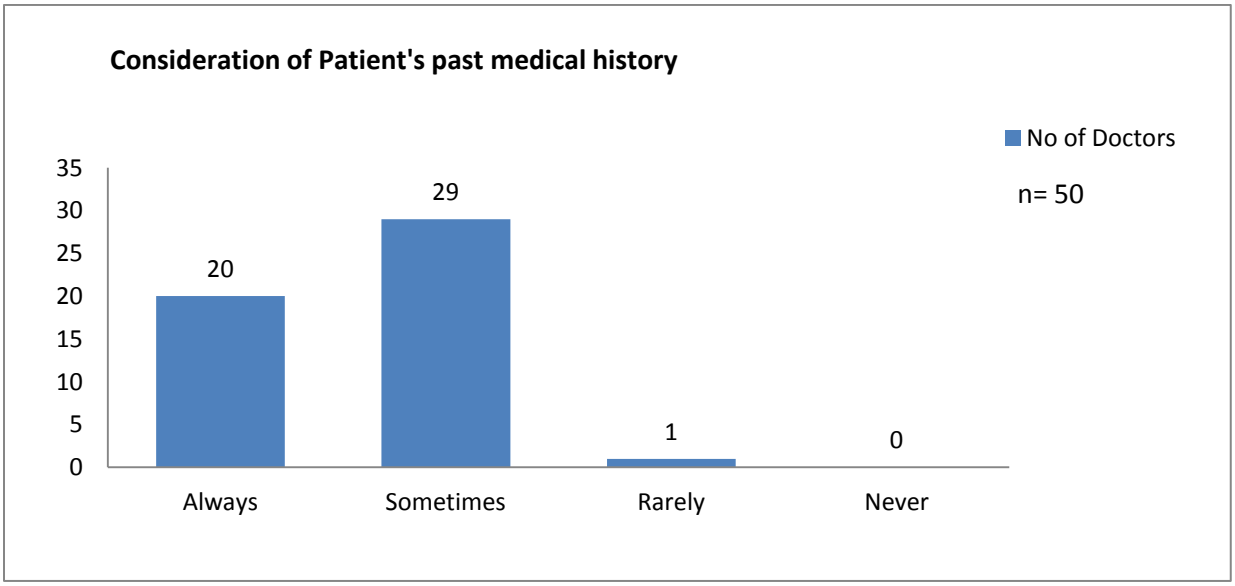
Out of 50, 30percent (15) said that they always prescribe antibiotics in case of suspected cases, 38percent (19) said they sometimes follow such practice whereas 32percent (16) doctors said they rarely prescribe antibiotics in unclear cases and none of them said absolute no to this practice.

Graph: 14 Distribution of doctors according to their perception towards consideration of patient's demographic details while prescribing antibiotics.



Out of 50, 58percent (28) doctors said that this is important consideration, 34percent (17) doctors said that not always this consideration is required whereas 8percent (4)of doctors said they rarely or never consider demographic details.

Graph: 15 Distribution of doctors according to their perception towards consideration of patient's past medical history while prescribing antibiotics.



Out of 50, 40percent (20) doctors said that this is important consideration, 58percent (29) doctors said that not always this consideration is required whereas 2percent (1) of doctors said they rarely consider demographic details.

The consultants appeared to be more inclined to accept hospital's antibiotic policy criteria and then resident doctors and least were medical officers.

The compliance seems to be better in ICUs where consultants mostly prescribe the antibiotics as compared to IPDs where resident doctors and medical officers take the charge.

But still gap exists between the perception of the activities and the actual practice as evident from the overall compliance and appropriate use of antibiotics in the hospital.

8. Discussion:

As it is evident now that there are so many gap areas from dissemination of antibiotic policy in the hospital till practice and attitude of the doctors regarding antibiotic prescription.36percent doctors don't know about the hospital's antibiotic policy, 56percent doctors do not prefer to sent cultures strictly before starting the antibiotics, 80percent doctors do not prefer to discuss doubtful cases with microbiologists on routine basis which again lead to hit and trail therapy whereas 38 percent of our doctors not tend to review their prescriptions as a mandatory practice which is less as compared to the findings of review of prescriptions by a senior colleague was reported to occur less than half the time by 65.3percent (252/386) of the respondents. Around 78percent doctors do prescribe antibiotics even if they can rule out presence on bacterial infections which is more than the study finding which says nearly one third (29.8percent; 115/386) agreed with the statement that unnecessary prescriptions of antibiotics do no harm. In antibiotic

prescription age, gender and patient's past history of antibiotic therapy and hospitalization plays a vital role still 60 percent doctors said they sometimes or rarely considers past medical history of patients whereas 48percent doctors said that they sometimes consider the patient's demographic details for antibiotic prescriptions. As a result the overall inappropriate use of restricted antibiotics in the hospital came out to be 52percent which is comparable with the study results which indicate that 30percent to 60percent of antibiotics prescribed in ICUs are unnecessary, inappropriate, or suboptimal. This figure is indicative of prompt action plan for strengthening the hospital's antibiotic stewardship program and applying managerial checks on antibiotic prescriptions.

9. Suggestions:

- Dissemination of antibiotic policy is the foremost requirement to all cadres of doctors in the form of retraining for existing doctors and as induction for new doctors.
- Focused training of resident doctors and medical officers required with respect to antibiotic policy criteria.
- Introduction of Restricted antibiotic justification form making it mandatory to be filled by prescribing doctor without which pharmacy will not dispense the indent.
- Tracking of patients on antibiotics regarding their review by the doctors, cultures being sent and arranging for microbiologist discussion in case of non compliant cases by the institute managers.

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