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Assessment of Clinician's Knowledge and Perception on Antimicrobial Resistance a Primary Strategy for Antimicrobial Resistance Control

By Dr. N. Shanmuga vadivoo, Dr. B. Usha & Dr. B. K Padmavathi

Annapoorana Medical College, India

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Methods: We did a cross sectional survey of 737 doctors at three tertiary care teaching hospital to assess their Knowledge, perception and attitude regarding Antimicrobial resistance. Anaesthetists, Pre & para clinical doctors who were general practitioners also participated in the survey.

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Conclusion: Although most doctors view antibiotic resistance as a serious national problem, perceptions about its local importance, its causes and possible solutions vary widely. Overall, most of our clinicians had better understanding and surprisingly Pre & Para clinical doctors also have enough knowledge regarding Antibiotics practice.

Keywords: antimicrobial resistance, KAP survey, clinicians & para clinicians.

I. Introduction

Antimicrobial resistance (AMR) a global problem is particularly pressing in developing countries where the Health care associated infection (HCAI) burden is high and cost constrains the replacement of older antibiotics with newer, more expensive ones. Several studies [1-4] have identified the inappropriate use of antimicrobials and noncompliance with infection control precautions as the main risk factors associated with an increased probability of colonization with resistant pathogens and there by Antimicrobial resistance. Hence management of common and lethal bacterial infections has been critically compromised by the rapid appearance & spread of these antibiotic-resistant bacteria [5]. The pipeline of antibiotic research and development is nearly dry, especially when it comes to antibiotics active against Gram-negative bacteria [6]. The bacterial disease burden in India is among the highest in the world: consequently, antibiotics play a critical role in limiting morbidity and mortality in the country. This has led to increasing use of newer antibiotics and ultimately ended up with increased prevalence rates of Multi drug resistant bacteria. Though we all know that Abuse, overuse & Misuse of antibiotics have exacerbated Antibiotic resistance, resistance development is a natural unstoppable process. Hence our challenge is to slow the rate at which resistance develops & spreads. Combating Antimicrobial resistance calls for a concerted approach from individuals to global levels involving various organisations like CDC, WHO, Health ministry of India and other organisations [6, 7]. These organizations recommends all the health care facilities to have their own Antibiotic policy based on Local Cumulative antibiogram [8] and to implement antibiotic stewardship programme [9] accordingly to combat the most prevalent MDR pathogens at their own hospital settings.

II. Background

Many strategies have been proposed for the rational use of antibiotics, like a formulary replacement or restriction, health care provider education, feedback activities, approval requirement from an infectious disease specialist for the drug prescription [9]. Various studies which were done in India and other developed countries have highlighted the importance of rational drug therapy through educational interventions, strict antibiotic policy and Stewardship [9, 10, 11].

Knowledge is the first step in modifying behaviour in relation to physician's adherence to clinical practice &Guidelines. Therefore a very important primary strategy for framing an Institutional Antibiotic policy is assessment of Clinicians' Knowledge and their perception about Antimicrobial resistance. Also assessment of antibiotics prescription practice &

Author α σ ρ: Associate professor, Department of Microbiology Annapoorana medical college & Hospital Periyaseeragapaadi, SALEM-636 308. e-mails: shanmugavadivoon@gmail.com, dr_ushasekar@yahoo.co.in, bk.padmavathi@yahoo.in

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knowledge about the driving forces behind antibiotics prescription followed by educational intervention plays a very important role. The assessment is usually done by Knowledge, perception & attitude survey based on LIKERTs scale. Studies on clinicians' attitude towards Knowledge, perception of Antimicrobial resistance have been published in both Community and Hospital settings [12-22]. Some of these studies have shown poor correlation between knowledge and practice. Hence the purpose of this study is to conduct a survey to assess and explore Knowledge, attitude & Perception of clinicians' towards antimicrobial resistance at three tertiary care centre.

III. Material & Methods

This study is a cross sectional survey from three tertiary care teaching hospitals during 2014.All the three are located in suburban areas with 530, 900 & 300 beds respectively. Clinicians of above mentioned three tertiary care centres belonging to following specialities like General medicine, Surgery, Obstetrics Gynaecology, Paediatrics, Orthopaedics and super specialities like Nephrology, Urology, Paediatric surgery and Resident doctors working in all the above mentioned speciality participated. Anaesthesia &Para clinical doctors who were general practitioners also participated in the survey.

The Study instrument: The survey was carried out with a structured, validated, anonymous questionnaire encompassing sessions to assess Knowledge & perception of Clinicians towards Antibiotic Resistance. The Questionnaire was reviewed by Institutional Ethical Committee team to assess the relevance & Wordings of questions. The willing participants were approached individually and were requested to fill in the questionnaire anonymously. The Questionnaire was distributed onsite during working hours. No incentives for subjects to participate and no reminders were given.

The response to questionnaire was assessed in FIVE point Likert scale ranging from strongly agrees to strongly disagree. Briefly the questionnaire consisted of

- Professional profile of area of speciality, staff position, experience in that speciality.
- Section-1-Question pertaining to knowledge about Antimicrobial resistance like awareness at Global, national level and community level.
- Section-II-Question pertaining to practices known to contribute to Antimicrobial Resistance.
- Section-III-Questions pertaining to factors involved in antibiotic prescribing practices.
- Section-1V-Questionnaires were Drivers of choice in decision making to prescribe antibiotics.

Following the Questionnaire survey and based on the feedback, a CME on Antimicrobial resistance, Basic infection control practices, Antibiotic policy and Stewardship was organised. Again a Post CME survey in a questionnaire format to assess the Knowledge transfer was given to the Clinicians which consisted of Questionnaire on Necessity for Role of hand hygiene, Isolation precautions, Antibiotic policy & Stewardship programme for reducing Antimicrobial Resistance

IV. Results

A total of 737 doctors filled in the questionnaire. An overview of the professional profile of the 737 participantsare given in Fiure-1. The staff position and years of experience in that particular field shown in Table-1. Table-2 gives the profile of different specialities of physicians & Surgeons from different centres. Anaesthetists and Para clinical doctors were also included in our study because many of them were practicing physicians.

Table 1 : Professional profile of the participants

Staff position	Number %	Years of experience
Prof/Associate prof	170 23%	18-25 yeas
Assistant prof	125 17%	6-10 years
Senior and Junior Residents	361 49%	1-8 years
Consultants	81 11%	10-15 years

Table 2 : Department wise statistics of the participants

Speciality	Total	Percentage
Anaesthesia	30	*4.1%*
General medicine	103	*14.1%*
General surgery	94	*12.5%*
OBG	88	*12%*
Paediatrics	76	*10.5%*
Orthopaedics	63	*8.5%*
Ophthalmology	25	*3.4%*
ENT	21	*2.8%*
Dermatology	23	*3.1%*
Chest/TB	15	*2%*
ICU	81	*11%*
Surgical super speciality	10	*1.4%*
Medical Super speciality	15	*2%*
Pre/Para clinical	93	*12.6%*
TOTAL	737	*100%*

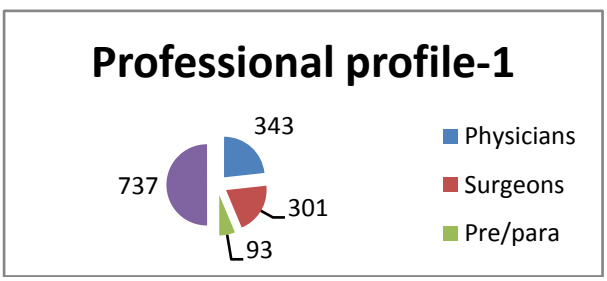

Figure 1 : Overall Demographic profile

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Knowledge on Antimicrobial use and Antimicrobial resistance rates is shown in Figure-2. About 93% of doctors strongly agreed /agreed that AMR is a worldwide problem. Response to practices known to contribute AMR is shown in Table-3 .Antibiotic prescription practices and drivers of choice for Antibiotics are shown in table 4 & Table-5 respectively. Data's on Post CME questionnaire survey is shown in TABLE-6.

Table 3 : Practices known to contribute to antimicrobial resistance

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Failure to properly diagnose patients infective conditions	2.5%	16%	9.2%	48.3%	24
Prescribing antimicrobials when they are not needed	4.1%	5.5%	8.4%	37	45
Limited use of laboratory services for infection diagnosis	2.5%	7.1%	8.4%	56%	26%
Poor Adherence to isolation and contact precautions	1%	8.4%	9.6%	58.4%	22.6%
Poor hand hygiene & Poor infection control	1.2%	10.5%	8%	40.3%	40
Patients demand for Antibiotics	3.5%	20.5%	22%	40%	14%
Patients failing to adhere to treatment	0	4.2%	3.3%	45%	47.5%

Table 4 : Antibiotic Prescribing Practices

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Microbiology lab results are efficiently communicated to the treating physician.	2.9%	8.4%	5.5%	41.1%	42.1%
I regularly refer to the susceptibility/sensitivity patterns at this institution (e.g., an antibiogram) when prescribing antibiotics	2.1%	6.3%	12.6%	53%	26%
If medically appropriate IV antibiotics should be stepped down to an oral alternative	3.3%	4.6%	5.6%	58.4%	28.1%
A majority of patients admitted to this institution will be prescribed at least one antibiotic during their hospital stay	1.2%	5.8%	21.8%	52.5%	18.7%
Many of my patients receive 5 or more days of antibiotics during their stay at this institution.	4.2%	9.6%	13.4%	51.2%	21.6%
Only Few of my patients are discharged from this institution on antibiotics.	2.5%	9.2%	19.5%	56.5%	12.5%

Table 5 : Opinion on the Drivers of Choice of Antibiotic for a Particular Infection?

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Severity of infection	1.2%	2.1%	2.9%	50.8%	43%
Likely infecting organisms	0	0.4%	3.7%	63%	32.9%
Lab results	0.7%	2.9%	8.4%	58.4%	29.6%
Effectiveness of antibiotics for patients typically seen	1.2%	3.3%	12.6%	62.1%	20.85
Recommendations' by the pharmacists	27.7%	48.3%	10.5%	3.5%	10%

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Table 6 : Post CME Questionnaire Survey

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Essential Infection control practices like Hand Hygiene reduce Health care Associated Infections	0	0	0	37%	63%
Isolation Precautions will significantly reduce Health care Associated Infections	0	0	15%	43%	42%
Do you think Antibiotic policy will help to reduce Antimicrobial resistance in this Institution	0	7%	11%	58%	24%
Do you think Antimicrobial stewardship programs can improve patient care?	0	0	3%	81%	16%
According to you will Antimicrobial stewardship programs reduce the problem of antimicrobial resistance?	0	0	15%	69%	16%
In your opinion will you be able to benefit or update your knowledge by this CME organised by the institution pertaining to Infection Control Programme?	0	0	0	62%	38%

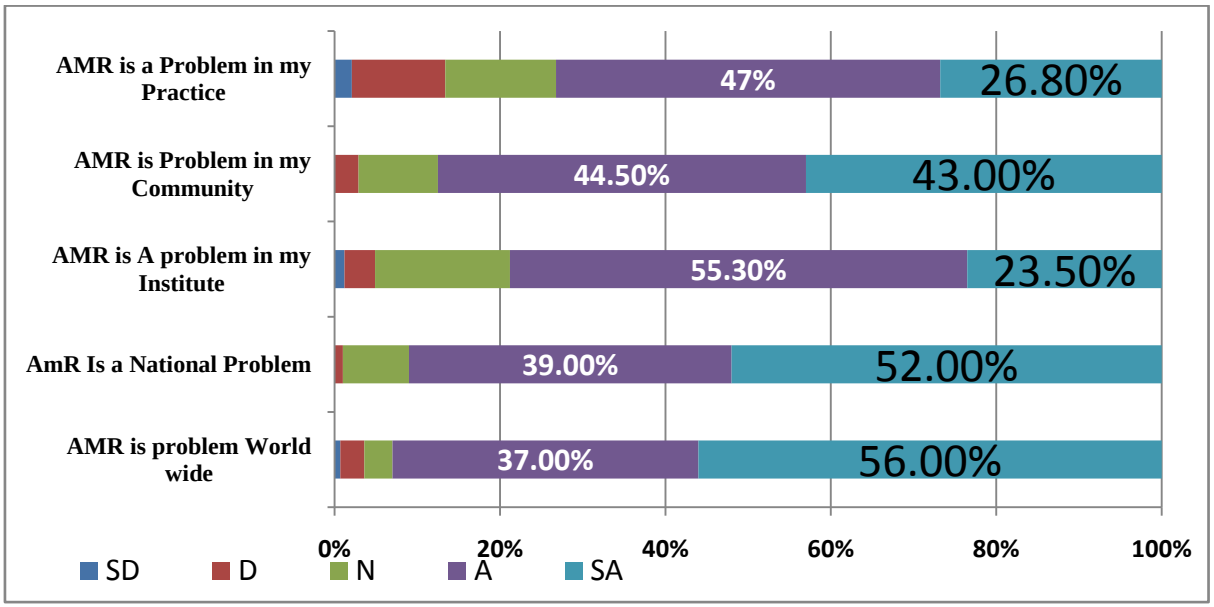

Figure 2 : Antibiotic Resistance -Awareness

V. Discussion

One of the emerging public health problems is AMR and no effective first line drugs exist for resistant pathogens. Inappropriate Antibiotics use & Infection control noncompliance has been primary attributes for dramatic raise in antimicrobial resistance.

The present study describes the results of a KAP-survey among 737 medical doctors (From all the specialities) practicing in three tertiary care teaching hospitals .Our study was done to assess the knowledge, attitude and the perception among the practitioners at a hospital setting towards a rational use of antibiotics.

The awareness of AMR problem worldwide, national & Institutional level and in their practice by clinicians at three centres varied .In our study significant percentage of clinicians (90%) perceived that Antibiotic resistance is a problem Worldwide& national level and less percentage (75%) in their institutional level as shown in Fig-2. In contrast to our study, a high perception that AMR as an institutional problem was shown in studies by Arjun Srinivasan [18] *etal*, and Maha et al [21].Our data is similar to a study by Wester *etal* [21] where in 87% respondents agreed that Antibiotic resistance is a national problem and 55% perceived it to be a problem in their institution. In a study by Giblin *etal* [16] 89% respondent's choice was national problem and 73% in their own institution and 65% in their practice. This disparity among clinician's perception demonstrates a lack of awareness & understanding

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regarding the problem. Therefore, until the clinician's perception changes towards the fact that even in their personal practice their patients are also susceptible to AMR they will not have any motivation to change their practice behaviour particularly with respect to antibiotics use.

Regarding our clinician's response to practices contributing to AMR, 93% agreed that patient's failure to adhere to treatment an important contributor of AMR as shown in TABLE-3.In contrast, a study by Maha *etal* [16] showed only 68% agreed that patient's failure to adhere to treatment an important contributor of AMR. Our study also showed only 80% of respondents agreed that poor adherence to infection control practices like isolation precaution & Hand hygiene contributes to antibiotic resistance. In a study by Shah *etal* [20] only 31% respondents agreed that hand hygiene is significant in reducing antibiotic resistance. 54% of respondents agreed that patients demand for antibiotics a contributing factor to Antibiotic resistance. A similar data was shown by Sivagnanam[12] etal and Garcia et al [14] where in 55% of respondents agreed patients demands for antibiotics a contributing factor .

Among the data's on clinicians antibiotics prescribing practice (Table-3)79% agreed that they refer to susceptibility pattern while treating for infections at their respective institution &82% agreed that Micro lab results are efficiently communicated to treating physicians. In a study by Sivagnanametal[12] only 42% of practitioners agreed that they refer sensitivity reports. The necessity of De-escalation to oral antibiotics from IV is needed was agreed by 86% of clinicians.

As shown in Table-5, 74% of respondents disagreed for pharmacist's recommendation for Antibiotics. A similar data was shown in a study by Shah *etal* [20] wherein 73% respondents gave less importance for Pharmacists Recommendations.

Our institution organised a CME which emphasised problems of AMR, and how to combat Resistance by Basic infection control measures like Hand Hygiene, Antibiotic policy &Antibiotic stewardship .A post CME questionnaire survey was done to assess the transfer of knowledge which revealed that almost 100% agreed that basic infection control measures will reduce HCAI & there by Antibiotic resistance as shown in TABLE: 5. 100% of respondents agreed that they will be benefited by CME which will update them in AMR knowledge & Infection control practices. In a study by shah etal 70% agreed that CME will help in updating knowledge.

To our knowledge this is the first time Pre &Para clinical faculties were included in a KAP survey on Antibiotic resistance. This inclusion was done because many of the pre and Para clinical staffs are into General practise and also the necessity of AMR knowledge is essential while treating friends & families.

VI. Conclusion

Antimicrobial resistance accounts for numerous social & economic costs including mortality &morbidity. AMR continues to be a growing problem for all clinicians nationally & at institutional level. A multifaceted problem caused by AMR requires a multifaceted solution. At the institutional level, the assessment of clinician's knowledge on awareness about AMR and to educate them becomes a priority before initiating other strategies.

To summarise, our KAP study on Antibiotic resistance showed that though 95% of clinicians viewed this as a national problem, only 75%agreed that it's a problem in their institution. Also only 81% agreed that poor infection control measures & poor isolation precautions contributes to AMR and 79% refer to susceptibility pattern given by Micro lab. De-escalation of IV antibiotics to Oral antibiotics is a necessity was agreed by 86.5% of respondents.

Finally what have we learnt and understood was that the knowledge& attitude of clinician is crucial to reduce AMR at institutional level. Also as AMR problem is not limited by specialities, a better understanding of practices by all specialities included. Overall, most of our clinicians had better understanding and surprisingly Pre & Para clinical doctors also have enough knowledge regarding Antibiotics practice. Education by workshops & CME play a major role in updating knowledge. Following the study we have framed Antibiotics Policy and stewardship based on our institutional Antibiogram which addressed the susceptibility pattern of the most prevalent drug resistant pathogens.

VII. Acknowledgement

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