Awareness regarding Appropriate Antimicrobial use and antimicrobial resistance among health care professionals and lay persons.

Abstract:

Aim: This study is designed to determine the awareness of anti-microbial resistance and appropriate antimicrobials use among health care professionals (intern, junior residents and nurses) and lay persons.

Methods: The study will be held at rural tertiary care hospital in central India including junior resident, Interns and nurses, patient and their relatives. Survey tool and data questionnaire will be provided to participants in English and Marathi. *Results:* Comparison of knowledge of antimicrobial resistance among hospital staff, patient and their relatives will be done. *Conclusion:* There is a need to frame policies to prevent excessive use of Antimicrobials and to increase awareness about the knowledge of proper usage antimicrobial and antimicrobial resistance among lay person.

Keywords: Antimicrobials resistance, Health care provider, Awareness of Antimicrobials overuse

Introduction:

"Antimicrobials resistance refers to insensitivity of a microorganism to antimicrobial agents, and is similar to the phenomenon of tolerance seen in higher organism"[1]. AMR caused nearly 600,000 death per year and it is predicted that another 10 million would die due to same cause in upcoming 50 year. Mortality secondary to Cancer and road traffic accidents is same as AMR alone.[2] Due to antimicrobials resistance, there is not only increase in morbidity and mortality rate but also tremendous increase in financial burden. This leads to rising economic load due AMR to health systems which are already struggling with chronic underfunding[1].

Today over-the-counter (OTC) drugs are being widely used among general public in India without knowing its repercussion[2.] Inappropriate antimicrobials use is a menace to the society worldwide which results in rise and spread of Antimicrobial Resistance in hospitals and community settings[3]. The occurrence of antimicrobial resistance is advanced in communities where there is high level usage of non- prescription antimicrobials. Moreover, in India, majority of population reside in rural area where there is scarcity of Doctors and other health care professionals resulting in inappropriate antimicrobials use[3]. Moreover, India has the maximum infectious disease burden in the world. Thus, there is a major part of Antimicrobials to decrease morbidity and mortality by infectious diseases [4]. Hence the knowledge of proper use of Antimicrobials and antimicrobial resistance (AMR) is necessary in developing countries like India, which is scarce[4.]The world Health organization (WHO) noticed that antimicrobial resistance is a worldwide problem and it is because of inappropriate, indiscrimination, and irrational use of antimicrobial.

To prevent AMR, future directions for India were pointed out by N Taneja et al[2]. Few of directions were to educate the lay persons at the community level about AMR and to prevent OTC Antimicrobials use among them. Moreover, authors recommended re-educating the health care professionals for appropriate Antimicrobials use and improve Antimicrobial prescription practices among health care professionals. There are very few studies on awareness of AMR in the rural population of central India. Hence we aimed this study to obtain knowledge and awareness of Antimicrobials usage and Antimicrobials resistance among health care providers (HCPs) and lay persons in rural tertiary care hospital.

Objectives:

- To determine the awareness of Antimicrobials use and antimicrobial resistance among health-care professionals (resident doctors, Interns and nurses).
- To determine the awareness regarding Antimicrobials use and antimicrobial resistance among lay person (patient and the person accompanying patient) attending a rural hospital of central India

Materials and Methods:

*Study site and population***:** This study will be conducted at rural tertiary care hospital in central India. The study will be done among health professionals (like junior residents, interns, nurses), and lay person (patient and the person accompanying patient) attending the Medicine OPD and their non-sick relatives coming along with them. Daily medicine OPD caters to approximately 200 patients per day. There are 48 junior residents in one batch per year in our Medical College. All three batches will be considered for our study amounting to144. There are nearly 170 interns per year. Nurses from the medicine IPD wards will be recruited for our study.

Study design: Cross-sectional study

*Sample size***:** Based on a study describing Antimicrobials prescription practices, we assumed a prevalence of irrational Antimicrobials practice (overuse and inappropriate choice of Antimicrobials for treatment of viral infections) among health-care professionals of 50% with alpha = 5%, design effect of 1%, and 5% acceptable margin of error. The minimum sample size was calculated as 384. The sampling structure was subsequently stratified among the four groups of HealthCare providers: 96 junior resident doctors, 96 Interns, 96 nurses, and 96 lay person (patient and the attending person).

Selection criteria:

1. Health-care professionals like junior resident doctors, Interns, nurses working in a rural tertiary-care hospital.
2. Lay person patient and the accompanying person attending Medicine OPD in a rural tertiary-care hospital.
3. Lay person (patient as well as the accompanying person) should be conscious, oriented and should be able to understand the questionnaire.
4. Subjects willing to take part in the study

Survey tool: A "self-administered WHO questionnaire" and Marathi version of "WHO questionnaire" will be used to evaluate knowledge and awareness of appropriate

Antimicrobials usage and Antimicrobial resistance among health care professionals and lay persons[5]. This Survey tool will be provided to HCPs and lay persons in Wardha district of Maharashtra India , for obtaining their knowledge linked to proper usage of Antimicrobial and AMR[5.] WHO questionnaire covers 13 questions assessing the knowledge of participants in the domain of i) uses of Antimicrobials, ii) knowledge of Antimicrobials iii) knowledge of AMR and iv) environmental factors leading to AMR.

Ethics: Study will be started after seeking approval from Institutional Ethics committee. The subjects meeting the eligibility criteria will be informed after about the study and will be included in the study after receiving written informed consent. The participants will be assured of confidentiality of data.

Data collection: Background information regarding participant's age, gender, education, address, occupation and per capita income will be noted. The self-administered WHO Questionnaire will be pre-tested prior to data collection. WHO Questionnaire will be handed to the HCPs and they will be asked to mark appropriate answers. Questionnaire will be given on one to one basis to HCPs. The data collection will be done in excel sheet. For lay person, Marathi translated WHO Questionnaire will be used for data collection. In case of illiterate lay person, they will be interviewed orally in local language and the answers will be recorded. Both the options will be provided to subjects to overcome literacy difficulties.

Data Analysis: The data will be analyzed with the help of STATA version 15 MP software. Main outcome variables will be proportion of health care professionals and lay person aware of antimicrobial use and antimicrobial resistance. Estimates of outcome variable will be presented with 95% confidence interval. Test of significance will be used wherever suitable. The level of significance will be set at a p-value < 0.05.

Implications: The study may help:

- To determine proportion of inappropriate Antimicrobials use
- To create an awareness among Health Care Professionals.
- The policy makers to frame policies to prevent irrational use of Antimicrobials.

Expected Result:

This study will be lead at a rural tertiary care hospital in central India. A total 96 interns, 96 junior residents, 96 nurses and 96 laypersons will take part in the study. Their knowledge, attitude regarding antimicrobials usage and antimicrobial resistance will assess by using a questionnaire. Proportions and percentages will use for expressing result. The study will be done among participants who are willing to take part in our study. From our study we will be expected that knowledge of junior residents about antimicrobial use and antimicrobial resistance should probably be more than nurses, interns and laypersons because they are studying this topic since many years and must have gone through various workshop regarding this conducted at various institutions or symposiums. We also expect that knowledge of interns is more than nurses and lay person because they are studying this topic since 4.5 years. It will be also expected that nurses might have more idea than lay persons regarding antimicrobial use and AMR.

Discussion:

HCPs are an important group in controlling antimicrobial resistance. Antimicrobial resistance lead to increase in mortality and morbidity that causing an additional load to health care systems in low socioeconomic status countries, but it is producing a high economic burden, too[1]. HCPs are most likely to prevent antimicrobial resistance in their practice and advice patients on the same if they are themselves aware of antimicrobial resistance. Though most of the HCPs are aware about AMR is exist as a national problem, but very few are mindful about the presence of any AMR awareness programs for Antimicrobials resistance [4,8], by doing this study it will be helpful to identify the gap of knowledge in Health Care Professionals and lay persons about the causes and factors contributing to antimicrobial resistance.Other studies have verified that very few training program was arranged for physicians in infectious diseases and pharmacology , and that brings about poor training of physician and this poor training will lead to improper management of antimicrobials and this could be the promoting factor leading to inappropriate prescribing. [6,7] . In recent time, Gram positive and negative bacterial infection become difficult to treat with conventional Antimicrobials. Most of the bacteria shows multi drug resistance patterns. Biofilms are involved in antimicrobial resistance by creating obstacles in infection control.[9] In primary care, viruses cause most infections, there is particular problem taking birth which is antimicrobials overprescribing General practitioners should be aware of this drug overprescribing problem.[10,7.] National Action Plan on Antimicrobial Resistance (2017–21) was implemented in April in India to control the rising risk of antimicrobial resistance.[12]

We carried out a thorough search in PubMed to find the articles which were relevant to our study and used the keywords to sensitize or search: Antimicrobials resistance, Health care provider, Awareness of Antimicrobials overuse. we screened and reviewed research papers that had conducted studies on similar topics and some key findings revealed by different studies were as: a study conducted by Belay tafa, Adung Endale, and Desalegn Bekele (paramedical staff knowledge and attitude towards antimicrobial resistance in Dire Dawa, Ethiopia), they come out with finding that in Ethiopia , the common factors which was responsible for antimicrobial resistance were patient poor adherence, self-prescriptions, and empiric choice of antimicrobials[1]. This survey reported most important result that 90% of the health workers does not gone through any workshop on antimicrobial resistance and four-fifth of the prescribers had never attended any training related to antimicrobial prescription.

Another similar study was conducted by Luis Felipe Higuita-Gutiérrez, Gustavo Eduardo Roncancio Villamil, and Judy Natalia Jiménez Quiceno (Knowledge, attitude, and practice regarding antibiotic use and resistance among medical students in Colombia) which revealed that only 18.2% of medical students had heard the term “antimicrobial stewardship” while only 69.3% medical students had knowledge that antimicrobial resistance was caused by the empiric antimicrobial therapy. Concerning about the approach, only 11.6% of medical students considered that once the symptoms disappear, antimicrobials should be discontinued and they also reviewed that 24.6% medical students quantified that it is fine to prescribe broad-spectrum antibiotics to make assured that the patient is cured. Regarding practice, 28.5% know that antimicrobial resistance is a multifactorial problem, but they do not take any action on it because they think about that individual actions would have small influence[13]. Several studies reveal that to passing on good quality health information in community to improve antimicrobial stewardship effective source was social media and internet. A study conducted in India by Manoj K. Gupta, Chirag Vohra, Pankaja Raghav (Assessment of knowledge, attitudes, and practices about antibiotic resistance among medical students in India) the most important factor contributing to amtimicrobial resistance in India is self – prescription and by conducting this study they came with result that 45% medical

students accepted that they buy antimicrobial without a medical prescription and the knowledge of medical students was quite satisfactory on antimicrobial use and antimicrobial resistance [14]. Related studies were also reported by Rana et. al.[15] , Dangre et. al.[16], Ingle et. al.[17] and Bhute et. al. [18]. Mallick et. al. reported on inducible Clindamycin resistance in Staphylococcus Aureus[19]. Studies by Raut et. al.[20] and Sharma et.al.[21] were reviewed.

Conclusion:

As we all know all over world the major public health issue is antimicrobial resistance, this questionnaire would seem to be a very useful tool for collecting data on knowledge of how to use antimicrobial and antimicrobial resistance among HCPs in developing country. This study will unveil awareness and knowledge regarding the antimicrobial usage, AMR and factors eliciting AMR amongst common person. This study findings will help to get known that is there any need to strengthen the medical student's curriculum on antimicrobials. Further-more study will unravel some answers to the questions such as, is there any need for a formal source of information for use of antimicrobial and antimicrobial resistance to help HCPs and lay persons to improve their knowledge.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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