Necessity of Reviewing and Establishing the National Guidelines Regarding Antimicrobial Therapy for Bacterial Isolates

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Abstract

The emergence of anti-microbial resistance (AMR) is one the biggest challenges faced by the clinicians around the Globe. To coup up with the situation, further management options are heading towards deficiency. In such condition appropriate selection of antibiotics in light of results obtained from culture and sensitivity harbors great significance. The currently used microbiological diagnostic and management options are based upon the guidelines derived from Western data. The National data regarding accurate guidelines for diagnostic and management modalities are deficient. Therefore, the objectives of this review article will be to identify the significance of reviewing and establishing the National guidelines, as a stride to reduce AMR. The literature review had emphasized the need of reviewing and establishing the regional and National guidelines as a significant factor to reduce anti-microbial resistance.

1 Introduction

The era from the years 1930s to 1960s was a golden period for the discovery of many efficacious antibiotics. This short era unfortunately ruined earlier, when the researchers became helpless in view of emergence of resistant bugs. Thus, catastrophe for the development of newer antibiotics, malpractices and injudicious use of antibiotics, trends of sailing the drugs without prescription, self-medications, etc, all are the predisposing factors for emergence of AMR. The resultant of all this, lead to increased morbidity and mortality rates^{1,2}. An Australian study recognized that 47% of the prescribed antibiotic were not in acquiescence with patient's culture and sensitivity reports or the recommended guidelines³. Same is the situation in US hospitals, where 50% usage of anti microbials for any age group, was considered unnecessary⁴.

The emergence of AMR has become a challenging task around the globe¹. It is ranked amongst the leading cause of mortalities⁵. A published WHO report for the year 2014, concluded that about

700,000 to several million people die annually as a consequence of AMR⁶. While as per the report of year 2019 by center for

disease control (CDC), 2.8 million people per anum develop AMR, out of which 35,000 people die. Thus necessity of a collaborative global approach is the need of time to combat this emerging threat⁷.

Like the state of Global insurgence, Pakistan is facing the same challenge i.e increasing prevalence of AMR. A study report for the year 2017, concluded that injudicious use of antibiotics, self medication, culture for sale and buying without proper prescription, predisposes to AMR. However, super added factors includes, lack of good diagnostic facilities, increased use of antibiotics in domestic animals, lack of surveillance systems, and trend of aggressively managing the patient by using more potent drugs. All are considered to promote emergence of AMR^{8,9}. Besides all this, the trend of malpractices focusing scanty dispensing by unexperienced healthcare professionals are all the

provoking features for AMR¹⁰. A published report for the year 2018, concluded by analyzing the census of 15 years data, which over the period from 2000 to 2015, 67% increased consumption of antibiotics were observed in Pakistan. Thus, adding up to the emergence of AMR^{11,12}.

A published report by WHO showed that 20% of childhood mortality in Pakistan, is the result of acute respiratory tract infections (ARTIs)¹³. However, Global statistics revealed that 40% of childhood mortality in developing countries i.e Bangladesh, Indonesia, Nepal, and India, results from ARTIs¹⁴. The major factor behind such high mortality is the lack of health care facilities and accurate management options¹⁵. Other highlighted factors includes malpractice for antibiotics prescription i.e penicillins, cephalosporins, and macrolides, to treat viral ARTIs^{16,17}. Comparatively various International guidelines recommend the limited use of antibiotics for ARTIs^{18,19}. Nutshell of all this has resulted in increased economical burden for the health care system. Besides that a substantial increase in AMR was observed, adding up to increased morbidity and mortality^{20,21}.

2 Reported data

In view of this current situation, only way out will be the enactment of an antimicrobial stewardship program (ASP), both in community and hospital settings²²⁻²⁴. This collaborated effort by various health regulating bodies at Global level, will endorse judicious use of antimicrobials whilst restraining the influence of AMR²⁵. For ASP, the patrons could be the infectious disease (ID) physicians/ practitioners, clinical pharmacists, nurses and microbiologist. A unanimous decision and collaborative efforts of all these can be a step forward to reduce the morbidity and mortality rates from AMR²⁶⁻²⁸. In Pakistan this role is played by the Medical Microbiology and Infectious Diseases Society of Pakistan (MMIDSP). Which is devoted to develop and gadget native ASPs throughout the country²⁹.

One published report for the year 2014 analysed that implementing accurate guidelines for antibiotic usage and minimizing absurd practice of antibiotics to reduce AMR. Moreover, it was identified that due to deficiency of prophylactic/ management guidelines for antibiotics, usually results in prolonged management, might exceeding 7 to 10 days. Thus, overall management cost per patient increases alot. Besides this, workload on hospital, nurses, doctors adds up too much. This all effects the quality care of patients and lead to emergence of AMR³⁰. The National Action Plan of Pakistan, for combating anti microbial resistance, was laid out in the year 2017. This is in view to fulfil the commitment and decision of World Health Assembly Resolution 2015. The resolution emphasized dire necessity of establishing the Regional and National action plans at Global level. It was also entrenched that for National action plan, multi-sectoral approach, along with involvement of all stakeholders should be opted. It was accentuated that policies should be

formulated to ensure reduction of inappropriate Antimicrobial use and discourage antibiotics sale without prescription³¹.

The published report by Zaman et al, in 2017, narrated various microbial causes of AMR. Hydrolysis, efflux, altered targeted sites are the common causes for AMR of P-Lactams (Penicillins, Monobactams Penems, Cephalosporins,). Phosphorylation, acetylation, nucleotidylation, efflux, and alteration in targeted sites, were the common identified causes for Aminoglycosides (Streptomycin, Gentamicin, Spectinomycin) AMR. Reprogramming peptidoglycan biosynthesis results in AMR for Glycopeptides (Vancomycin, Teicoplanin). Monoxygenation, efflux, altered target results in AMR for Tetracyclines (Minocycline, Tigecycline). Hydrolysis, glycosylation, phosphorylation, efflux, altered target causes Macrolide (Erythromycin, azithromycin) AMR. Nucleotidylation, efflux, altered target causes AMR for (Clindamycin)³².

The current review article has highlighted the necessity of reviewing the anti microbial susceptibility. The result of current study had highlighted that around the Globe, emergence of anti microbial resistance is on the rise. Mostly identified factors from National and International data revealed the common etiological factors. Amongst all these, maximum focus was given for the establishment of Regional and National guidelines for anti microbial. The resultant will be a step forward to review accurate management options, which in turn will be helpful to reduce the emergence of resistance pattern.

3 Conclusion

The literature review had emphasized the need of reviewing and establishing the regional and National guidelines as a significant factor to reduce anti-microbial resistance.

4 Recommendations

1. Colloaborative efforts are required to review and establish Regional and National anti microbial susceptibility guidelines.
2. Antibiotic Stewardship should be promoted at community and hospital settings
3. Policies should be formulated to stop the malpractices for antibiotics prescribing trends.
4. Policies should be formulated to consider culture and sensitivity as initial protocol for antibiotic prescription.
5. Policies should be formulated for the Pharmaceutical companies and chemists regarding discouraging antibiotic sailing without prescription.

5 Conflicts of interest

None

6 Author's contribution

IAM: Provision of all technical support for completion of review article, references gathering for introduction and literature review along with introduction write up.

HZ: Topic selection for manuscript writing, abstract writing, final formatting of entire manuscript, planning for bench work for said topic to proceed for article.

WH: References gathering for introduction and literature review and write up of literature review.

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