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Burgeoning Irrational Antibiotics use in Primary Health Care in Nepal

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ABSTRACT

Rational use of drugs has immense impact on quality health care. Developing nations have 80% essential drug list prescription. Even though WHO estimates 15-25% antibiotics prescription in these regions, majority of Nepalese patients are prescribed more than one antibiotic in addition to inappropriate prescription in 10%-42% patients. Moreover, Nepal stands as a leading antibiotics prescribing Asian nation. Escalating irrational prescription and excessive over the counter use of antibiotics at peripheral regions of Nepal is possibly leading the emergence of multidrug resistant bacteria. Organisms like *S. pneumoniae, K. pneumoniae, Salmonella* spp., *E. coli, N. gonorrhea*, MRSA are rapidly developing first-line, second-line and multi-drug resistance in Nepal. Antimicrobial resistance is the biggest global health concern of the present day threatening the emergence of post antibiotic era. Timely intervention is must to safeguard future generation.

Keywords: Antimicrobial resistance; irrational prescription; primary health care.

INTRODUCTION

Low Middle Income Countries (LMICs) are found to have more than 80% essential drug list (EDL) prescription.[1] Similarly, WHO has implemented Integrated Management of Neonatal and Childhood Illnesses strategy to enhance rational use of medicines (RUM) in LMICs which is statistically seen to work.[2] On the contrary, globally 50% of all drugs are prescribed, dispensed or sold inappropriately; again only 50% of patients take their medicines as prescribed or dispensed.[3] Furthermore, one third of world population have inaccessibility to essential medicines.[3] Antibiotics prescription in Nepal is much higher than WHO expectations and thus stands as one of leading antibiotics prescribing Asian nation. Despite unavailability of data to depict Nepal's actual antibiotics resistance burden, studies and antimicrobial resistance (AMR) surveillance have shown marked increase in first line, second line and multi-drug resistance (MDR) in recent years.[4,5]

RATIONAL USE OF MEDICINES AND ESSENTIAL DRUG LIST

WHO introduced the concept of essential medicines in 1977. Essential medicines are the drugs that meet the priority health care needs of population.[3] WHO regards RUM only when patients get drugs as per their clinical requirements, in adequate doses of patients own need for an optimum duration and in a minimum price.[3] Any deviation from these conditions marks the use of drugs irrational. WHO recommends all physicians to prescribe from EDL. EDL in Nepal was prepared in 1986 AD. EDL 2016 of Nepal consists of 48 antibacterials, 25 antivirals, 12 antiprotozoals, 4 antihelminths and 3 antifungals.[6] National antibiotics treatment guidelines 2014 of Nepal has classified antimicrobials into groups 1,1A, 2 and 3 and its prescription as non-restricted, non-restricted as per TB and Leprosy protocols, restricted (to be prescribed by at-least medical officers) and very restricted (to be prescribed by faculty, specialist and consultant) respectively.[7]

Antibiotics are among the most sold drugs across the world. WHO expects 15-25% antibiotics use in infection prevalent regions.[3] Studies have shown 80% antibiotics consumption in primary care and the rest in hospitals.[8] Primary Health Centers (PHCs) and Health Posts (HPs) are the backbone of Nepalese primary health care. In Nepal, antibiotics are the most prescribed medicines. Majority of patients are prescribed more than one antibioticin addition to inappropriate prescription in 10%-42% patients.[4] All drugs at HPs are prescribed by paramedicals/ health workers while doctors work in PHCs and hospitals. Thus, paramedicals are supposed to prescribe only group 1 and 1A while medial officers should prescribe only group 2.[7] But such guidelines are barely in practice and neither are monitored. Irrational use of antibiotics like amoxicillin, ampicillin, ceftriaxone and

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gentamicin are seen at various health facilities. Such irrational prescription are particularly found at lower level health facilities by health workers.[4] Furthermore, majority of the antibiotics are available over the counter (OTC) drugs that has made non-prescription antibiotics use rise beyond control. Patients' unawareness and worry about cost of medical consultation and investigations also promote OTC use of antibiotics. In a situation where irrational antibiotics prescription is still a matter of immense worry, non-prescription use of antibiotics which is frequently associated with inadequate courses, inappropriate drugs and dosages points to OTC use of antibiotics as a bigger problem than prescription use. Even though AMR is a natural phenomenon it is positively related to the use of antibiotics.[5] Therefore, the excess antibiotics prescription in Nepal is bound to have high AMR.

DIAGNOSTIC AND ANTIBIOTIC SUSCEPTIBILITY TESTING (AST) CAPACITIES IN NEPAL

AMR surveillance in Nepal was stared in 1999 which has escalated up with a network of 20 laboratories. It does surveillance of eight pathogens namely *Salmonella* spp, *Shigella* spp, *Vibrio cholerae*, *Streptococcus pneumoniae*, *Neisseria gonorrhoeae*, *Haemophilus influenza* type b, Extended Spectrum Beta Lactamase (ESBL) producing *E. coli* and Methicillin Resistant *Staphylococcus aureus* (MRSA).[5] Looking at the scenario its high time the network is expanded such that it covers entire nation and all health facilities with equal participation from private sector. Similarly, significant contribution of animal and agriculture in AMR is poorly documented.[4,5] It should also be integrated in the mainstream surveillance.

ANTIMICROBIAL RESISTANCE

AMR has narrowed the liberty of antimicrobial selection and has become a problem of global health. WHO has marked AMR as the greatest present day threat to human health. Antibiotics resistance is peaking globally as well in Nepal.[4] AST from those 20 laboratories in Nepal have shown immense increase in the resistance of organisms under surveillance in the past decade. Resistance to Ciprofloxacin in *Salmonella* raised from 0% in 2003 to 85% in 2014. *Shigella* spp. have shown five-fold increase in MDR. Similarly, resistance to Ceftriaxone in *Pneumococci* raised from 0% in 2006 to 13% in 2013. There has been 80% rise in MRSA in two years. Furthermore, MRSA has shown increased resistance to both first and second line drugs.[5] Many patients treated at our higher centers are seen to have multidrug resistant bacteria. A situation analysis on antibiotics use and resistance in Nepal by Basnya *et al*. has shown a great increase in resistance to various single and multiple drugs in *Streptococcus pneumoniae*, *Klebsiella pneumoniae*, *Salmonella spp.*, *Escherichia coli*, *Neisseria gonorrhea*, MRSA and *Mycobacterium tuberculosis* (table 1).[4] These resistance analysis were deduced from studies done at different tertiary centers.Those bacteria probably acquire such resistance from irrational and OTC use at peripheral parts. Available antimicrobials often don't show proper action against those multidrug resistant organisms. Such patients on subsequent illnesses hardly respond to antibiotics prescribed from primary health cares. AMR is a phenomenon of the present and is no more a prediction. Hardly any new major antibiotics have been developed in past three decades (figure 1). Present trend of excessive misuse of antibiotics in primary health care can initiate a post antibiotic age from our land in which common infections and minor injuries can once again sadly kill people. LMICs invest 20%-40% of total health budgets in drugs which is double than developed nations.[3] On the contrary, LMICs lack adequate newer classes of antimicrobials. AMR decreases the treatment success rates and profoundly increases morbidity, mortality and health care costs. This makes the problem of AMR more worrisome in LMICs like Nepal which warrants a regular review of antimicrobials prescriptions and control of OTC consumption as in developed nations.

Table 1. Antibiotics resistance in different organisms.

Organisms	Resistance percentage against various antibiotics*
K. pneumoniae	0%-87%
S. pneumoniae	0.4%-56.6%
Salmonella spp.	0%-10%
E. coli	39%-83%

*resistance percentage against various antibiotics shown by different studies done at different tertiary centers of Nepal over past two decades(inferred from review done by Basnyat *et al.*).[4]

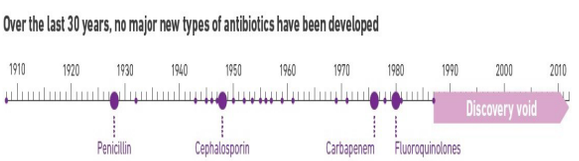

Figure 1.Timeline of discovery of major antibiotics (Source: WHO)

RECOMMENDATIONS

Judicious and rational use can definitely reduce the prevalence of AMR. A flourishing irrational use of antibiotics in children and adults in our primary health care stresses more rigorous training in overall antibiotics

prescription to help decrease the misuse of these drugs. A provision of AST of pathogens should be made integral part of antibiotics prescription. Again, infection prevention and antibiotics stewardship remain vital to reduce antibiotics use and enhance its appropriate use respectively.

CONCLUSIONS

Non adherence to a particular standard recommendations and lack of proper and monitored guidelines for prescription and non-prescription OTC antibiotics use seem to be burgeoning contributors of irrational antimicrobials prescription and AMR in our primary health care.

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