SYNTHESIS ON ANTIMICROBIAL RESISTANCE CONSIDERING ONE HEALTH APPROACH IN THE CONTEXT OF NEPAL

KEY MESSAGES:

AMR is an important public health issue that threatens to undo the remarkable achievements of modern medicine.

There is growing burden of AMR in Nepal due to widespread irrational use of antibiotics along with fragile health care systems poor infection control and prevention measures.

Use of antibiotics as growth promoter in animal agriculture, overuse, use for long periods, self-medication practices and lack of well-equipped hospitals are drivers of the AMR in humans.

Poor husbandry practices with inappropriate infection prevention and control, lack of awareness on good management practices and prudential use of antibiotics contributes to AMR in the animals.

Given the complexity of the AMR challenge at the level of human, animal health and environment, the role of a "One Health" approach in tackling the problem of AMR is crucial.

The National Health Policy of Nepal, 2076 (2019) has prioritized AMR as an important public health issue, and has highlighted to develop the national action plan (NAP) to reduce AMR and effectively regulate and control antibiotic use through multisectoral collaborative action.

The NAP-AMR is aligned with the Global Action Plan (GAP) where activities are identified under the strategic interventions of each of the five strategic objectives. Improve awareness and understanding of AMR; Strengthen knowledge through surveillance and research; Reduce the incidence of infection; optimize the use of antimicrobial agents in health, animal and food sectors; and develop an economic case for sustainable investment that considers the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions.

Formation of High level Multisectoral Steering Committee - AMR (AMRMSC), and the National Technical Working Committee (NTWC) – AMR to manage AMR.

What are antimicrobials?

Antimicrobials – including antibiotics, antivirals, antifungals and antiparasitics are medicines used to prevent and treat infections in humans, animals and plants[1].

What is antimicrobial Resistance?

Antimicrobial Resistance (AMR) occurs when bacteria, viruses, fungi and parasites change over time and no longer respond to medicines making infections harder to treat and increasing the risk of disease spread, severe illness and death.

As a result of drug resistance, antibiotics and other antimicrobial medicines become ineffective and infections become increasingly difficult or impossible to treat[2].

[1]Neill JO. Antimicrobial Resistance: Tackling a crisis for the health and wealth of nations (2014).

[2] https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance

ANTIMICROBIAL RESISTANCE

AMR is an important public health issue that threatens to undo the remarkable achievements of modern medicine. It is estimated that, currently, at least 700,000 people die each year due to drug resistant diseases[3], with most of the direct and indirect impact falling on low- and middle-income countries. A 2017 World Bank report estimates that by 2030, AMR could cause a global economic loss to the tune of more than $1.0–3.4 trillion annually, worse than that caused by the 2008-09 financial crisis[4]. By 2030, AMR could force up to 24 million people into extreme poverty, due to its combined effects on human health as well as food systems[5]. The economic losses are projected to be worse in low-income countries, thereby increasing global economic inequality and vulnerability to infectious diseases. The inappropriate use of antibiotics by individuals – together with the use of antibiotics in industrial-scale farming to produce protein-rich diets for feeding the increasing human population, and the discharge of antibiotic residues and genes into the environment – creates greater selection pressure for resistance among pathogens. The World Health Organization (WHO) has declared AMR among the top 10 global health threats[6]; it can no longer be addressed by single, isolated interventions with limited impact. Nepal is one of the major contributors to the growing burden of AMR due to widespread irrational use of antibiotics along with poor health care systems poor infection control and prevention measures. AMR is also neglected owing to other public health priorities and poorly implemented laws or the lack of regulations for Antimicrobial Use. The Government of Nepal, Ministry of Health and Population (MoHP) has undertaken several measures to address the commitment made to contain the challenges of AMR in Nepal. The National Health Policy of Nepal, 2076 (2019) has prioritised AMR as an important public health issue, and has highlighted the need to develop a national action plan (NAP) to reduce AMR and effectively regulate and control antibiotic use through multisectoral collaborative action[7]. It is notable that the Nepal Health Sector Strategy 2015–2020 has also identified growing antibiotic resistance as a public health challenge, and has incorporated an action plan on antimicrobial resistance containment as a key intervention to strengthen the quality health system, thereby improving the quality of care at the point of delivery[8].

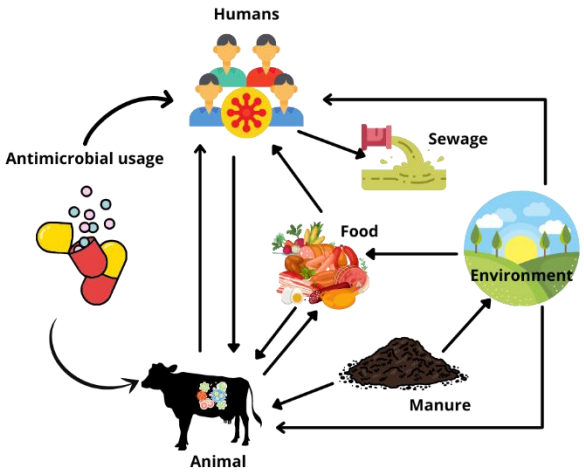

Figure 1. The routes of transmission of AMR

[3]Neill JO. Antimicrobial Resistance: Tackling a crisis for the health and wealth of nations (2014).
[4]World Bank Report. Drug Resistant Infections: A threat to our economic future. (2017).
[5] IACG Report https://www.who.int/antimicrobial-resistance/interagency-coordination-group/IACG_final_report_EN.pdf?ua=1(Accessed on October 31, 2019).
[6]World Health Organization. Top ten threats to global health. (2019).
[7] National Health Policy 2076. (2019). National Health Policy 2076.
[8] MOHP Nepal, Kafle K, et al. National Antibiotic treatment guidelines-2014. (2014).

ASSESSMENT OF ANTIMICROBIAL USE (AMU) AND ANTIMICROBIAL RESISTANCE (AMR) IN NEPAL

Human health sector:

Most patients were unnecessarily prescribed more than one antibiotic without bacterial confirmation or susceptibility testing. Antimicrobials are commonly prescribed for conditions that do not require antibiotics, such as colds, coughs and diarrhoea. Self-medication is common in Nepal, and most people do not comply with the physician-directed duration of treatment. Pharmaceutical companies with vested interests offer incentives to physicians to prescribe "their" brand of drugs. Recently, most antibiotics are becoming less effective due to the development of partial resistance by bacteria. There is high prevalence of methicillin-resistant Staphylococcus aureus (MRSA) in tertiary care hospitals in Kathmandu. Penicillin-resistant Neisseria gonorrhoea infection is also on the rise in hospitals.

Animal health sector:

Retailers and distributors do not have adequate knowledge on the effective dosage and possible side effects of veterinary drugs. Farmers use antibiotics to compensate for poor farm sanitation and hygiene. Resistant microbes from animals are transmitted to humans either through the food chain or via direct or indirect contact with animals. Antibiotics are used inappropriately in cattle, pigs and poultry as growth promoters as and to minimise production losses. Safe and judicious use of antibiotics is still not practised in dairy farms, and the risk to public health due to residues in meat and milk is high. Inadequate regulations and guidelines for the use of veterinary drugs and a lack of AMR surveillance in the veterinary field.

Environment Health sector:

In environments affected by anthropogenic activities, antimicrobial residues and antimicrobial resistant bacteria are found in surface waters, soils, animal and human waste streams, and foods of plant origin. Overall, the main sources of this environmental contamination are human waste from homes and hospitals, animal waste from farms, pharmaceutical manufacturing waste, and antimicrobial pesticides used in agriculture. To control the AMR situation in the environmental sector, the country does not yet have a mitigation strategy to cope up with the AMR situation. Nepal has recently started to push for protocols focusing on mitigating this problem as well as establishing microbiology laboratories to conduct studies to understand the problem of AMR in the environment sector.

One Health Approach in tackling AMR

One Health is the collaborative effort of multiple health science professions to attain optimal health for people, domestic animals, wildlife, plants, and our environment. The drivers of antimicrobial resistance include antimicrobial use and abuse in human, animal, and environmental sectors and the spread of resistant bacteria and resistance determinants within and between these sectors and around the globe. Most of the classes of antimicrobials used to treat bacterial infections in humans are also used in animals. Given the important and interdependent human, animal, and environmental dimensions of antimicrobial resistance, it is logical to take a One Health approach when addressing this problem. This includes taking steps to preserve the continued effectiveness of existing antimicrobials by eliminating their inappropriate use and by limiting the spread of infection. Major concerns in the animal health and agriculture sectors are mass medication of animals with antimicrobials that are critically important for humans, Numerous countries and several international agencies have included a One Health approach within their action plans to address antimicrobial resistance. Necessary actions include improvements in antimicrobial use regulation and policy, surveillance, stewardship, infection control, sanitation, animal husbandry, and alternatives to antimicrobials. Given the important and interdependent human, animal, and environmental

dimensions of antimicrobial resistance, the government of Nepal has committed to a One Health approach to tackle this problem[9].

NEPALS COMMITMENT TO TACKLING AMR

Nepal has been one of the heralds in the Asian subcontinent in perceiving the risks of AMR. Nonetheless, it has had an uneven excursion in assembling responses to address AMR. An AMR situation analysis was led by the Global Antibiotic Resistance Partnership (GARP) and distributed in May of 2015[10]. This suggested building up national strategic plan for the utilization of antibiotics that protects their adequacy into the future and increases the health benefits from their proper use. Following the UN General Assembly Resolution on AMR, Nepal published its National Antimicrobial Resistance Containment Action Plan in 2016 under the Ministry of Health and Population, Department of Health Services led by the National Public Health Laboratory (NPHL) and upheld by WHO, Nepal. The revised NAP-AMR was prepared with a one health approach, with multisectoral involvement from the human, animal, food and environmental sectors, and the leadership of the one health National Technical Working committee (NTWC). During the NAP-AMR development, in addition to the involvement of different stakeholders from the four sectors, the engagement of areas such as academia, councils, and professional associations, and the effective participation of the Ministry of Finance (MoF), the National Planning Commission, the Ministry of Education Science and Technology (MoEST), the Curriculum Development Centre and external development partners (EDPs) was ensured, and their input was taken at various stages. The document emphasises an integrated one health response to contain AMR. The NAP-AMR is aligned with the GAP where activities are identified under the strategic interventions of each of the five strategic objectives.

1. Improve awareness and understanding of AMR;
2. Strengthen knowledge through surveillance and research;
3. Reduce the incidence of infection;
4. Optimise the use of antimicrobial agents in health, animal and food sectors; and
5. Develop an economic case for sustainable investment that considers the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions[11].

Acknowledging the complexity of AMR, and to respond to the issue methodically, several initiatives have been undertaken by the Government of Nepal, examples of which include the formation of High level Multisectoral Steering Committee - AMR, and the National Technical Working Committee- AMR.

[9] One health approach in Nepal: Scope, opportunities and challenges. (2019)
[10] World Health Organization, Nepal AMR Integration Report. (2018)

[11] NATIONAL ANTIMICROBIAL RESISTANCE CONTAINMENT ACTION PLAN NEPAL. (2016).