Anti-Microbial Resistance in Uganda

Richard Odoi and Maiko Joakim Odoi review Anti-Microbial Resistance in Uganda and the attempts being made to contain its spread

It is now accepted the world over that antimicrobial resistance (AMR) is a global public health threat. But nowhere is this threat more manifest than in countries like Uganda, where resources are limited are health systems weak. In 2015, Global Antibiotic Resistance Partnership Uganda Chapter,[1] under the auspices of the Uganda National Academy of Sciences, sponsored a study that found worsening trends of resistance and diminishing effectiveness of antibiotics in the country in both humans and animals.[2]

A growing number of infections – including pneumonia, tuberculosis, gonorrhoea, salmonellosis[3-8] – are becoming harder to treat as the medicines used to treat them become less effective.[9,10,11] Recently, Najjuka[13] documented high resistance rates to both β-lactam and non-β-lactam antibacterial agents in district hospitals. Alarming rates of Multidrug resistance were also reported.[12,14,13,15,9] A systemic review on the current status of carbapenem resistance in east Africa revealed carbapenemresistance profile as follows: A. baumannii (23%), followed by P. aeruginosa (17%), Klebsiella pneumoniae (15%), Proteus mirabilis (14%) and Escherichia coli (12%) mainly isolated from respiratory tract, blood, urine and wound/pus. Of particular concern is the high prevalence of multi-drug resistant bacteria such as methicillin-resistant Staphylococcus aureus (MRSA) and extended-spectrum beta-lactamase (ESBL)-producing bacteria, which confers resistance to some advanced antibiotics.[16]

Causes of antimicrobial resistance in Uganda

The factors favouring the emergence and spread of antimicrobial resistance in Uganda include: overuse of antibiotics (associated with self medication), overprescription of antibiotics, and patients not finishing the entire course of antibiotics prescribed. Uganda also experiences overuse of antibiotics in livestock and fish farming, paucity of human resource and high patient load, high percentage of infection, poor hygiene and infection control, self-medication by the population, ineffective medicine regulation, and lack of diagnostic tests before treatment.

Recently, Yantzi, van de Walle and Lin[17] documented

the socio-cultural factors that facilitate antibiotic misuse in Uganda. The strong public perception of antimicrobials as a panacea for the majority of illnesses in Uganda provides a strong incentive for use of these medicines in both man and animals. There is also an increasing use of antibiotics in poultry and livestock not only for treating disease, but to promote growth and prevent disease. Healthcare workers generally overprescribe antibiotics for a variety of reasons. For instance, health workers in Uganda will prescribe antibacterial agents in the management of disease symptoms related to viral infections such as common colds. Over-the-counter supply and unregulated supply chains of antimicrobials[18] are also common. In addition, attendance at health clinics has been associated with carriage of ESBL-PE and the development of Multi-drug resistance (MDR) phenotype.[13]

Low availability of human resources coupled with large numbers of patients with infection can lead to difficulties in prescribing effective empirical antimicrobial therapy by the physician.[19-21] In Uganda patients presenting to hospitals for treatment have in most cases used antibacterial agents at home prior to hospital visit and hence end up with 'prescribing cascade'.[21] Coffie et al[22] provide examples of low testing practices before treating an infection. Inadequate doses of antimicrobial agents being dispensed to patients in the private sector is a common problem; medicines being dispensed according to the amount of money patients have is another, and is linked to inadequate regulation.[23] At least four in every ten individuals that visit a health-care

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facility are treated with an antibiotic, frequently in inadequate doses.

Hygiene amenities such as soap for hand-washing in health-care facilities are in low supply.[24,25,26] Poor knowledge and attitude of health workers about infection control in the country has been documented.[27] Easy availability of antimicrobials in drug shops, self medication, over-the-counter sale of antimicrobials all represent infringements with the regulation of medicines. In May 2015 the Uganda National Drug Authority (NDA) was sued for failing to crack down on illegal drug shops and clinics. Several drug shops and private clinics that do not conform to the required standards remain operational in many districts, putting the lives of patients at risk.

Diagnostic tests are fundamental in medical decision-making, increasing or decreasing the probability of infection in a patient based on the result. In Uganda these tests are not often offered. When offered at all, the tests are too expensive for the vast majority of patients to afford.

The consequences of antimicrobial resistance

The first line medicine for managing uncomplicated malaria was chloroquine (CQ) nearly up to the year 2000.[32] However, as a result of resistance to CQ and to a combination of CQ with Sulfadoxine-Pyrimethamine, in 2004 Uganda adopted the use of more expensive artemisinin-based therapy (ACTs) as first-line drug.[28] Common antibiotics like the penicillin, the first generation cephalosporins, the amino glycosides like gentamycin, the polyketide antibiotic like tetracycline etc, were the drugs of choice until the emergence of antibacterial agents against these drugs in the country.

The economic impact of increasing numbers of untreatable infectious diseases has not been shown empirically but as will be evidenced currently there is an explosive use of more expensive fourth generation of cephalosporins for treating most bacterial diseases.

Antimicrobial resistance provides opportunities for new infections to emerge or old ones to re-emerge. In the recent past there have been outbreaks of Ebola virus disease in Uganda as well as Marburg haemorrhagic fever, Lassa fever, chikungunya and maybe Zika fever, Crimean Congo haemorrhagic fever as well. The cost of containing these outbreaks and treating patients is enormous. And this is before the costs in terms of associated mortality are considered. Apart from the above, infection with penicillin-non-susceptible pneumococci is associated with more than four times the risk of suppurate complications, infertility and promotion of the transmission of other sexually transmitted infections, including human immunodeficiency virus.

Response to AMR in Uganda and way forward

In attempts to fight against antimicrobial resistance in the country, a laboratory network that integrates identification, surveillance of enteric pathogens and their antibiotic resistance patterns of major classes of pathogens responsible for enteric infections has been established at the Central Public Health Laboratory (CPHL) in Uganda. Uganda also adopted a OneHealth approach that includes the human, animal, agriculture, and environmental sectors with the release of its National Action Plan (NAP) in 2017.

A consortium headed by the Infectious Diseases Institute (IDI) and comprising departments of Pharmacy, Veterinary Medicine and Microbiology at Makerere University secured funding from the Fleming Fund in 2018. Funded by the UK Department of Health and Social Care under its Fleming Fund Grants Program, the objectives of the grant included launching and disseminating the National Action Plan on AMR, supporting the establishment of the secretariat for the AMR Platform, and making high-level decisions regarding AMR in Uganda. A well-functioning One Health AMR/AMU surveillance governance structure is also required to provide technical support for the AMR Platform on AMR and AMU. Increasing the collaboration between stakeholders to implement a One Health AMR surveillance program, establishing a MOH-led system of collecting, collating, analysing, reporting and disseminating AMR and AMU data on national and international platforms in alignment with the requirements of the Global Antimicrobial Resistance Surveillance System (GLASS) remain key actions to follow, as well as strengthening AMR and AMU surveillance in animals. The Center for Disease Dynamics, Economics & Policy (CDDEP) under the Global Antibiotic Resistance Partnership (GARP) carried out a baseline assessment in 2014 that informed the actions to combat the problem. A multidisciplinary task force was created with a surveillance plan for 2017-2022 in place.

Conclusion

There is already a high level of drug resistance to commonly prescribed antibiotics in Uganda, including multidrug resistance. Some progress is already being made with support from some development partners with respect to monitoring and understanding AMR through initiatives such as formation of a One-Health Group under the auspices of the Uganda Academy of Sciences to monitor and conduct research on antimicrobial resistance in the country through a surveillance program. This effort can be made more robust through a serious government funding.

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