ABSTRACT

Background: Antimicrobial resistance (AMR) is now a public health, animal and ecosystem problem globally. Human activities, including agriculture, veterinary and human medicine practices, have been shown to contribute to the evolution and spread of AMR in the environment. These activities include misuse and overuse of antimicrobials of variable quality and efficacy in humans and animals, improper storage and disposal of antimicrobials and preservatives for food and antibacterial agents in household products. A recent systematic review has indicated that there are very high levels of antimicrobial use and AMR in animal production systems in Africa. Regionally, high levels of antimicrobial use, related weak regulatory measures and poor AMR surveillance systems are of great concern to animals, the environment and human health. All these emphasize the call for an effective holistic and multisectoral collaboration (One Health) approach, including environmental, animal and public health sectors, to effectively mitigate this emerging threat. Globally, several efforts have been made to combat AMR. In 1998, the World Health Assembly adopted a resolution requesting all member states to take action against AMR. In 2011, the World Health Organization (WHO) issued a policy package aimed at increasing international attention to AMR as a growing public health threat. The WHO policy package recommended several actions to be taken by governments to stimulate change and address AMR. These actions include committing to a comprehensive, financed national plan with accountability and civil society engagement, strengthening surveillance and laboratory capacity, ensuring uninterrupted access to essential medicines of assured quality, and regulating and promoting rational use of medicines. The WHO member states were encouraged to develop National Action Plans (NAPs) for AMR by 2017. All these efforts reflect a global recognition and consensus that AMR poses a profound threat to human health. However, the effective implementation of NAPs faces some challenges, especially in low- and middle-income countries (LMICs). The challenges include: (i) lack of access to appropriate antimicrobial therapy; (ii) weak regulation around antimicrobial use in humans and animals; (iii) weak surveillance of antimicrobial use and resistance levels; (iv) lack of updated antimicrobial treatment guidelines; (v) lack of continuing medical/veterinary education on antimicrobial use for prescribers; (vi) a weak regulatory framework for the use of antimicrobials in animal production and aquaculture; (vii) tendencies of farmers treating their animals without consulting veterinarians; and (viii) livestock keepers who fail to observe the recommended therapeutic doses and withdrawal periods as well as frequently using incorrect routes of administration. Recognizing that antimicrobials play a critical role in the treatment of diseases of farm animals and plants, the FAO developed the 2016–2020 AMR action plan to support the WHO-led Global Action Plan on Antimicrobial Resistance to assist countries to adopt and implement the multisector NAPs to combat AMR. The action plan highlights the critical requirements for involvement of public health and veterinary authorities, the food and agriculture sectors, financial planners, environmental specialists and consumers in the strategy. However, there is a growing concern that resistance to antimicrobial drugs will reverse the achievements of food safety and animal health. Several studies have demonstrated the magnitude of AMR in Tanzania. The prevalence of multidrug-resistant bacteria in clinical settings ranges from 25% to 50%. A study on AMR among producers and non-producers of extended spectrum beta-lactamases in urinary isolates at a tertiary hospital in Tanzania found AMR in both *Escherichia coli* and *Klebsiella* species isolates. Despite years of global concern and the development of a comprehensive action plan, AMR in Tanzania has

continued to increase in human, animal and environmental sectors. A recent study reported that >70% of all samples from humans and food animals contained coliforms that were resistant to cefotaxime, tetracycline, sulfamethoxazole or ampicillin. Despite these specific studies, there is limited information on AMR stewardship in Tanzania. This study was therefore designed to explore and describe the policy actors and human and animal health practitioners' perceptions of AMR in Tanzania. Objective: To explore and describe the perceptions of policy actors and practitioners on antimicrobial use and resistance in human and animal health in Tanzania. Methods: This was an exploratory qualitative study, which involved semi-structured interviews with nine policy makers and 102 practitioners. Results: Improved multisectoral collaboration and coordination among experts from the animal and human sectors, government will, improved infrastructures, existence of public awareness campaigns on appropriate use of antimicrobials and existence of antimicrobial stewardship were identified as strengths for the implementation of National Action Plan on Antimicrobial Resistance (NAP-AMR) in Tanzania. Despite these strengths, insufficient public awareness of AMR, limited community engagement and inadequate human resources were among the reported weaknesses. A number of opportunities for the implementation of NAP-AMR were also reported including the presence of integrated disease surveillance and response strategy in health sector and development of a coordinated surveillance system. Furthermore, the inadequate laboratory capacity and poor resource mobilization were identified as challenges facing the implementation of NAP-AMR. Conclusion: The future policies of AMR need to capitalize on the identified strengths and opportunities as well as design interventions to improve public awareness of AMR and community engagement, deployment of adequate human resources and ensure adequate resource mobilization to meet AMR needs.
Keywords: Antimicrobial use, Resistance, Policyactors, Practitioners, Perception, Tanzania

1. **Frumence, G., Mboera, L.E.G., Sindato, C., *et. al*… (2021). The Governance and Implementation of the National Action Plan on Antimicrobial Resistance in Tanzania: A Qualitative Study. *The Policy Design, Implementation and Governance of Antimicrobial Resistance.* Vol.10(3):273.**
Doi: 10.3390/antibiotics10030273.

ABSTRACT

Tanzania launched its first National Action Plan (NAP) on antimicrobial resistance (AMR) in 2017 to reduce the burden of AMR in the country and contribute to the global response. We aimed to analyze the implementation of the NAP on AMR in Tanzania using the governance framework. In-depth interviews were conducted with human and animal health practitioners and national-level policy actors. We adapted Chua's AMR governance framework to analyze the development and implementation of the NAP in Tanzania. Implementation of the NAP has realized several achievements, including: (i) the establishment of a functioning Multi-Sectoral Coordinating Committee for coordinating the implementation of AMR activities; (ii) existence of governance structure; (iii) establishment of human and animal surveillance sites; (iv) creation of AMR awareness in the community and (v) availability of guidelines at the health facility level to ensure AMR stewardship. However, some dimensions of the governance areas, including reporting and feedback mechanisms, accountability, transparency and sustainability of AMR plans, are not

effectively implemented. Addressing these challenges should involve strengthening the collaboration of the different sectors involved at different NAP implementation levels by careful planning and coordination, and provision of adequate resources to ensure sustainability. Results: The analysis of the implementation of the NAP adapted to Chua's governance framework consists of five main governance areas: policy design, implementation tools, sustainability, monitoring and evaluation and one health engagement. In the next few sections, we detail our findings according to each governance area. Conclusions: This study uses a governance framework to analyze the development and implementation of Tanzania's AMR NAP according to three governance areas: policy design, implementation tools and monitoring and evaluation. The NAP is an important first step in fighting the increase in the prevalence of AMR in the country. While the NAP outlines strong objectives, operationalizing and implementing them require careful planning with attention to detail to ensure Tanzania can achieve its goals. This analysis indicates that despite the availability of the NAP, there are challenges in its implementation. These include weak AMR surveillance, inadequate resources for plan implementation sustainability and a lack of funding for research and monitoring the progress. Strengthening the one health approach involving different NAP implementation levels, combined with careful planning with adequate allocation of resources, should be given top priority in policy and decision making for the effective implementation of the NAP.
Keywords: antibiotics; antimicrobial resistance; implementation plan; governance; Tanzania