

Antimicrobial stewardship - what is possible

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Submitted: October 2020

Accepted: January 2021

Published: February 2021

Abstract

Antimicrobial drugs are the basis of modern medicine, saving lives and allowing surgery and chemotherapy to be possible. Inappropriate use of antimicrobials has led to resistance, meaning we can no longer rely on them being effective. This is further complicated by a lack of new drugs coming to market. Antimicrobial resistance is a well-documented global problem and threatens low and middle-income countries (LMIC) disproportionately. A “One Health” approach is needed, tackling antimicrobial use in human, veterinary, agriculture and environmental sectors. Many health professionals are aware of antimicrobial resistance but struggle to know how to change their practice safely. Here, the author reports on her experience as an antimicrobial pharmacist at Betsi Cadwaladr University Health Board (BCUHB) in Wales and observing practices in Eswatini. BCUHB used various strategies and tools to support prescribers to change prescribing practice. Some of these tools were specifically aimed at primary care prescribers. Similar tools could be developed to support prescribers in LMIC. Antimicrobial resistance cannot be ignored and action is needed now.

Keywords: Antimicrobial Stewardship (AMS), Antimicrobial Resistance (AMR), antibiotics, low and middle-income countries (LMIC), primary care

Introduction

Antimicrobial Drugs (AMDs) are widely used in modern medicine practice to prevent potential infections (prophylactic therapy) or manage existing infectious diseases. Microorganisms such as bacteria, fungi, viruses, and parasites mutate all the time naturally. However, exposure to antimicrobial drugs causes selection of resistant strains, rendering AMD less effective or ineffective. The emergence and spread of AMD resistance present a significant global public health threat. The 2016 O’Neill review estimated about 700,000 die every year from drug-resistant strains of common bacterial infections. However, if the current situation is left unchecked, this could rise to 10 million deaths annually by the year 2050 and associated cumulative cost to the global economy of over 100 trillion.^[1] The middle and lower-income countries are disproportionately affected: eighty-nine percent of the 10 million fatalities would be in Africa and Asia.^[2]

Antimicrobial Drug Resistance (AMDR) often occurs as a result of the inappropriate use of antimicrobial drugs, including over- and under-prescribing. It is estimated that 8% of hospitalized COVID-19 patients experienced bacterial infections while 72% received antibiotics.^[3] Overuse of specific antibiotics increases the likelihood of resistance.

The World Health Organization (WHO) has reported on several instances of AMDR, such as multidrug resistant TB (MDR-TB), which has been reported in all regions of the world, and extensively drug-resistant TB (XDR-TB), which is resistant to at least four of the core TB drugs. Moreover, resistance has also emerged to carbapenem antibiotics, the last resort for treatment of *Klebsiella* pneumonia, a common intestinal bacterium that can cause life-threatening infections, and a significant cause of hospital-acquired infections. However, developing a new drug costs a significant amount of time and money. Therefore, promoting good antimicrobial prescribing practice is a feasible way to combat the growing AMR threat.

Citation:

Roberts. Antimicrobial stewardship - what is possible. *South Sudan Medical Journal* 2021; 14(4):11-14 © 2021 The Author (s)

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Several efforts aimed to slow down the emergence and spread of AMR strains have been introduced, including World Antimicrobial Awareness Week which occurs annually each November. Its main objectives are to increase awareness of global antimicrobial resistance and to encourage best practices among the general public, health workers and policy makers to avoid the further emergence and spread of drug-resistant infections.

Fighting AMR requires a “One health” approach that covers human, veterinary, agricultural, and environmental sectors.^[2] However, this article will focus mainly on the antimicrobial stewardship approach in fighting antimicrobial resistance adopted at the Betsi Cadwaladr University Health Board (BCUHB), with whom the author worked.

Antimicrobial Stewardship Approach

Antimicrobial Stewardship is an organizational or healthcare system broad approach that promotes and monitors antimicrobial usage in the health care sector. However, Antimicrobial Stewardship cannot successfully fight AMR without infection control and vaccination programs. As part of the global effort to combat AMR, the WHO in 2015 introduced five strategic objectives:

- to improve awareness and understanding of antimicrobial resistance;
- to strengthen knowledge through surveillance and research;
- to reduce the incidence of infection;
- to optimize the use of antimicrobial agents
- to develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions.

Between 2017-2019, BCUHB achieved a 12.6% reduction in the volume of antimicrobial drugs prescribed in primary care.^[4] The interventions used can be grouped in the following categories: educational programme, multidisciplinary approach, adherence to antimicrobial prescription guidelines, and surveillance.

Educational program

One of the most useful tools in our approach was educating health care professionals, especially those under training. This ensured that they understood the threat of antimicrobial resistance and the impact of irrational prescribing of antimicrobials on patients and public health in general. The following resources can be helpful.

FutureLearn^[5] runs various free access courses on Antimicrobial Resistance and Stewardship for health professionals, including:

- Antimicrobial Stewardship for Africa;
- Antimicrobial Stewardship: Managing Antibiotic Resistance;
- The role of Antifungal Stewardship;
- TARGET Antibiotics-Prescribing in Primary Care;
- Utilizing Social Science and Behaviour Change in Antimicrobial Stewardship Programmes: Improving Health Care;
- Challenges in antibiotics Point Prevalence surveys.

As well as discussing the importance of Antimicrobial Stewardship, they also discuss strategies that can be used to tackle antimicrobial resistance.

The WHO also runs the online course, “Antimicrobial Stewardship: A competency-based approach.”^[6]

It is important to educate children about infection control and antibiotic use. E-bug^[7] is a free educational resource for the classroom which provides lesson plans for teachers and teaches school children about microorganisms, how disease spreads, and basic information about antimicrobials. Resources are available for school students of different ages and in different languages.

Promoting non-prescribing of antibiotics where appropriate

General Practitioners in BCUHB were aware of the problem of antimicrobial resistance but struggled to identify how they could change their prescribing habits safely. The majority of antibiotic prescribing occurs outside the hospital, so it is important to support primary care prescribers, although historically, most resources have been directed at hospital prescribing.

The Royal College of General Practitioners in the UK developed the TARGET (Treat Antibiotics Responsibly, Guidance, Education Tools) toolkit^[8] to help influence prescribers’ and patients’ personal attitudes and perceived barriers. To develop the tools, they asked the question “why do primary care staff prescribe antibiotics”. They identified three key reasons:

- Relief of symptoms;
- Worry about complications/more serious illness;
- Patient pressure.

They then developed training material and patient information leaflets that could be used instead of an antibiotic prescription. The leaflets were aimed at commonly presenting infections and tackled the questions above. The leaflets explained why an antibiotic was not necessary, for how long patients could expect to experience symptoms, how they could help themselves,

and when to get help if symptoms did not improve. Use of the TARGET toolkit is discussed in a FutureLearn online course.^[5]

The TARGET toolkit leaflets were appreciated by prescribers in BCUHB and were a successful tool in driving change, giving prescribers the confidence to know when an antibiotic was not appropriate. Similar leaflets could be beneficial in LMIC, including South Sudan, giving prescribers the confidence to know when it is safe not to prescribe an antibiotic.

Team Approach

BCUHB recognised the importance of a team approach and developed the Safe Clean Care initiative. Safe Clean Care is a multidisciplinary behavioural change program that sets out clear achievable goals.

Importantly Safe Clean Care had management support. The initiative acknowledged everybody's involvement in preventing healthcare-acquired infection and prevention of antimicrobial resistance by including consultants to cleaners in the meetings. The approach adopted was to listen to staff, to understand barriers to change, to recognize good practice but also to implement consequences for staff who repeatedly failed to comply with initiatives such as "bare below the elbow".

Instead of concentrating on what could not be changed, e.g. hospital buildings, areas that could be changed were targeted, e.g. de-cluttering the wards.

Safe Clean Care empowered staff to make a change and acknowledged their work. It allowed people to start to make a difference rather than being overwhelmed by the problem. As a result, staff morale and patient care improved.

Antimicrobial Prescribing Guidelines

Advice for prescribers on which antibiotics to prescribe is essential for prudent antimicrobial prescribing. BCUHB were fortunate to have a formulary developed and updated at local level based on sensitivities. This is not the case in many LMIC but there are other tools available that can help. The WHO in 2017 introduced the Access, Watch, Reserve ("AWaRe") classification of antibiotics in its Essential Medicines List.^[9] The classification is a tool for antibiotic stewardship at local, national and global levels with the aim of reducing antimicrobial resistance.

The Commonwealth Pharmacists Association, as part of their Commonwealth Partnership for Antimicrobial Stewardship, has supported Ghana, Tanzania, Uganda and Zambia to develop antimicrobial Formularies and publish them on the Micro Guide app along with other useful prescribing information.^[10]

South Africa has also developed a pocket guide to antibiotic

prescribing, which, as well as being a formulary, explains the principles behind antibiotic prescribing, the likely pathogen causing infection, the penetration of antibiotics at different sites and antibiotic sensitivities.^[11]

Surveillance

One of the strategic objectives outlined in the WHO 5-point strategy discussed above is to strengthen knowledge through surveillance and research. At the local level, accurate sensitivity data help to identify appropriate treatment, but when shared, it can be used on a national and global level. Many LMIC have limited lab resources, which makes both the individual patient decision difficult and the extent of resistance within the country unknown.

Resources that may be useful are:

- GLASS promotes and supports a standardized approach to the collection, analysis, and sharing of AMR data at a global level.^[12]
- The Global Point Prevalence Survey of Antimicrobial Consumption and Resistance (Global-PPS) is a simple freely available web-based tool that measures and monitor antimicrobial prescribing in hospitals worldwide. The system also offers feedback and help in identifying hospital interventions and identifying targets.^[13]
- The Centre for Disease Dynamics, Economics and Policy provides information on antibiotic use and antibiotic resistance at the country level where information is available.^[14]

Conclusion

Antimicrobial Stewardship is complicated but possible. Although health professionals are often aware of the risk that overuse of antimicrobials will cause resistance, they often do not know how to safely reduce their prescribing of antibiotics and feel their actions will not make a difference. Clear prescribing guidelines and tools can support antimicrobial stewardship and encourage individuals and institutions to begin to tackle the problem. Antimicrobial resistance is not a problem that will go away and action is needed now in all countries including South Sudan. In many LMICs patients can obtain antimicrobials without prescription, so interventions directed at prescribers also need to include pharmacists and pharmacy assistants.

Acknowledgements

I thank my anonymous reviewer from South Sudan and James Beard for their inputs to this paper making it relevant to countries like South Sudan.

Funding: none.

Conflicts of interest: none.

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COVID-19 UPDATES

South Sudan Corona Dashboard

Click <https://corona-scanner.com/country/south-sudan> for on-going updates on COVID-19 in South Sudan. Corona Scanner <https://corona-scanner.com/> is a free online dashboard solution which offers real-time coronavirus statistics like the amount of infections, deaths, still sick and recovered people per country. More statistics are coming very soon. The data displayed on this website originate from reliable sources (global health institutes) and is automatically updated every 30 seconds. Please note that the data only includes verified cases, which means that the exact numbers can vary from the numbers provided by news / social media sources.

Seven things to know about COVID-19 variants in Africa

<https://www.afro.who.int/news/seven-things-know-about-covid-19-variants-africa>

22 January 2021 Brazzaville. New COVID-19 variants have emerged in Africa as the continent records a new peak in infections. While virus mutations are not unusual, those that are more infectious are worrisome. On this site Professor Francisca Mutapi, Professor in Global Health Infection and Immunity, University of Edinburgh, answers the following questions.

1. Why do viruses mutate, and should we be worried about SARS-CoV-2 variants?
2. Mutation, variants, lineages and strains are used quite often. What is the difference?
3. How many variants are circulating in Africa and what do we know about them?
4. What is the implication of the variants on COVID-19 transmission, therapeutics and vaccines?
5. Does vaccine development take virus mutation into consideration?
6. Can vaccines be restructured to tackle virus mutations that emerge later?
7. What should Africa countries do to better respond to the new variants?

Gordon Memorial College Trust Fund applications for 2021/2022

The deadline for Gordon Memorial College Trust Fund(GMCTF) grant applications for the academic year 2021/2022 is 28th February 2021. New applicants, and those wishing to renew their grants after successful progress in their current courses, should go to the website www.gmctf.org to submit their applications before the deadline.

Eluzai Hakim, Associate Editor SSMJ