

Antimicrobial resistance (AMR) – the ‘ticking time bomb’ for healthcare

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Public health issue

Antimicrobial resistance (AMR) has been defined by World Health Organization (WHO) as one of the top ten global health issues today (1). AMR is growing at an alarming rate, mainly due to the imprudent use and overuse of antimicrobials, such as sub-optimal prescribing by doctors, self-medication with antibiotics (SMA) and low compliance towards antibiotics treatment. AMR-related infections are much more difficult to treat, require more advance and expensive antibiotics, prolong hospital stays, and result in higher morbidity and mortality rates. In the United States and Europe, more than 2.8 million AMR-related infections occur every year, causing over 35,000 deaths each year (2). AMR also has major implications for the economy. In 2008 alone, AMR-related infection is estimated to cost an extra 20 billion dollars in direct healthcare costs in the United States, as well as an indirect cost of up to 35 billion dollars due to loss of productivity (3). Considering the lack of development and discovery of new antibiotic classes for the past few decades, and if AMR is not tackled comprehensively, by 2050, it is projected to become the number one cause of death globally, with an estimated 10 million attributable deaths per year and a financial burden up to US\$100 trillion (4, 5).

*By 2050, one person could die every 3 seconds if
AMR is not tackled now – WHO (2019)⁵*

The current situation in Malaysia

AMR is a burgeoning problem worldwide, and Malaysia is not an exception in this regard. According to the National Surveillance of Antibiotic Resistance (NSAR) in Malaysia, *Acinetobacter baumannii* resistance rate to Meropenem has risen from 49% in the year 2008 to 61% in 2016 (6). An increase in resistance rate towards Erythromycin, a most common antibiotic use to treat respiratory tract infection has also been observed over the past few years (6). These are just a few examples of antibiotic resistance and the list goes on, highlighting the severity of the AMR issue in Malaysia.

Rampant use of antibiotics is very common in Malaysia, with one-third of Malaysian self-medicating with antibiotics before this (7). According to a few studies done in Malaysia, the public knowledge and attitude towards antibiotic use were generally poor or moderate, and they are predisposed to wrong self-medication practice and high risk of causing AMR (8-10). Furthermore, illegal antibiotic sales without prescription via the internet or pharmacies have exacerbated the problem, putting the public at risk of inappropriate antibiotic use without proper medical consultation (11).

Antibiotic overuse or misuse is common in the community, even for diseases that are not caused by a bacterial infection, such as viral fever, common cold and cough. Studies showed that more than half of the general public expects antibiotics to be provided to treat minor ailments such as flu and cough whenever

they seek medical treatment in a health clinic (12, 13). Also, antibiotic prescribing in private clinics were found to be five times higher than in government clinics, indicating the lack of consensus in practice among the private and public health sectors (4).

Recommended action

The causes of AMR are complex and multifactorial including individual health-seeking behaviour and healthcare practices, thus requiring multifaceted interventions to tackle it. The Antibiotics Smart Use (ASU) programme introduced in Thailand was a good example and model for promoting rational use of medicines and has been shown effective in limiting AMR(14). The relevant stakeholders and public health policymakers can implement similar approaches and utilise the **socio-ecological model** (Figure 1) to outline the recommended social and behavioural interventions to address this AMR issue, taking into consideration both upstream and downstream factors (Figure 2).



Figure 1: Socio-ecological model

1) Individual level:

Individual knowledge, attitude and perception of antibiotics are all key elements that influence antibiotic usage (14). Ongoing education on the threat of AMR and prudent use of antibiotics are needed as many Malaysians were found to have inadequate knowledge of it. Health authorities can collaborate with other stakeholders such as the schools and media to convey the scientific information in lay language across multiple channels (e.g. school, newspaper, TV, social media) as this strategy has been shown beneficial (11).

2) Interpersonal level:

Family members and friends can have a significant impact on a person's health decisions, such as whether or not to self-medicate with antibiotics (15). Thus, educational programmes and interventions should not only target individuals, but also their family, friends and social network (e.g. via group counselling).

3) Community level:

The existing 'Know Your Medicine' and 'Komuniti Sihat Pembina Negara' (KOSPEN) programme by the Ministry of Health, which involved multi-stakeholders including schools, non-governmental organisations (NGOs) such as Tzu Chi, local committees and community pharmacies, have been proven successful in improving public knowledge and health awareness regarding quality use of medicine. Training of trainers- *Duta Kenali Ubat Anda*, radio and television interviews, education talks and exhibitions in schools and public places are among the activities that have been carried out (4, 16). Given this, more similar empowerment programmes should be implemented, on a larger scale with coordination and

participation from other stakeholders to ensure the program's success. Community pharmacists, for example, can help promote the programme and educate the public about proper antibiotic usage. The World Antibiotic Awareness Week (WAAW) is celebrated from 18 to 24 November every year and it is an excellent opportunity to raise awareness and combat AMR.

4) Organisation level:

Regardless of whether they work in private or public health sectors, all physicians should follow established guidelines such as the National Antimicrobial Guideline (NAG) and practise evidence-based antibiotic prescribing. Continuous education and training should be provided to all healthcare practitioners to strengthen their knowledge of AMR. Aside from that, all healthcare organisations should implement Antimicrobial Stewardship Programs (ASPs), which are typically comprised of a multidisciplinary team including physicians, pharmacists, microbiologists and infectious disease (ID) specialists, with sufficient knowledge and experience in their respective fields. Many studies have shown that ASP is effective in optimising antimicrobial therapy and lowering the risk of antimicrobial resistance by ensuring antibiotics are prescribed with the proper indication, dosage, and duration (17).

At the same time, the use of antimicrobials in veterinary medicine and agriculture should be monitored and reduced to prevent resistance. This is because AMR is a One Health issue that affects plant and animal health as well, and if the introduction of resistance genes into human via food is not controlled, the problem of AMR in human medicine will not be addressed (17).

5) Policy level:

Even though antibiotics were classified as controlled medications in Malaysia, community pharmacies were frequently discovered to be a common source of obtaining antibiotics without a prescription for self-medication (18). To control the illegal sale of antibiotics in community pharmacies and on the internet, the government should implement stringent regulations and enforcement. Furthermore, policymakers should limit the healthcare treatment costs to lower the barrier of seeking proper medical treatment, as the price is a major root factor in antimicrobial misuse, particularly among the poor (11). Last but not least, the government can encourage more research on novel antibiotic discovery and social-behavioural studies on AMR by creating a conducive environment (i.e. providing financing and technical support).

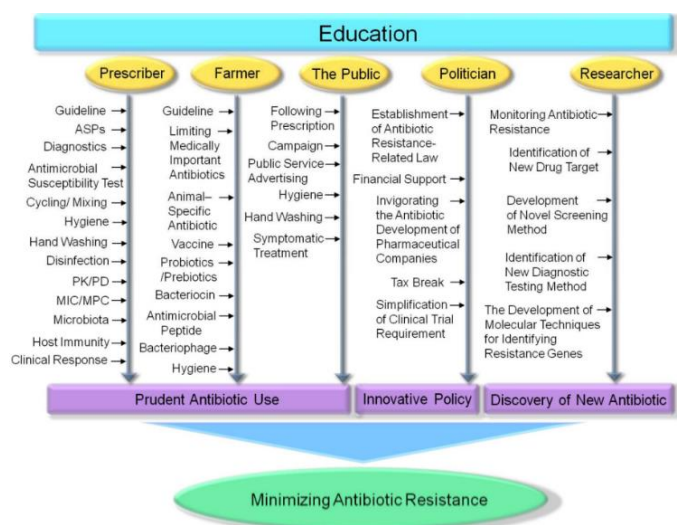


Figure 2: Strategies to minimise antimicrobial resistance (AMR)(17).

Conclusion

AMR is a multifaceted global crisis that jeopardises human health and the achievements of sustainable development goals (SDGs), and there is no time to waste.

AMR will have a disastrous impact on everyone unless immediate action is taken. Multidisciplinary and holistic approaches, as stated above, should be conducted to tackle this issue, in line with the WAAW 2021 theme of 'spread awareness, stop resistance'.

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