

Irrational Antibiotic Use and Distribution in the Thai Community: a Complex Situation in Need of Integrative Solution

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Abstract: Irrational use of antibiotics is a complex problem. The root of the problem is not only identified in hospitals, but it is also found in many sectors of the community. At the system level, people conveniently have access to medicines through a variety of sources, including hospitals, pharmacies, and grocery stores. At the individual level, people lack of knowledge and misunderstand about antibiotics; and they are unaware of the consequences of irrational antibiotic use. Additionally, antibiotics are used irrationally in livestock and agriculture. Consequently, people and society are at risk of antimicrobial resistance. Formerly, the interventions for rational drug use have been mainly focused on operations in public health facilities. However, due to the complexity mentioned above, solutions cannot be carried out solely in the hospitals. Integrated interventions for all sectors in society are needed – including empowering people to have better health and drug literacy, supporting collaborative work between all sectors in a community, and implementing laws and regulations to control improper access to medicines – together with extensive interventions in hospital settings

Keywords: medication use in community; antibiotics; antimicrobial resistance; system complexity

Introduction

Antibiotics have been used extensively due to their efficiency in killing bacteria, helping to save lives and treat illnesses. They have not only been used in humans,

but also in livestock, agriculture, and fishery. Overuse of antibiotics resulting from a lack of concern about consequences leads to antimicrobial resistance (AMR). This causes many public health problems, such as

longer treatment duration, higher cost of treatment, and higher death rates.⁽¹⁾

Irrational use of antibiotics is a complex problem; the root of the problem is not only found in hospitals, but it is also found in many sectors of the community. Despite ongoing interventions, the problem still exists. Thus, different perspectives are needed with the cooperation of many sectors.

The objectives of this article is to describe the situation of antibiotic use and distribution in the community in order to raise an awareness of the complexity of the AMR problem in Thai community. Data used in this article are collected from research articles and reports on the distribution and use of antibiotics in Thailand between 2006 and 2019; and were analyzed to understand the situation of antibiotic use and distribution in the community as well as interventions for the problem. Recommendations to solve irrational antibiotic use in the community are also proposed.

Distribution of Antibiotics in the Thai Community

Approximately 25,000 distributors, retailers, and wholesalers were licensed for pharmaceutical sales in 2017. However, records of Thai Food and Drug Administration (FDA) did not differentiate among those groups. Therefore, the amount of antibiotic sales to individual patients cannot be precisely monitored.⁽²⁾ Thai people have access to antibiotics through many settings, such as hospitals, health centers, and pharmacies. According to the 1987 Drug Act, most of antibiotics are classified as dangerous drugs that can be purchased only in pharmacies and dispensed by a pharmacist.⁽³⁾ However, in Thailand, antibiotics

can be found in grocery stores. Previous studies showed that 20–70% of grocery stores sold antibiotics.^(4–11) Tetracycline and penicillin V were the top antibiotics found in grocery stores.^(4–6,9,11)

Between 2017 and 2019, a survey of the project to promote safe drug use in the community, which was launched by Thai Food and Drug Administration (FDA) since 2015, showed that out of 22,830 households, 11% of them had leftover antibiotics, most commonly amoxicillin and tetracycline. People reported that they received the antibiotics from public hospitals, pharmacies, and grocery stores.^(12,13) In addition, antibiotics, such as norfloxacin and amoxicillin, were found in school nursing units in many schools.^(14–16) These data reflect that, in Thailand, people have access to antibiotics from various sources, through prescriptions by healthcare practitioners, or non-prescriptions and self-medication by non-qualified personnel. As a result, the society is at risk of AMR.

The Use of Antibiotics

Easy access to antibiotics from a variety of sources is an issue of unsafe drug use that poses the risk of AMR for society. The problem is even more complicated and serious with the behavior of Thai people toward antibiotic use, caused by misunderstanding and attitudes about antibiotics as a magical medicine for the treatment of any illnesses caused by “inflammation” (means ak-seb in Thai) of various organs and systems of the body. The misunderstanding of these properties has extended to the treatment of diseases and abnormal symptoms that occur in animals and plants in livestock and agriculture.

1) Behaviors of antibiotic use in humans

Self-medication is a common health behavior in Thailand to treat common health illnesses. Self-medication of Thai people has increased from 20% in 2005⁽¹⁷⁾ to 27% in 2015.⁽¹⁸⁾ Antibiotics are always mentioned as one of the medicines used for self-medication.

A health survey of 19,468 Thai people in 2014 reported that people experienced colds (46.2%), diarrhea (19.7%), and simple wounds (9.1%) in the past 6 months.⁽¹⁹⁾ About half of them reported using antibiotics. A national survey by the National Statistical Office of Thailand (NSO) and the International Health Policy Program (IHPP) in 2017 showed that 8% of Thais used antibiotics in the past month for the treatment of colds, fever, and sore throat.⁽²⁰⁾

Aside from antibiotics seeking behavior to treat minor illnesses, people still have other inappropriate antibiotic use behaviors, such as failing to complete the entire course of antibiotics when their condition improves, and consuming lozenges that contain antibacterial drugs.⁽²¹⁾

A lack of knowledge and misunderstanding about antibiotics are an important factor that affects the behavior of antibiotic use among Thai people. Consistent findings from collected data in single site⁽²²⁻³³⁾ and multiple sites^(12,13,20,21,34-38) researches were observed. For instance, evaluation of the Antibiotics Smart Use (ASU) Project between 2007 and 2011 in 15 provinces showed that 25-50% of Thai people understood that “antibiotics kill all types of germs, both viruses and bacteria”.⁽³⁴⁻³⁶⁾ The national survey by the NSO and IHPP in 2017 found that Thai people misunderstood that antiseptic/antibiotics can kill the virus or treat the flu.⁽²⁰⁾ A test of knowledge

about antibiotics among 20,750 elderly people, revealed that the average knowledge was 1.75 points out of 6 points. The lowest score was for the item “when having simple wound or abcess, you must take antibiotics.”^(12,13)

Most Thai people refer to “antibiotics” as “anti-inflammatory drug” (ya kae ak-seb) – a term that has been used for a long time.^(12,13,37,38) Using the name “anti-inflammatory” causes misunderstanding about antibiotic properties, resulting in misuse. Whenever they feel sick, such as having a cold or sore throat, they perceive that there is inflammation in their throat and often request for antibiotics.^(39,40) Tetracycline was used for the treatment of any kind of inflammation, especially for endometritis. Amoxicillin was used for sore throats and colds while norfloxacin was used for diarrhea.⁽⁴¹⁾ The findings were consistent with studies among healthcare practitioners which reported that Thai people were unconcerned about antibiotic use and AMR, and always requested for antibiotics. Failing to receive antibiotics from one place, they would seek them out from another place.^(40,42)

2) Antibiotic use in livestock and agriculture

In Thailand, antibiotics have been used extensively in agriculture and livestock, making the antimicrobial problem more complicated. Data show that antibiotics such as ampicillin, amoxicillin, and tetracycline are used in orchards, such as citrus and pavello, to control disease in plants caused by bacteria.^(6,43,44) At present, no antibiotics have been registered by the Department of Agriculture to be used in plants, indicating that farmers bought antibiotics that were intended to be used in humans for the use in agriculture.

In animal farms for domestic consumption and for

export, antibiotics have been used extensively, especially for chickens and aquatic animals.⁽⁴⁵⁾ To obtain large quantities of products in a shorter farming period farmers use antibiotics in animals, such as pigs^(45,46), chicken⁽⁴⁵⁻⁴⁷⁾, cows⁽⁴⁶⁾, and aquaculture⁽⁴⁵⁾. Antibiotics are used throughout the life of the animal with the purpose of both treating and preventing diseases, reducing death, extending life, and promoting growth.^(45,46) Most farmers were aware that a veterinarian must be consulted with respect to the use of drugs. However, while most farmers consulted veterinarians initially, they bought antibiotics on their own for long-term use.^(45,46)

The misuse of antibiotics in agriculture due to a need to increase productivity and a lack of awareness of the long-term effects is an important issue. Amoxicillin, colistin, doxycycline, oxytetracycline and tilmicosin were generally used for the prevention and treatment of animal diseases.^(46,47) The lack of awareness has a direct impact on the growing problem of drug resistance. In livestock farms, a high proportion of AMR was found, especially on farms with intensive antibiotic use.⁽⁴⁸⁾

Antibiotic residues and environmental contamination are becoming a global problem. Research findings showed contamination of waste water with ciprofloxacin and norfloxacin in hospitals and with ciprofloxacin in pig farms in Thailand. The concentration of ciprofloxacin in pig farm wastewater was 21.98 times higher than wastewater in hospitals. Tetracycline was found in hospital wastewater, community wastewater, and pig farm wastewater. Tetracycline in pig farm wastewater was 45.67 times more concentrated than the wastewater of hospitals.⁽⁴⁹⁾

Interventions for Rational Antibiotic Use at the National and Community Levels

Irrational antibiotic use in hospitals and communities has been a long-term issue in Thailand. Academics and civil society have been aware of and trying to solve the problem since 1988. Promotion of rational drug use began to implement through the National Drug Policy in 2011 and the National Drug System Development Strategy 2012–2016. Rational use of medicines was one of the strategies in these national policies.⁽⁵⁰⁾

An important starting point was the implementation of the ASU Project in 2007 by the Thai FDA. It aimed to reduce unnecessary prescriptions of antibiotics for minor illnesses, including upper respiratory tract infections, acute diarrhoea, and simple wounds. This initiative had resulted in serious awareness of the issue and cooperative work from various sectors, including government, private, citizens and civil society, to promote the rational use of antibiotics.⁽⁵¹⁾

The concept of rational use of antibiotics, has been integrated or linked to national policy. For example, in 2009, the National Health Security Office (NHSO) stipulated that rational antibiotic use would be key performance indicators (KPI) of hospital settings. The KPI were used for paying compensation to hospitals which achieved the approved standards for appropriate use of antibiotics for the conditions, as part of the Pay for Performance (P4P) policy.⁽⁵¹⁾ In 2015, the 8th National Health Assembly raised the issue of resistant bacteria crisis and integrated problem management as a national agenda. It was noted that the issue is very important to Thai health and a national mechanism is needed for the integration

between relevant departments and parties.⁽⁵²⁾ In 2017, the rational drug use policy, prevention and control of antimicrobial resistance (AMR) and encouraging rational drug use (RDU), were announced under 12th National Strategic Plan for Public Health by the Ministry of Public Health (MOPH). One of objectives was to reduce morbidity rates due to AMR and inappropriate use of antibiotics.⁽⁵³⁾ The government announced the Thailand Antimicrobial Resistance Management Strategic Plan 2017–2021, which is the first Thai strategic plan that focuses on resolving the problem of AMR.⁽⁵⁴⁾

Previously, the interventions for rational drug use mainly focused on operations in public health facilities, which has helped to solve the problem to a certain extent. Since the problem of antibiotic overuse/misuse is more complex than controlling medication in hospitals and because it is an issue relevant to problems at many levels, it needs a more integrated perspective and collaboration of various groups of people. The national policy focusing on the community is still unclear. Although there have been ongoing attempts to develop rational use of drugs in the community from various sectors, including government, private, and community, these are sparse. In some areas, although there are cognizant and enthusiastic personnel, continuous support at the national and organizational levels are lacking. Although there are various models of interventions in the community, there is still a lack of integration between related organizations, a lack of community participation, and a lack of standard tools to support work and system evaluation.⁽⁵⁵⁾

In 2018, MOPH appointed a working group to develop rational and safe drug use systems in the community (RDU community).⁽⁵⁶⁾ A framework and

guidelines for rational and safe drug use system in the community was developed. Furthermore, the resolution of the community-centered system management for becoming a rational drug use country was announced in the 12th National Health Assembly in 2019.⁽⁵⁵⁾

Community-driven Collaboration

Community-level operations can be accomplished through collaborative efforts from people in many sectors. Lessons learned from the local core group that successfully implemented Antibiotics Smart Use Project (ASU) at the community level suggest that the success factors included having a team of change agents as leaders to provide resources, driving the ASU along with other projects in the community, having mutual agreement in the community, and having continuous evaluation. Strategies for scaling up ASU included creating a key driver in the community, persuading groups or individuals of importance or authority within the area to be a team of change agents, defining ASU as an important community policy, and campaigning of ASU by the local change agent team. Various community interventions were used, such as educating and raising concerns through social networks, healthcare providers, and news reporters.⁽⁵⁷⁾ The campaigns through mass media and change agents can increase knowledge and awareness about rational use of antibiotics.^(25,38)

Laws and Regulation Requirements

In addition to operations at the community level, formulation of a legislation to set up standards at the national level is needed to control the spread and misuse of antibiotics more effectively. From 2017–2019, there was a process to review and reclassify the status of antimicrobials for humans and animals, resulting in withdrawal of oral colistin formulations⁽⁵⁸⁾

and reclassification of antimicrobials from over-the-counter drugs to dangerous drugs (e.g. sulfacetamide eye drop and silver sulfadiazine cream).⁽⁵⁹⁾ However, the regulatory system for monitoring and controlling the distribution of antibiotics is still needed.

Empowering People for Rational Medication Use

Drug literacy is an important factor for desirable health behaviors. Therefore, supporting people to gain access, understand, evaluate, and apply drug and health information appropriately through drug literacy is crucial. Health literacy is therefore a national agenda as it appears in various national development plans, such as the 12th National Health Development Plan (2017–2021), and Strategic Health Plan for Health Promotion and Disease Prevention (2017–2021).

Conclusions and Challenges

Thailand needs health system management policies for rational drug use, which should connect all health service units at all levels to the community. Effective participation of government, private, civil society, and citizen is indispensable. Empowering people through better health and drug literacy, supporting community participation as well as strengthening government, private, and local communities to create a mechanism to ensure the rational use of antibiotics are needed.

Drug use behaviors in hospitals, clinics, pharmacies, and communities are related to each other. Currently, there is no connection of practice between hospitals and communities due to a lack of information on drug distribution and use at the community level, resulting in the inability to assess the country's overall medication consumption. Data is available at the hospital level, but lacking in the other areas, such as in community pharmacies, and agriculture. Availa-

bility of this relevant information will help to determine appropriate decisions in setting better interventions for rational use of antibiotics. Therefore, developing data and information system at all levels to ensure continued program development and for the purposes of monitoring and evaluation is essential.

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สถานการณ์การใช้และกระจายยาปฏิชีวนะในชุมชนของไทย: ปัญหาซับซ้อนที่ต้องจัดการแบบบูรณาการ

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การใช้ยาปฏิชีวนะอย่างไม่สมเหตุผลเป็นปัญหาที่มีความซับซ้อนซึ่งไม่ได้เกิดในสถานพยาบาลเท่านั้นแต่เกิดขึ้นจากหลายส่วนในชุมชนด้วยประเด็นในเชิงระบบ ประชาชนสามารถเข้าถึงยาโดยสะดวกจากแหล่งที่หลากหลาย ทั้งจากสถานพยาบาล ร้านยาและร้านค้าปลีก และประเด็นในระดับบุคคลที่ขาดความรู้ ความเข้าใจเกี่ยวกับยาปฏิชีวนะ ขาดความตระหนักในผลกระทบจากการใช้ยาอย่างไม่สมเหตุผล การนำยามาใช้ในการปศุสัตว์ และการเกษตรเชิงพาณิชย์ ผลกระทบของปัญหาเกิดเป็นความเสี่ยงทั้งต่อตัวผู้ใช้ยา และต่อปัญหาการดื้อยาต้านจุลชีพของสังคม มาตรการแก้ไขปัญหาการใช้ยาที่ไม่สมเหตุผลที่ผ่านมา มักมุ่งเน้นที่การดำเนินงานในสถานพยาบาลภาครัฐเป็นหลัก แต่เนื่องจากความซับซ้อนของปัญหา การแก้ปัญหาก็ไม่สามารถดำเนินการได้เพียงทางฝั่งสถานพยาบาลเท่านั้น แต่จำเป็นต้องจัดการแบบบูรณาการจากทุกภาคส่วนในสังคม ได้แก่ การเพิ่มศักยภาพของประชาชนให้มีความรอบรู้ ด้านสุขภาพและยา การสนับสนุนการทำงานอย่างบูรณาการของชุมชน การดำเนินการทางกฎหมายและระเบียบข้อ บังคับเพื่อควบคุมการเข้าถึงยาอย่างเหมาะสม ร่วมกับการดำเนินการอย่างต่อเนื่องในสถานพยาบาล

คำสำคัญ: การใช้ยาในชุมชน; ยาปฏิชีวนะ; การดื้อยาต้านจุลชีพ; ความซับซ้อนของระบบ