



A Review of Antibiotic Dispensing and Use in Asia

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ABSTRACT

In particular, antibiotics are a crucial drug in pharmaceutical treatment. These drugs are used to treat and prevent infectious illnesses all around the globe, but particularly in Asia, where the majority of the population has poor to moderate incomes. Asia is noted for having nations with underdeveloped healthcare systems, a lack of services in rural regions, and improper medication counseling. There are certain groups that reside in regions with less developed medical technology. Patients who get proper prescriptions and counseling are more likely to take their medications as prescribed, acquire trust for and understanding of antibiotics, and refrain from misusing them. Although the central Asian nations in this review paper have experienced problems with the distribution and use of antibiotics. Antibiotics are used to treat or stop the spread of a specific bacterial illness inside the body. Although they offer certain advantages, antibiotics may sometimes have serious adverse effects, such as antibiotic resistance. The majority of Asian nations have limited resources, connections, and locations when it comes to drug awareness and oversight. Many times, low-poor nations decide to give medicine without a prescription due to a lack of funding or because the pharmacist is unable to generate any cash. Because of community misuse of antibiotics and a lack of knowledge about how to handle these specific prescriptions, the distribution of antibiotics requires adequate responsibility and direction with appropriate counseling. This review article aims to increase understanding of the use and administration of antibiotics as well as the execution of public health awareness intervention activities as a means to lessen this problem.

INTRODUCTION

The most often given medications in many industrialized and developing nations are antibiotics.[21]An antibiotic is a chemical that may be created either naturally by bacteria or artificially in a lab by chemists. Antibiotics have the power to stop or stop the development of bacteria (a particular class of germs).[14]Antibiotics are crucial medical interventions, particularly in underdeveloped nations like the WHO's Asian area where infectious illnesses are still the leading cause of death. Antibiotics are bought and used in this region of the globe without a doctor's prescription.[27]These days, there is a lot of worry about antibiotic resistance. One of the main causes of this is the general public's irrational, excessive usage of antibiotics.[25]

Access to and availability of antibiotics have increased as a result of global health system development and improvement. However, due to their extensive usage and prolonged shelf life, the pathogenic organisms that antibiotics are meant to kill have developed resistance to them, decreasing their efficacy. Antibiotic misuse is a very common practice in both high- and low-income countries across the globe. Antibiotic-resistant bacteria are becoming more common and more widespread as a result of the widespread usage of antibiotics during the last 80 years, both appropriately and improperly. The usage, overuse, or abuse of antibiotics is primarily blamed for the development of antimicrobial resistance (AMR), which is the leading cause of morbidity and death from illnesses that were formerly curable.[28]

Antibiotic misuse may result in selecting the incorrect drug. It includes the use of medications, which has the potential to both produce good and damage, unlike other forms of self-care. Numerous studies show that there are hazards connected with the incorrect use of non-prescription pharmaceuticals, including those related to drug resistance, misdiagnosis, under- or overdosing, using expired prescriptions, drug interactions, longer duration of use, and polypharmacy risk.[28]In order to lower unpleasant responses as well as antibiotic resistance, usage must be reduced. In order to avoid the improper and excessive use of antibiotics and restrict their use to thoughtful use in specific situations, a good prescription is thus a crucial approach to stop the fast development of bacterial resistance to antibiotics. For the development of programs, policies, and activities linked to the dispensing of these medications in this group, knowledge of the patterns of inappropriate use of antibiotics and associated risk factors in the pediatric population is essential.[29]

Inappropriate antibiotic administration raises the risk of unfavorable effects, which compromises the intended therapeutic results, the safety of therapy, the expense of treatment, higher rates of morbidity and death, and antibiotic resistance.[30]The improper distribution of antibiotics was initially identified as being caused by inadequate training of pharmacy staff. The majority said that they did not need a prescription to give antibiotics since it is not customary to turn away clients who want any form of medication. Without a prescription, antibiotics should not be given out, and people should be informed on how to take them properly. The general people needed to be made aware of the risks associated with antibiotic misuse and overuse. It stressed the need for physicians to modify their impolite behavior and lower their consultation fees at public hospitals.[30]

The community's improper use of antibiotics contributes to the formation and spread of antibiotic-resistant bacteria, which pose a serious danger to human health. The goal of the current investigation was to identify improper antibiotic usage and distribution across Asia.[21]

METHODS

In order to examine the prescription and use of antibiotics more thoroughly, this review paper incorporates a cross-sectional study. The Philippines was chosen for the study due to its characteristics or connections with self-medication or antibiotic sharing [5, 6]. The cross-sectional research implemented a self-administering survey, which is less prone to social desirability bias than surveys given by interviewers [2]. The research included only people who were enthusiastic about completing the self-administered survey and learning more about antibiotics. When participants consented to take part, they were separated into groups and given the choice of completing the survey or rejecting it. They also received the additional instruction that they were not permitted to talk to one another during the group sessions. After completing the survey, participants were paid 100 pesos as compensation for their travel and time spent. Additional questions were added to the self-administered survey as it progressed, such as their knowledge of antibiotics and whether they had ever given antibiotics to family members (other than children, spouses, and the elderly). [2] Likert-scale questions were used to evaluate the inquiries, and dichotomized Likert scales were used to look at the misunderstandings (comparing strongly agree, agree, strongly disagree, and disagree). The survey's findings did not include those who skipped or failed to answer a question. The self-administered survey was therefore investigated using multiple logistic regression analysis.

RESULTS AND DISCUSSIONS

Table 1

Countries	Antibiotic dispensing and use in Asia: A Review
Philippines	According to recent meta-analyses, 38% of people worldwide use antibiotics for self-medication and sharing. The reported prevalence of lifetime antibiotic sharing was 78% (n = 218). Participants who reported sharing antibiotics most often shared them with family (37%) and children (33%), followed by neighbors (18%), elderly family (18%), spouse or sex partner (16%), friends (14%) and others (4%). Among those employed (65%), a small percentage indicated they shared antibiotics with co-workers (7%). Of note, percentages do not total to 100% because response options were not mutually exclusive.
China	Antibiotics have been overused for many years, which has promoted antimicrobial resistance (AMR) and had a severe impact on health outcomes and costs. Half of all antibiotics consumed globally are used in China, mostly in outpatient and community settings and frequently inappropriately for self-limiting community-acquired diseases. Despite widespread awareness of AMR, inappropriate demand and usage in the community, notably in primary care settings, is driven by public perceptions of antibiotic efficacy and easy access to antibiotics for self-limiting diseases. Financial incentives, a lack of diagnostic capability, and worries about side effects all have an impact on how doctors choose which medications to prescribe. [35]
Thailand	It has been said that antimicrobials are being sold all over the country without a prescription, accounting for an estimated two-thirds of all sales worldwide. Antimicrobials are also the most often distributed medications in poor nations. Antimicrobial resistance is also known to have been caused by the overuse, improper use, or inappropriate use of antibiotics. Competence is the main justification given by community pharmacists in Thailand for dispensing antibiotics without a prescription. According to research investigation, over 90% of them have a knowledgeable understanding, attitudes, and practices about the use and resistance of antibiotics. Through continuous learnings, adherence to antimicrobials recommendations, partnership with other healthcare workers, and raising public knowledge about antimicrobial usage and resistance, pharmacists in Thailand could maintain their competence.[36] Although international standards may not recommend antibiotics for viral self-limiting infections, they distribute antimicrobials in accordance with local guidelines. While Thai consumers may find community pharmacies to be the most easily available sources of healthcare, pharmacists' incorrect prescription of antibiotics for self-limiting viral diseases will lead to a rise in antimicrobial resistance. This emphasizes the requirement for revised guidelines and enhanced pharmacist education.[37]
Indonesia	The cases of inappropriate dispensing of antibiotics without a prescription by pharmacist and 41% of patients do not need to take the full course of therapy with a possibility of contributing to antimicrobial resistance because of unnecessary use of medication[24]. Poor law enforcement for pharmacists in lack of monitoring for patients without prescription for

	<p>antibiotics; this is due to insufficient employees or economic problems to the business[26]. Reports of antimicrobial resistance for patients obtaining antibiotics without the prescription of the doctor is 86.1% [33]. Most likely the antibiotics were given by standalone pharmacies and pharmacies attached to clinics without the need for a prescription because of cases of low-standard pharmacies dispensing antibiotics without a prescription to supplement their income[34].</p>
Malaysia	<p>Malaysia is recorded to have spent a large proportion of money in 2006 and 2007 on antibiotics with a 25% of community pharmacists dispensing the medication without a prescription but having symptoms of the disease. The public knowledge by a cross-sectional study of 408 participants 59.1% of the participants the risk of overuse of antibiotics resulting in antibiotic resistance. Low-level knowledge was found in one-third of participants of antibiotics and being wrongly self-medicating.[16,17]</p>
India	<p>In the event of unprofessional guidance for antibiotic dispensing there were cases of antibiotic resistance. Most cases in India dispense antimicrobial agents without a prescription with amoxicillin 174 or 51.2 % out of 261 most of the patients were not given guidance on their medication and were antibiotic-resistant. In New Delhi, India it is estimated that 20-50% of patients taking antibiotics are used them inappropriately.</p> <p>Resulting in the unprofessional dispense of prescription drugs. [7,8] A global issue regarding the self-medication of patients taking antibiotics with a high incidence of side effects does not need a prescription resulting in antibiotic resistance. In the incident of New Delhi with a rise in cases of antibiotic use without proper knowledge of medication and were developed with antibiotic resistance.[9,10]</p>
South Korea	<p>In South Korea has a high rate of antibiotic resistance this adds up to the use of outpatients in South Korea is high and the government promotes the use of antibiotics reduced antibiotic costs [53]. Out of the OECD countries, South Korea has more than 1.5 times of usage antibiotics because of the E. coli Bacteria caused by chicken, swine, and other domesticated animals.</p>
Vietnam	<p>Vietnam has a high population size with a burden of contracting an infectious disease and limited access to medication and the distribution of prescribed practices is poor with common self-medication. Antibiotic usage of patients is low because of, lack of knowledge, lack of diagnostics, pressure, incentives, etc. Particular rural parts of Vietnam, despite the regulatory precaution of dispensing prescribed antibiotics, have poor distribution and knowledge to both the supplier and the consumer. A case study was conducted of patient buys antibiotic in 2083 urban and 870 rural and were observed that 88% in urban and 91 rural bought the antibiotic without a prescription with little knowledge of poor adherence and antibiotic resistance [11,12,13]</p>
Singapore	<p>Most individuals seeking primary health care in Singapore are uninformed about the function of antibiotics in URTI. Taking the notion that antibiotics heal URTIs faster was most significantly associated with requesting antibiotics. Those with higher educational levels were less likely to seek antibiotics, whereas those with lower academic levels were more likely to have inaccurate knowledge. Furthermore, Scott et al. reported that numerous improper behaviors by patients, such as outright requests for antibiotics, misrepresenting the severity of sickness, or reporting previous positive experiences with antibiotic use, frequently influenced clinicians to prescribe antibiotics. Most of the patients seeking primary health care in Singapore are misled about the function of antibiotics in URTI. Poor information was prevalent and was linked to a need for antibiotics.[57]</p>
Cambodia	<p>Antibiotic misuse is widely known in Cambodia due to high infectious disease and the access to antibiotics is unrestricted. In the Cambodia community, unrestricted antibiotics were facilitated by pharmacies, drug outlets and "village pett" which are unofficial medical providers. Medication being dispensed in the third generation along with antimicrobial use were more in the otorhinolaryngology department than other departments. As well as the prevalence and antibiotic resistance for gastric cancer. Gastric cancer is the leading mortality in Cambodia. Since Cambodia is more susceptible to this infection. They still face major problems of high prevalence of clarithromycin, metronidazole, levofloxacin and multidrug-resistant H. pylori. [42,44]</p>

Laos	The global issue of the misuse and overuse of antibiotics contributes to antibiotic resistance. In Laos, there are appropriate dispensing of prescriptions of antibiotics to pregnant women during pregnancy, delivery or early childhood. In order to improve the use of antibiotics in the Laos community, there should be continuous education and regular surveillance vision is necessary in order to control the issue. In other words, it will improve the use of antibiotics with pregnant women during pregnancy, delivery and early childhood. [48]
Hong Kong	The increasing rate of community-associated methicillin-resistant <i>Staphylococcus aureus</i> according to the Department of Health of Hong Kong from 2000 to 2015, is due to the increase in overall volume from 2000 to 2015 [49]. Dispensing antibiotics is strict in Hong Kong without prescription because of the close proximity to other countries. Antibiotics can be easily attained without a prescription [51].
Taiwan	The overuse of prescribed antibiotics is caused by infectious diseases but a lot is not needed in most cases and is unnecessary or inappropriate for giving to patients which will lead to antibiotic resistance [40]. Study shows behavior, attitudes, and knowledge about antibiotic usage only 39.2 percent were aware of basic antibiotics out of 1024 adults in residents of Changhua County, Taiwan [47].
Japan	Broad-spectrum antimicrobial classes have been used often in Japan, although little is known regarding the long-term trends in both national and agent-specific antimicrobial use. [38] The two factors that were most predictive of leftover antibiotic possession were living in a nation where antibiotics are prescribed in fixed packs rather than in specific numbers of pills and having the mindset that leftover antibiotics can be stored and used again. Lack of information from the doctor and/or pharmacist also had a pronounced negative impact. This study suggests that prescribing antibiotics in precise dose amounts should be advised, along with the creation of pertinent information campaigns addressing patients' misconceptions about leftovers and the distribution of fundamental knowledge about the significance of finishing antibiotic therapy. [39]
Iran	A strategy must be implemented at the institutional, community, national, regional, and international levels to address the numerous problems caused by rising antimicrobial resistance. Partners in the development of such a plan should come from the fields of behavioral sciences, clinical and veterinary medicine, public health, microbiology, animal husbandry, and the pharmaceutical and agricultural industries, as well as microbiology. [41] Relatives, friends, and prior successful experiences were the main sources of drug information. There have been reports of inappropriate drug usage, including improper diagnosis, short and extended treatment durations, sharing of antibiotics, and keeping medicines at home for future use. Both harmful and beneficial effects of self-medication (SMA) were found. [43]
Saudi Arabia	The general knowledge of Saudi Arabian citizens on the use of antibiotics is low. This requires the implementation of public health awareness intervention initiatives about the usage of antibiotics. [15] In Saudi Arabia, the prevalence of non-prescription antibiotic use ranged from 48%. Cough (40%) and influenza (34% of all antibiotic uses) were the two most frequent causes. When they felt better, 49% of respondents stopped taking antibiotics. Self-medication and knowledge of the risks of antibiotic usage are negatively connected, yet knowledge of the proper use of antibiotics is limited. [18]
Qatar	Analyses of medical practices involving antibiotics have also shown improper use. The overuse of antibiotics by patients and healthcare professionals has been linked to the emergence of resistance. [19] 95.8% of individuals said they had previously used antibiotics. The study population's median knowledge score was 4/8. The use of antibiotics to treat viral infections was frequently misunderstood. In this study population, inappropriate usage was also revealed by the hoarding of antibiotics for later use and the sharing of antibiotics with family or friends. [20]
Nepal	Financial limitations and consumer misunderstanding led to behaviors like self-medication and pressure on healthcare professionals to prescribe or administer antibiotics. Inadequate antibiotic options and a lack of research facilities in healthcare organizations were further factors contributing to antibiotic misuse. Additionally, in the private sector, the business motivation brought on by incentives offered by pharmaceutical corporations played a part in the incorrect prescription or dispensing of antibiotics. [22] Antibiotic resistance was a notion that was well-known but not fully understood. Nearly half of respondents (47.7%) thought

	antibiotics helped them recover more quickly if they had a fever, while 50.9% were unsure whether skipping doses would contribute to the development of antibiotic resistance. In addition, 88.2% said they would visit another doctor if they were not prescribed an antibiotic when they thought they needed one. The majority of respondents said they had good habits for getting and utilizing antibiotics, however, 84.6% said they occasionally preferred taking one when they had a cough and sore throat. [23]
Jordan	Only licensed pharmacists in Jordan are permitted to dispense prescription medications. According to the law. Additionally, it is prohibited to dispense antibiotics without a prescription in accordance with Jordan's Food and Drug Administration (JFDA) rules. These laws are not entirely upheld, though. Customers in Jordan are given their prescribed medications by pharmacy assistants and occasionally by students. This study found that this national law of Jordan has been broken. In this investigation, three pharmacy assistants and one trainee performed 37% and 6% of the antibiotic interactions among the 12 dispensers, respectively. [31] Results Of the 150 community pharmacists addressed, 114 filled out and returned the survey (response rate: 76%). More than 83.3% thought that antimicrobial resistance was a worldwide issue. A sizable portion (59.7%) informs patients about the dangers of using antibiotics improperly. Implementing antimicrobial stewardship, according to almost half of the participants (44.7%), would lead to improved results. [32]
Pakistan	In low- and middle-income nations, pharmacies are a major provider of healthcare services, particularly in areas with a low patient-to-physician ratio. Unsuitable antibiotic dispensing is prevalent due to the broad variation in the training of pharmacy staff, which raises the risk of subpar therapeutic outcomes and antibiotic resistance. [46] The use of antibiotics without a prescription or to refill a previous prescription, keeping an antibiotic supply at home, sharing antibiotics with others, using the wrong dose guidelines, and stopping antibiotic therapy too soon are all examples of inappropriate antibiotic practices. Key contributing factors to the inappropriate use of antibiotics in Pakistan included education level, low health literacy, high consultation fees for private practitioners, inadequate healthcare infrastructure in rural areas, patient overload, busy schedules of people, and an unrestricted supply of antibiotics. [45]
Syria	Prior to the start of the current conflict in 2011, Syria was recognized by other Arab League countries for having a substantial local pharmaceutical industry. Patients in Syria typically self-diagnose and self-treat, with a prevalence rate of 57%, or they consult their neighborhood pharmacists. [50] Most of the respondents (187, 74.8%) had a moderate level of knowledge, while 42 (16.8%) had a poor knowledge level, and only 21 (8.4%) were the well knowledgeable majority of participants (200, 80%) said they would quit using antibiotics once they felt better. Participants disagreed with the claim that using antibiotics speeds up the recovery from cold in 158 cases (63.2%). However, 90 (36%) of them claimed that when they exhibit symptoms of the common cold, they anticipate their doctor to prescribe antibiotics. The majority of the survey participants had intermediate levels of knowledge and attitudes on the usage of antibiotics. Unfortunately, a large number of participants were using antibiotics improperly for a variety of reasons, including a lack of resources and instruction. [52]
Palestine	In Palestine, a case study was conducted for the Palestinian pharmacist out of 155 pharmacists showed that 77.0% or 119 encounters of doctors prescribed an unnecessary antibiotic medication, 82.6% or 128 were from patients who were mad and demanded without prescription and 60.8% or 94% given the medication without prescription. [55] Palestine has a high percentage of using self-education in antibiotics which was reported by 98% of students surveyed at An-Najah National University. [56]
Israel	With concerns about the spread of antibiotic resistance due to self-medication antibiotic treating infectious diseases and a problem in Israel. [59] In a study in Northern Israel out of the 467 participants, 89.4% of antibiotics were obtained by doctor's prescription but 81 (18.7%) would consider self-medication rather than taking a medical consultation. [58]

CONCLUSION

In conclusion, the improper use of antibiotics is a common practice that occurs all around the world. Countries in Asia, including the Philippines, China, Thailand, Indonesia, Malaysia, South Korea, India, South Korea, Vietnam, Singapore, Cambodia, Laos, Hong Kong, Taiwan, Japan, Saudi

Arabia, Qatar, Nepal, Jordan, Pakistan, Syria, Palestine, and Israel, all take a unique approach to the distribution and utilization of antibiotics. The factors that significantly contribute to antibiotic resistance in the countries mentioned above are the dispensing of medication without a prescription, poor distribution and knowledge of both the supplier and the consumer, as well as numerous improper behaviors by patients, including outright requests for antibiotics. Therefore, it is very necessary to execute public health awareness intervention programs concerning the use of antibiotics in order to forestall the development of antibiotic resistance in every country.

CONFLICT OF INTEREST

No conflict of interest among authors

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