

### Summary of eligible literature

Authors	Research design	Objectives	Sample characteristics	Data collection and instruments	Key findings
Aditya <i>et al.</i> (15)	Analytical cross-sectional study	The purpose of this study was to determine the relationship between socioeconomic-demographic characteristics with antibiotic self-medication in community-dwelling adults	The study involved a sample size of 146 respondents, who were 18 years old and above and were residing in Sayang Village, Indonesia. This population sample had experience using antibiotics the previous year when the study was conducted	A validated questionnaire from previous research was used to collect antibiotic self-medication and socioeconomic-demographic data	The study found that there is no significant relation between age category, education with antibiotic self-medication and antibiotics self-medication. The study has also revealed that there is a significant relationship between economic characteristics with antibiotic self-medication
Ahiabu <i>et al.</i> (26)	Mixed-methods approach, incorporating both qualitative and quantitative methods	The study aimed to comprehensively investigate the treatment practices of households and antibiotic dispensing in medicine outlets in the Eastern region of Ghana. It sought to understand the prevalence of self-medication	The study involved a sample size of 12 households in three rural communities in the Eastern region of Ghana. The households targeted for the study included those with children under five years	Data collection methods included illness recall visits to 12 households in rural communities, with detailed fieldnotes taken and analyzed thematically	The study found that self-medication, including antibiotic self-prescription, was a common practice in the study settings. Fever, abdominal, and respiratory symptoms were the most common causes of ill-health in the households studied. Of the 95 medicine use events reported, 62 (65%) involved

		<p>and the use of antibiotics without a prescription in households and to document and analyze the dispensing practices of antibiotics in both rural and urban medicine outlets. The study also aimed to identify factors influencing the inappropriate use of antibiotics, such as lack of controls in antibiotic dispensing, community knowledge, poverty, and perceived barriers to formal healthcare. Additionally, it sought to explore the engagement of pharmacies and medicine outlets in public health interventions, particularly regarding the prescription of antibiotics and the role of</p>	<p>and the elderly above 60 years. The research was conducted in both rural and urban settings, providing a comprehensive understanding of the treatment practices and antibiotic dispensing in diverse community contexts within the Eastern region of Ghana</p>		<p>self-treatment with pharmaceuticals, and 38 (40%) involved antibiotics, often without a prescription. The study also found that the lack of controls in dispensing antibiotics, community knowledge, and use of antibiotics in ways inconsistent with biomedical recommendations, poverty, and perceived barriers to formal healthcare were factors that influenced the inappropriate use of antibiotics. The study documented differences in antibiotic dispensing practices between rural and urban medicine outlets, with rural medicine outlets dispensing more antibiotics without a prescription. Penicillins were the most commonly dispensed antibiotics, constituting 30% of antibiotic sales in urban medicine outlets and 46% in rural ones. The study's findings suggest that stricter</p>
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		<p>pharmacists in advising the public on everyday health care. The study's findings were intended to provide insights into potential interventions to address inappropriate antibiotic use, including stricter regulation of the pharmaceutical sector, training of dispensers, evidence-based treatment guidelines, and public education, with the ultimate goal of contributing to the understanding of antibiotic use and resistance development in developing countries, particularly in the context of Ghana</p>			<p>regulation of the pharmaceutical sector, training of dispensers, evidence-based treatment guidelines, and public education are potential interventions to address inappropriate antibiotic use in the study settings</p>
Aslam <i>et al.</i> (29)	Scoping review	The study aimed to identify potential interventions to address the issue of antibiotic	1. Ramalhinho <i>et al.</i> (2014) conducted a cross-sectional, population-based survey in	Two-phase mapping approach. In the first phase, studies were	1. Prevalence: The practice of self-medication with antibiotics (SMA) was observed to be more frequent in younger

		<p>misuse in low- and middle-income countries and to highlight the need for multinational studies based on standardized methodological approaches to better understand the global practices and prevalence of self-medication with antibiotics.</p>	<p>Portugal with a sample size of 1,192 participants, including both males and females. The study was conducted in public places, and the researchers reported that self-medication with antibiotics was greater among older males than young adults.</p> <p>2. Ramay <i>et al.</i> (22) explored and compared the magnitude of self-medication with antibiotics among socioeconomic communities in Guatemala. The study included 418 participants, both male, and female, and was conducted in pharmacies. The study</p>	<p>screened, and in the second phase, data were extracted from selected studies, followed by the assessment of data quality</p>	<p>aged individuals belonging to low- or middle-income groups, with a high prevalence rate reported among the South Asian lay public</p> <p>2. Common Indications: The most common indications for SMA were flu, cough, common colds, sore throat, diarrhea, toothache, and fever</p> <p>3. Determinants: Past good experience and suggestions from friends or relatives were reported as the most common determinants for SMA</p> <p>4. Impact on Antibiotic Resistance: The prevalence of SMA in low- and middle-income countries may be a major contributor to antibiotic resistance, which is a significant global health concern</p> <p>5. Need for Interventions: The review identifies a need for education campaigns and mass media campaigns</p>
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			<p>highlighted the need for interventional programs for the sale of antibiotics and for pharmacists to play effective roles in antibiotic use.</p> <p>3. Moise <i>et al.</i> (2017) evaluated the prevalence of self-medication with antibiotics, factors associated with it, and knowledge to examine self-medication with antibiotics in Haiti. The study included 200 participants, both male and female and was conducted through face-to-face interviews using standardized open-ended and close-ended</p>		<p>to strengthen lay public awareness about the side effects and risks associated with SMA. Additionally, government agencies need to implement strict policies to restrict over-the-counter availability of antibiotics</p> <p>6. Variability in Studies: There was variability among the included studies in terms of designs and outcomes, indicating a need for multinational studies based on standardized methodological approaches to better understand the global practices and prevalence of SMA</p>
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			<p>questionnaires in a hospital setting. The study emphasized the need to improve public awareness about the dangers of self-medication with antibiotics and to enforce current laws to minimize the consumption of over-the-counter antibiotics.</p> <p>4. Widayati <i>et al.</i> (2011) conducted a population-based survey in Indonesia with 559 participants, including both males and females. The study aimed to evaluate the prevalence rates and patterns associated with self-medication with antibiotics.</p>		
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Aslam <i>et al.</i> (16)	Analytical cross-sectional study	The purpose of this study was to determine the relationship between socioeconomic-demographic characteristics and antibiotic self-medication in community-dwelling adults.	The study included a total of n=480 participants in Islamabad, Pakistan, with a majority of male participants (55.6%) and a mean age of 37.1±10.1 years (median 36; range 21–70). The age range of the participants varied from 21 to 70 years, with the majority of participants falling in the age group of 31–40 years (44.2%)	A questionnaire containing both open-ended and close-ended (multiple choice) questions and data were collected in public places such as parks, hospitals, shopping malls, bus stations, supermarkets, and metro stations through the interview-administered method from February to July 2020	<ol style="list-style-type: none"> <li>1. The prevalence of self-medication with antibiotics among the study participants was 75.8%</li> <li>2. The most common reasons for self-medication with antibiotics were lack of trust towards doctors, economic considerations, and easy availability of antibiotics as over-the-counter (OTC) drugs from pharmacies</li> <li>3. The most commonly used antibiotics were amoxicillin, ciprofloxacin, and azithromycin</li> <li>4. The future prevalence of self-medication with antibiotics was significantly associated with the participant's gender, income levels, and occupation type</li> <li>5. The lack of strict legislation/laws over the availability of antibiotics without prescription and the limited</li> </ol>

					<p>availability of health insurance further complicates the issue of self-medication with antibiotics</p> <p>6. The study highlights the need for strict implementation of laws and regulations regarding the availability of antibiotics without prescription and the importance of educating the public on the proper use of antibiotics</p>
Awosan <i>et al.</i> (17)	Cross-sectional study	The objectives of the study were to assess the knowledge, risk perception, and practices related to antibiotic resistance among patent medicine vendors (PMVs) in Sokoto metropolis, Nigeria	The sample size was 200 patent medicine vendors selected by a multi-stage sampling technique. The age range of the respondents was 20 to 59 years, with a mean age of 33.82±9.46 years. The study was conducted in Sokoto metropolis, Nigeria. The setting of the study was patent medicine stores in the	Pretested, self-administered, semi-structured questionnaire	<p>1. Most respondents had adequate knowledge of the causes and prevention of antibiotic resistance and perceived it as a serious threat to their own health and the health of their clients</p> <p>2. Practices favorable to the development of antibiotic resistance were prevalent among the respondents, with a majority consistently selling antibiotics to clients without a doctor's prescription</p> <p>3. Other practices favorable to the</p>



			selected districts of the Sokoto metropolis		development of antibiotic resistance among the respondents included self-medication and purchasing drugs from the open market instead of pharmaceutical companies 4. The study highlights the need for government regulation and close monitoring of patent medicine vendors' practices to avert the looming crisis of medical practice without potent antibiotics
Belachew <i>et al.</i> (30)	Systematic review and meta-analysis	To estimate the proportion of non-prescription antibiotics requests or consultations that resulted in provision of antibiotics without a valid prescription among CDROs in SSA region, and describe the type of antibiotics dispensed.	Sample sizes: 23 studies, 4,195 client encounters or visits Age range: Not explicitly mentioned in the context provided Countries: Conducted in Sub-Saharan African (SSA)	The study on the non-prescription dispensing of antibiotics in Sub-Saharan African countries utilized two methods to collect data: cross-sectional questionnaire-based surveys and cross-sectional client-based studies.	1. The overall proportion of non-prescription dispensing of antibiotics in community drug retail outlets (CDROs) in Sub-Saharan African countries was found to be 69% 2. The proportion of non-prescription dispensing of antibiotics varied across different countries, ranging from 8% in Zimbabwe to 94% in Uganda

			<p>countries, with the majority of the studies from Ethiopia and Tanzania</p> <p>Settings: Included 298 pharmacies, 627 drug stores/shops, 14 rural drug outlets, and 398 Accredited Drug Dispensing Outlets (ADDOs) across seventeen localities in nine countries</p>	<p>- Researchers used questionnaires for the cross-sectional questionnaire-based surveys to collect participant data.</p> <p>- Researchers employed simulated client/case scenario methods for the cross-sectional client-based studies.</p>	<p>3. Upper respiratory tract infections and acute diarrhea were the most frequently presented case scenarios for which antibiotics were sought without a valid prescription</p> <p>4. The most commonly dispensed antibiotics without a prescription were amoxicillin and co-trimoxazole</p>
Bhuvaraghan <i>et al.</i> (31)	Systematic review	To investigate the use and misuse of antibiotics in dentistry in India.	<p>Sample sizes: Varied across the included studies, with some involving hundreds of participants and others with smaller sample sizes</p> <p>Age range: Ranged from children to adults, with</p>	<p>The systematic review on the use of antibiotics in dentistry in India used multiple methods to collect data. These methods included:</p> <p>- <b>Literature Search:</b> The researchers conducted a</p>	<p>1. There is a substantial problem of overuse of antibiotics for dental problems in India</p> <p>2. Antibiotics are being prescribed inappropriately for both clinical and non-clinical reasons</p> <p>3. Inappropriate, potent, and combination antibiotics are being</p>

			<p>specific age ranges reported in some studies</p> <p>Countries: Studies were conducted in various locations across India, including urban and rural areas in states such as Uttar Pradesh, Rajasthan, Maharashtra, Tamil Nadu, Karnataka, Kerala, Madhya Pradesh, and Gujarat</p> <p>Settings: Included tertiary care teaching hospitals, primary care facilities, small hospitals, general practitioner clinics, pharmacy shops, and dental outpatient hospital case records. Urban and rural</p>	<p>comprehensive search of multiple databases, including PubMed, Scopus, Web of Science, and Google Scholar, to identify relevant studies.</p> <p>- <b>Hand-searching:</b> A hand-search was conducted in selected dental journals to identify any additional studies that may have been missed in the initial search.</p> <p>- <b>Reference Checking:</b> The reference lists of all eligible studies were checked to identify any additional relevant studies that were not captured in</p>	<p>prescribed</p> <p>4. Antibiotics are obtained over the counter for dental problems by the general population</p> <p>5. There is a difference in antibiotic prescribing rates between general dentists and specialist qualified dentists.</p> <p>6. There is a need to emphasize the importance of optimal antibiotic prescribing in dental training</p> <p>7. Factors contributing to antibiotic misuse include a lack of knowledge, attitude, and training among providers, patient awareness and beliefs, and policy issues such as guidelines and pharmacy regulations</p>
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			settings were also specified in the studies	the initial search. Data  - <b>Extraction:</b> Two authors performed data extraction, and any discrepancies were resolved through discussion and consultation with a third reviewer.	
Do <i>et al.</i> (27)	Mixed-methods approach with in-depth interviews and focus group discussions	to identify contextually specific targets for interventions to improve antibiotic use practices by comparing community-based antibiotic access and use practices across communities in LMICs	Sample sizes: 6,190 households with 25,274 individuals Age range: Adults aged 18 years and older Countries: Bangladesh, Mozambique, Vietnam, Ghana, Thailand, South Africa Settings: Rural, suburban, and urban communities in low-income and middle-	The study on community-based antibiotic access and use in low-income countries utilized a mixed-method approach for data collection. Both quantitative and qualitative assessments were conducted. - For quantitative data collection, a survey was conducted using structured	1. Antibiotic use practices differed significantly between study sites in low-income and middle-income countries (LMICs), with access appearing to be more restricted in African locations compared to Asian locations 2. In Asian sites, antibiotics were widely available through a high density of both formal and informal suppliers, and there was a higher prevalence of dispensing without a prescription compared to African sites

			income countries	questionnaires. Qualitative data collection involved in-depth interviews and focus group discussions	- 3. The main factors affecting self-medication with antibiotics in LMICs were found to be accessibility, affordability, health-care facility conditions, and health-seeking behavior 4. There is a scarcity of comprehensive and contextual studies considering local complexities in LMICs, which hinders the development of evidence-based interventions to promote appropriate antibiotic use 5. The identified factors will serve as targets for the development of context-tailored interventions to effectively address the misuse of antibiotics and contain antibiotic resistance in LMICs
Green <i>et al.</i> (5)	Mixed-methods approach with in-depth interviews and	to investigate the association between multidimensional poverty and antibiotic use in patient populations in Kenya, Tanzania, and Uganda	- Sample sizes: A total of 6,827 outpatients aged 18 years and older, with some pregnant adolescents - Age range: most	The data was collected through a mixed-methods approach, combining quantitative and qualitative methods.	- Antibiotic misuse, including self-medication and non-adherence, was more common among individuals who were least deprived and least common among those living in severe

	focus group discussions		<p>participants were younger than 35 years old (3,840, or 60.5% of the sample)</p> <ul style="list-style-type: none"> <li>- Female participants predominant (79.2%)</li> <li>- Countries: Kenya, Tanzania, and Uganda</li> </ul>	<ul style="list-style-type: none"> <li>- in-depth interviews</li> <li>- questionnaire distributed to outpatients</li> <li>- adapted version of the internationally validated acute multidimensional poverty index</li> </ul>	<p>multidimensional poverty in Kenya, Tanzania, and Uganda - there are structural barriers, such as inefficiencies in public health care and easy access to antibiotics, as key drivers of antibiotic misuse across all levels of deprivation. - there is a need for interventions to address these structural barriers in order to reduce antibiotic misuse and combat antimicrobial resistance</p>
Hoque <i>et al.</i> (32)	Mixed studies and systematic review	Present a 'snap shot' of the current situation including existing policies and practices to address AMR, and the challenges and barriers associated with their implementation	<p>Sample sizes: Ranged from 30 respondents to 4,100 patients in various studies</p> <p>Age range: Included children aged &lt;5 years, adults, and elderly individuals</p> <p>Countries: Primarily focused on Bangladesh</p> <p>Settings: Included public sector hospitals, urban</p>	<p>The data was collected using a 'mixed studies review' method, which involved synthesizing evidence from qualitative, quantitative, and mixed method studies.</p> <ul style="list-style-type: none"> <li>- A data extraction matrix was used to organize the data, disaggregated into three key themes: current</li> </ul>	<p>1. The research article focused on the antimicrobial resistance (AMR) situation in Bangladesh across human, animal, and environmental sectors. - key findings included issues such as antimicrobial prescribing and use, self-medication, non-compliance of dosage, sensitivity and resistance patterns of antibiotics, use of antimicrobials in food animals, and environmental contamination</p>

			<p>clinics, community clinics, primary healthcare centers, tertiary hospitals, and rural health centers</p>	<p>antimicrobial situation (prescribing pattern, use, and compliance); perception regarding irrational use of antimicrobials and emergence of AMR (providers, users); and current policies and practices related to antimicrobial use.</p> <ul style="list-style-type: none"> <li>- The study team members critically appraised the selected articles under the guidance of the principal investigator, as per PRISMA checklist.</li> <li>- Instruments such as prescriptions, surveys, and antimicrobial sensitivity tests were used to collect</li> </ul>	<p>2. The research highlighted the deep-rooted factors contributing to the development and transmission of AMR in Bangladesh and emphasized the need for multi-sectoral and multi-stakeholder efforts based on the 'One Health' strategy to address the issue comprehensively</p>
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				the data from various settings including hospitals, clinics, and community health centers.	
Ingelbeen <i>et al.</i> (18)	Cross-sectional study	The objectives of the study were to investigate antibiotic use in patients with persistent fever in low- and middle-income countries. Specifically, the study aimed to (I) describe the prevalence and choice of antibiotics used prior to seeking medical care, applying the Access/Watch/Reserve (AWaRe) classification of the WHO List of Essential Medicines. Additionally, the study analyzed (II) factors associated with prior antibiotic use	1,939 participants aged 5 years and older with fever lasting 1 week or more, across six healthcare facilities in Cambodia, the Democratic Republic of the Congo (DRC), Nepal, and Sudan. The prevalence and choice of antibiotics used prior to study inclusion were described, and factors associated with prior antibiotic use were analyzed. The study found that 22.1% of participants reported prior use of one or more antibiotics, with the	- data on antibiotic use was collected using a nested cross-sectional study design. The researchers collected information on antibiotic use in the 4 weeks before study inclusion for patients with persistent fever. - Additionally, in cases where antibiotic names could not be recalled, efforts were made to complete the information by asking relatives, showing pictures of antibiotic packages, or	1. 22.1% of participants reported prior use of one or more antibiotics, with the most frequent antibiotics belonging to the Watch group, ranging from 23.6% in the DRC to 82.1% in Nepal 2. Cephems (33.9%), fluoroquinolones (16.9%), macrolides (14.1%), and beta-lactamase-labile penicillins (12.8%) were the most frequently used antibiotics 3. Antibiotic use was most frequent among young patients (5–17 years of age) and men 4. The time between initiating antibiotic use and study inclusion at the hospital varied between a median of 3 days in the DRC and 9 days in Sudan



			most frequent antibiotics belonging to the Watch group, ranging from 23.6% in the DRC to 82.1% in Nepal. Antibiotic use was most frequent among young patients (5–17 years of age) and men	through home visits to retrieve the medicine packages or prescriptions.	5. Several critically important Watch antibiotics were widely used in the community, even though antibiotic use is frequently deemed non-essential or ineffective when qualified healthcare workers consult these patients
Jamhour <i>et al.</i> (19)	Cross-sectional design	The objectives of the study were to evaluate the knowledge and self-medication practices of antibiotics in a sample of the population of Lebanon, to assess the factors associated with antibiotic misuse, and to identify the most common indications for antibiotic self-medication. The study aimed to shed light on the importance of proper antibiotic use and the risks of self-medication, and to	The objectives of the study were to evaluate the knowledge and self-medication practices of antibiotics in a sample of the population of Lebanon, to assess the factors associated with antibiotic misuse, and to identify the most common indications for antibiotic self-medication. The study aimed to shed light on the	designed questionnaire that was adapted from a validated scale and written at a grade 5 school level.	<ul style="list-style-type: none"> <li>- Self-medication: About half of the population surveyed reported self-medicating with antibiotics, with the most common indications for self-medication being sore throat, common cold, and fever</li> <li>- Knowledge about antibiotics: 61% of the participants thought that antibiotics should be taken for the common cold, and 83% knew that misuse of antibiotics could result in microbial resistance</li> <li>- Factors associated with self-medication: Self-medication with</li> </ul>

		provide insights into public health and antibiotic stewardship efforts in developing countries.	importance of proper antibiotic use and the risks of self-medication, and to provide insights into public health and antibiotic stewardship efforts in developing countries		antibiotics significantly correlated with a lower educational level, indicating that individuals with lower education were more likely to self-medicate with antibiotics - Stopping antibiotics at the appropriate time: People with higher knowledge about antibiotics were more likely to stop antibiotics at the appropriate time compared to those with lower knowledge - Prescription use vs. self-medication: Those who received antibiotics following a prescription were more likely to complete the course of therapy and stop antibiotics at the appropriate time compared to those who used antibiotics without a prescription
Kotwani <i>et al.</i> (35)	Qualitative study	Explore knowledge, practice and, behavior of consumers towards antibiotics, antibiotic	In-depth interviews were conducted with 72 consumers in ages 18 to 70	interviews	Retail pharmacies were the first point of consultation for common ailments for patients/consumers once home

		<p>use, antimicrobial resistance</p> <p>Purchasing behavior of consumers for antibiotics, and to gain insight which will help in developing evidence-based policy interventions.</p>	<p>years across all 11 districts of Delhi. The sample is characteristic of demographic distribution in the state. In each district 5-7 interviews were conducted, post which saturation in response was noted</p> <p>Based on this finding the sample size for each district of 5–7 was used to arrive at the total sample size. Six consumers refused to participate in the study and one left the interview mid-way as the subject did not interest him</p>		<p>remedies failed; they were largely unaware of the threat of antimicrobial resistance. Consumers’ knowledge of antibiotic use and about antimicrobial resistance was low, they used old prescriptions, and bought antibiotics OTC to save time and money. Despite the presence of regulations constituted to regulate the sale of antibiotics by the Government and the implementation of national campaigns, the practice of self-medication and behaviors such as OTC purchase, non-adherence to prescribed antibiotics was prevalent. Consumers perceive that antibiotics provide quick relief and accelerate the curing process and retail pharmacy shops try to protect their retail business interests by honoring old prescriptions and self-medication for antibiotics</p>
Ngu <i>et al.</i>	Cross-	Provide data on the prevalence	Minimum sample size was	validated structured	The prevalence of antibiotic self-

(20)	sectional	of antibiotic self-medication and identify the factors  Contributing to self-medication in adult patients with respiratory tract infection	245; ended up recruiting 308 participants	questionnaire	<p>medication amongst individuals with RTIs was 41.9% (95% CI: 36.5% to 47.5%). Patients with a history of pulmonary tuberculosis (TB) were significantly less likely to self-medicate with antibiotics (P=0.043)</p> <p>The most common source of antibiotic self-medication was pharmacies (62%) and cotrimoxazole and Amoxicillin were the most commonly used antibiotics [38.8% (50), 26.4% (34), respectively]</p> <p>Self-medication with antibiotics in adult patients with RTIs is common in Cameroon</p>
Ocan <i>et al.</i> (33)	Systematic review and meta-analysis	establish the burden, risk factors and effects of antimicrobial self-medication in low-and-middle-income	Total of 34 studies involving 31,340 participants were included	systematic review protocol & Random Effects Meta-analysis	The overall prevalence of antimicrobial self-medication was 38.8% (95% CI: 29.5–48.1%). Most studies assessed non-prescription use of antibacterial

		countries			(17/34: 50%) and antimalarial (5/34: 14.7%) agents. The common disease symptoms managed were respiratory (50%), fever (47%) and gastrointestinal (45%). The major sources of antimicrobials included pharmacies (65.5%), leftover drugs (50%) and drug shops (37.5%). Twelve studies reported inappropriate drug use; not completing dose (6/12) and sharing of medicines (4/12)
Owusu-Ofori <i>et al.</i> (21)	Cross-sectional survey	This study was undertaken to determine students of healthcare programmes self-medication practices and attitudes in relation to AMR	First-year students of healthcare programmes at the Kwame Nkrumah University of Science and Technology, Ghana	Questionnaire	-136 students (56.2%) had previously purchased antibiotics without a prescription and 78.3% expressed satisfaction with the outcome of self-medication <ul style="list-style-type: none"> <li>- Amoxicillin (78%) was the most frequent antibiotic bought without a prescription</li> <li>- Majority (76.3%) agreed that self-medication can lead to AMR</li> </ul>

					<p>- Majority (77.0%) believed that antibiotic abuse is a problem in Ghana and 94.8% agreed that the introduction of a course in the University on the rational use of antibiotic will help improve student's knowledge and practices</p>
Ramay <i>et al.</i> (22)	Descriptive cross-sectional study	The study aimed to compare the magnitude of antibiotic self-medication and the characteristics of those who self-medicate with antibiotics in two pharmacies serving disparate socio-economic communities in Guatemala City	Two Pharmacies in Guatemala City:  <b>1. Pharmacy in San Cristobal</b> - serves clients characterized as professional or executive employees with higher levels of education and higher purchasing power  <b>2. Pharmacy in Historical City Center</b> - serves clients from the working class with	Questionnaire	<p>- 70% of 418 respondents are self-administering. -The two primary reasons for self-medicating in both pharmacies were time constraints for doctors' visits (38% Suburb, 56% City Center P&lt;0.01) and purchasing convenience (27% Suburb, 17% City Center). In both settings, amoxicillin was most commonly purchased for self-medication, followed by tetracycline and sulfamethoxazole/trimethoprim</p> <p>- Flu-like symptoms were the most common reason for self-medicating in</p>

			<p>lower levels of education and lower purchasing power</p> <p><i>Note:</i> Customers who purchased antibiotics without a prescription are invited to participate in the study. Patients who are less than 16 years old, has seen a doctor that day, were already taking antibiotics, belonged to a vulnerable population, were under the influence of alcohol or drugs, and/or did not understand Spanish were excluded from the study</p>		<p>the Suburban and City Center pharmacy (33%, 32%, respectively), followed by fever and pain Prevalence of Self-Medication in LMIC Egypt—77.7%, Cameroon—68.4%, Nigeria—86%, Nepal—81.4%, Spain—72.7%, Australia—91.7%, Ethiopia—32.7%, Bangladesh—52.2%</p>
Rathish <i>et al.</i> (23)	Cross-sectional study	To determine the prevalence, associated factors and reasons for antibiotic self-medication among dwellers of	<p>- 118 households from NPE MOH area</p> <p>- Households were selected to represent each of the 19</p>	Questionnaire	- Of the 384 participants, 211 had consumed antibiotics during the last 3 months (55%)

		Anuradhapura, Sri Lanka	PHM areas of NPE MOH area using probability proportional to size		<ul style="list-style-type: none"> <li>- Ten participants were found to have self-medicated antibiotics</li> <li>- The prevalence of antibiotic self-medication was 2.6% (95% CI: 1.0–4.2%); 2.5% (5/203) in women and 2.8% (5/181) in men</li> <li>- Out of those who self-medicated antibiotics, most were Buddhists (90%, 9/10), unemployed or retired (60%, 6/10), having a monthly family income of 50,001–100,000</li> <li>- Sri Lankan rupees (60%, 6/10) and educated up to or below GCE A/L (70%, 7/10)</li> <li>- Most have self-medicated antibiotics for runny nose (80%–8/10)</li> </ul>
Sachdev <i>et</i>	Literature	To educate the people by	–	–	Different factors contribute to the



al. (36)	review	showing the development and plausible future to decrease antibiotic misuse.			<p>practice of self-medication:</p> <ol style="list-style-type: none"> <li>1. Partial Knowledge of antibiotics</li> <li>2. Easy availability of antibiotics</li> <li>3. Quick relief from acute illnesses</li> <li>4. Ignorance regarding the severity of the disease</li> </ol>
Sartelli <i>et al.</i> (37)	Literature review	To assess the need for implementing education and increasing awareness about correct antibiotic prescribing practices across the surgical pathways.	-	-	<p>The requisite to formulate, communicate, and adopt rigorous policies for appropriate antibiotic use is more pressing in LMCI where the greatest levels of abuse are encountered. Surgeons must improve the quality of surgical care and avoid inappropriate antibiotic prescribing in surgery. the issue can be addressed with a reasonable degree of success when prescribing surgeons have adequate relevant knowledge of both the properties of antibiotic agents and the pathogens</p>

<p>Torres <i>et al.</i> (34)</p>	<p>Systematic review and meta-analysis</p>	<ul style="list-style-type: none"> <li>- To map evidence of factors influencing self-medication with antibiotics (SMA) in low and middle-income countries (LMICs).</li> <li>- To identify research gaps in the understanding of factors influencing SMA in LMICs.</li> </ul>	<ul style="list-style-type: none"> <li>- Sample sizes: 150–1,827 participants</li> <li>- Age range: 18–69 years old</li> <li>- Female participants predominant in 10 studies</li> <li>- Countries: India, Laos, Nepal, Pakistan, Sri Lanka, Yemen, Nigeria, Guatemala</li> <li>- Settings: universities, hospitals, primary health care centers, pharmacies, households</li> </ul>	<ul style="list-style-type: none"> <li>- Systematic review and meta-analysis used data from 2007-2017 studies</li> <li>- Studies included evidence of self-medication with antibiotics and non-prescribed antibiotic use in adults from low-and-middle-income countries</li> </ul>	<p><b>Prevalence of SMA:</b> The review found a high prevalence of self-medication with antibiotics (SMA) in low- and middle-income countries (LMICs), ranging from 8.1% to 93%. Factors such as education level, monthly income, and gender were associated with SMA practices</p> <p><b>Factors influencing SMA:</b> Accessibility, affordability, and conditions of health facilities, as well as health-seeking behavior, were identified as factors that influence SMA in LMICs</p> <p><b>Reasons for SMA:</b> Common complaints that led to the practice of SMA included sore throat, common cold, cough, headache, toothache, flu-like symptoms, pain relief, fever, runny</p>
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					<p>nose, upper respiratory tract infections, and urinary tract infections</p> <p><b>Health conditions related to SMA:</b> The review highlighted various health conditions that were associated with SMA, including sore throat, common cold, cough, headache, toothache, flu-like symptoms, pain relief, fever, runny nose, upper respiratory tract infections, and urinary tract infections</p>
Torres <i>et al.</i> (28).	Systematic scoping review	<ul style="list-style-type: none"> <li>- To identify and map key concepts, sources of evidence, and knowledge gaps on a given topic.</li> <li>- To provide an overview of the existing literature, identify the main sources and types of evidence available, and analyze how research has been conducted on a particular</li> </ul>	<ul style="list-style-type: none"> <li>- Included studies in the systematic scoping review involved a total sample size of 7,676 participants</li> <li>- Participants predominantly being adults aged 18 to 69 years</li> <li>- Studies were conducted in various settings including rural and urban areas,</li> </ul>	<p>Methodological quality assessment using the Mixed Methods Appraisal Tool (MMAT) indicated that 10 studies were scored as high quality, while the remaining five had an average score</p> <ul style="list-style-type: none"> <li>- None of the included studies were scored as low</li> </ul>	<p><b>Prevalence of self-medication:</b> The review identified varying rates of self-medication with antibiotics across low- and middle-income countries in Asia and Africa</p> <p><b>Factors influencing self-medication:</b> Various factors influencing self-medication with antibiotics emerged, such as access to healthcare, knowledge</p>

		subject.	universities, hospitals, primary healthcare centers, pharmacies, and households - Studies were conducted across LMICs in Asia and Africa	quality	about antibiotics, cultural beliefs, and economic factors  <b>Reasons for self-medication:</b> The reasons for engaging in self-medication with antibiotics were diverse and included convenience, perceived minor illness, previous experience, and cost considerations  <b>Health conditions related to self-medication:</b> The review highlighted the specific health conditions or symptoms for which individuals tended to self-medicate with antibiotics, shedding light on the patterns of use in these populations
Torres <i>et al.</i> (24)	Qualitative cross-sectional study	- To understand the factors influencing self-medication with antibiotics in Maputo City.	- The study participants were residents of Maputo city - They visited private	- In-depth interviews and focus group discussions were conducted with open-ended questions in	<b>Self-medication with antibiotics and influencing factors:</b> Three major themes emerged regarding the factors influencing self-medication with

		<p>- To capture a diverse range of perspectives by including individuals from different socioeconomic backgrounds.</p>	<p>pharmacies in different socioeconomic areas</p> <p>- Participants included individuals of various ages, genders, and education levels</p>	<p>Portuguese.</p> <p>- The data was transcribed, translated into English, and analyzed thematically using latent content analysis.</p> <p>- Semi-structured interview guides were used to collect data on demographic characteristics, knowledge of antibiotics, attitudes and behaviors toward antibiotics use, patterns and reasons for self-medication with antibiotics, commonly used non-prescription antibiotics, and the main health problems leading to self-medication.</p>	<p>antibiotics:</p> <p>(I) Health system-related factors; (II) Health-seeking behavior; (III) Socioeconomic factors</p> <p><b>Health system-related factors:</b></p> <p>- Easy access to antibiotics at the pharmacy</p> <p>- Long wait to access health care facilities</p> <p>- Quality of assistance at health care facilities</p> <p>- Easy access to pharmacist's advice at the pharmacy</p>
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				- Pharmacy clients of various ages, genders, and education levels were purposefully sampled to capture a diverse range of perspectives.	
Nguyen <i>et al.</i> (38)	Situational analysis	<ul style="list-style-type: none"> <li>- To conduct a comprehensive situation analysis of the current patterns and determinants of antibiotic use and resistance.</li> <li>- To provide an understanding of the healthcare system, drug regulation and supply; antibiotic resistance and infection control; and agricultural antibiotic use in Viet Nam.</li> <li>- To identify the challenges and determinants of antibiotic use and resistance in an emerging economy like Viet Nam.</li> </ul>	N/A	<ul style="list-style-type: none"> <li>- Comprehensive review of international and local literature</li> <li>- Stakeholder meetings and consultations with relevant experts and organizations in Viet Nam</li> <li>- Sources include published papers, unpublished reports, local Vietnamese papers, and expertise from stakeholders representing</li> </ul>	<p><b>Injudicious antibiotic use:</b> The analysis found that increased accessibility to healthcare in Viet Nam has been accompanied by injudicious antibiotic use in hospitals and the community, with poor prescribing practices and self-medication being common. This has led to predictable escalation in bacterial resistance</p> <p><b>Antibiotic resistance:</b> The analysis found that pneumococcal penicillin-resistance rates are the highest in Asia, and carbapenem-resistant bacteria (notably NDM-1) have recently</p>

		<p>- To formulate feasible recommendations to improve antibiotic use in Viet Nam, while ensuring access to life-saving drugs and addressing the growing threat of antibiotic resistance</p>		<p>various areas</p> <ul style="list-style-type: none"> <li>- Working group involved key representatives from across Viet Nam</li> <li>- Policy workshop conducted to assess findings and recommend feasible policy changes</li> <li>- Data collection methods likely involved literature review, stakeholder consultations, and expert input</li> </ul>	<p>emerged. Hospital-acquired infections, predominantly with multi-drug resistant Gram-negative organisms, place additional strain on limited resources</p> <p><b>Agricultural antibiotic use:</b> The analysis found that widespread agricultural antibiotic use further propagates antimicrobial resistance</p> <p><b>Policy and enforcement:</b> The analysis found that while many policies exist to regulate antibiotic use in Viet Nam, enforcement is insufficient or lacking. Future legislation regarding antibiotic access must alter incentives for purchasers and providers and ensure effective enforcement</p> <p><b>National action plan:</b> The Ministry of Health recently initiated a national</p>
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					<p>action plan and approved a multicenter health improvement project to strengthen national capacity for antimicrobial stewardship in Viet Nam. The analysis provided important input to these initiatives</p>
Yeika <i>et al.</i> (13)	Systematic review and meta-analysis	<ul style="list-style-type: none"> <li>- To evaluate the prevalence of self-medication with antibiotics (SMA) in Africa.</li> <li>- To compare the reasons for self-medication with antibiotics across different regions of Africa.</li> <li>- To identify the sources of antibiotics used for self-medication in Africa.</li> <li>- To explore the factors associated with self-medication</li> </ul>	<ul style="list-style-type: none"> <li>- The study included 40 studies from 19 countries in Africa</li> <li>- Specific sample sizes, age ranges, countries, and settings of each individual study are not mentioned in the available context</li> <li>- Countries: Africa, including Western Africa and Northern Africa</li> <li>- Settings: community pharmacies, hospitals, and universities</li> </ul>	<ul style="list-style-type: none"> <li>- Electronic search: PubMed and Google Scholar databases were searched using specific terms related to self-medication with antibiotics and Africa to identify relevant observational studies from Jan 2005 to Feb 2020.</li> <li>- Screening and selection: Two reviewers independently screened titles and abstracts of</li> </ul>	<p><b>Prevalence of SMA:</b> The prevalence of SMA in Africa ranged from 12.1% to 93.9%, with a median prevalence of 55.7%. Western Africa had the highest reported prevalence of 70.1%, followed by Northern Africa with 48.1%</p> <p><b>Antibiotics used:</b> The review identified 27 different antibiotics used for SMA from 13 antibiotic classes. The most frequently used antibiotics were penicillins, tetracyclines, and fluoroquinolones. 41% of these antibiotics belonged to the WHO Watch Group</p>



		with antibiotics in Africa.		<p>identified studies and used the PRISMA flowchart to select cross-sectional and mixed methods studies that met the inclusion criteria.</p> <p>- Quality assessment: Selected studies were assessed for quality using the "risk of bias in prevalence studies evaluation" tool developed by Hoy <i>et al.</i>, which assesses studies based on nine criteria.</p> <p>- Data extraction: Relevant data from selected studies, including country, study design, sample size,</p>	<p><b>Indications for SMA:</b> The most frequent indications for SMA were upper respiratory tract infections, gastro-intestinal tract symptoms, and febrile illnesses.</p> <p><b>Sources of antibiotics:</b> Common sources of antibiotics used for self-medication were community pharmacies, family/friends, leftover antibiotics, and patent medicine stores</p> <p><b>Factors associated with SMA:</b> Several factors were associated with SMA, including younger age, poor educational status, engagement in a regular job, dissatisfaction with healthcare services, male sex, low educational status, urban residence, and lower levels of education</p>
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				<p>prevalence of self-medication with antibiotics, types and sources of antibiotics, reasons for self-medication, and factors associated with self-medication, were extracted using a spreadsheet in Excel.</p> <p>- Data synthesis: Both qualitative and quantitative syntheses were performed to analyze and compare prevalence, reasons, sources, and factors associated with self-medication with antibiotics in Africa.</p>	
Zeb <i>et al.</i>	Cross-	- To investigate the prevalence	- The study included 1,250	- The survey questionnaire	<b>Prevalence of self-medication:</b> The

(25)	sectional survey design	<p>of self-medication among university students in Hazara Region of KPK, Pakistan.</p> <ul style="list-style-type: none"> <li>- To identify the common illnesses/diseases for which students practice self-medication.</li> <li>- To determine the sources of information used by students for self-medication.</li> <li>- To explore the factors influencing the practice of self-medication among university students.</li> <li>- To assess the knowledge and attitudes of students towards the advantages and</li> </ul>	<p>subjects from different universities in the Hazara Region of KPK, Pakistan</p> <ul style="list-style-type: none"> <li>- Participants were selected based on their willingness to answer the questions in the current study without any specific inclusion/exclusion criteria for gender or age</li> <li>- Participants were divided into four major phases: Phase-1 (all the undergraduate students), Phase-2 (Master (minor) students), Phase-3 (Master (major) students), and Phase-4 (Doctorate students)</li> </ul>	<p>was designed in English and reviewed by a panel of professionals.</p> <ul style="list-style-type: none"> <li>- A pilot study was undertaken with 20 participants to examine the clarity and comprehensibility of the survey content.</li> <li>- Additional adjustments were made based on their feedback.</li> <li>- The survey tool's reliability was determined using the Cronbach's alpha test of internal consistency, which showed that the survey</li> </ul>	<p>study included 1250 subjects from different universities in the Hazara Region of KPK, Pakistan. The survey revealed that self-medication is prevalent among students, with factors such as exemption from physician fees, convenience, and lack of nearby pharmacies/hospitals contributing to this practice</p> <p><b>Awareness of antibiotic resistance:</b> The survey indicated that a significant proportion of students were aware of antibiotic resistance, possibly due to their interest in healthcare news and publications. However, a considerable number of participants were still unaware of the implications of antibiotic resistance</p> <p><b>Lack of counseling:</b> A concerning</p>
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		<p>disadvantages of self-medication.</p> <p>- To recommend strategies for reducing the risks associated with self-medication among university students.</p>	<p>- Participants were from various departments, including:</p> <ul style="list-style-type: none"> <li>- microbiology</li> <li>- zoology</li> <li>- chemistry</li> <li>- psychology</li> <li>- agriculture</li> <li>- medical lab technology</li> <li>- sociology</li> <li>- Pakistan study</li> <li>- food science</li> <li>- business administration.</li> </ul>	<p>tool was generally reliable with a score of 0.82.</p> <p>- The survey was conducted at different universities in Hazara Region of KPK, Pakistan.</p> <p>- Statistical analysis was carried out through SPSS 28, using Pearson correlation coefficient, standard deviation, mean, variance, and probability for the desired data.</p>	<p>finding was that a majority of students reported that their physicians and pharmacists did not provide counseling about the risks of antibiotics and self-medication. Instead, students often resorted to searching for medicines on social media platforms and purchasing them without a solid prescription</p> <p><b>Influence of discipline and age:</b> The survey also highlighted the influence of discipline and age on the prevalence of self-medication and awareness of antibiotic resistance among students. For example, students from health sciences disciplines showed higher awareness of antibiotic resistance compared to those from social sciences background</p>
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