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ASSESSMENT OF KNOWLEDGE, ATTITUDE, AND PRACTICE OF COMMUNITY PHARMACISTS TOWARDS ANTIMICROBIAL RESISTANCE AT YEKA SUB CITY, ADDIS ABABA, ETHIOPIA, 2023.

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Abstract:

Background: Antimicrobial resistance (AMR) is a global health concern that poses significant challenges to healthcare systems worldwide. Community pharmacists play a crucial role in the appropriate use of antibiotics and the prevention of AMR. However, there is limited research focusing on the specific knowledge, attitudes, and practices of community pharmacists towards AMR in Yeka Subcity, Ethiopia. Understanding their current understanding and practices can provide valuable insights for targeted interventions.

Objective: The main objective of this research is to assess the knowledge, attitudes, and practices of community pharmacists towards antimicrobial resistance in Yeka Subcity. The study aims to evaluate their understanding of AMR, their attitudes towards responsible antibiotic use, and their current practices in dispensing and counseling on antibiotics.

Methods: The study will employ a cross-sectional design, utilizing both quantitative and qualitative data collection methods. A structured questionnaire will be developed to assess the knowledge, attitudes, and practices of community pharmacists towards AMR. The questionnaire will be administered to a sample of community pharmacists practicing in Yeka Subcity. In-depth interviews will also be conducted with a subset of participants to gain a deeper understanding of their perspectives. The data will be analyzed using appropriate statistical techniques and thematic analysis for quantitative and qualitative data, respectively.

Workplan: The research will be conducted over a period of three-months. The workplan includes the following key activities: literature review, research proposal development, ethical approval, data collection tool development, recruitment and training of research assistants, data collection (questionnaire administration and interviews), data analysis, report writing, and dissemination of findings.

Keywords*: Antimicrobial resistance, Community Pharmacist knowledge, Yeka sub city*

1. Introduction

1.1. Background

Antimicrobial resistance (AMR) is a global public health concern that threatens the effectiveness of antibiotics and other antimicrobial drugs. Community pharmacists play a vital role in the appropriate use of antibiotics and can contribute significantly to prevent AMR. However, their knowledge, attitudes, and practices regarding AMR may vary and impact the overall management of antibiotic use in the community. This research aims to assess the knowledge, attitudes, and practices of community pharmacists towards AMR in Yeka Subcity, Ethiopia (Overstreet *et al.,* 2018).

Antimicrobial resistance (AMR) is a global health challenge that poses a significant threat to the effective treatment of infectious diseases. It occurs when microorganisms develop resistance to the drugs designed to kill or inhibit their growth. AMR not only leads to treatment failures and increased morbidity and mortality rates but also has substantial economic implications due to prolonged hospital stays and the need for more expensive second-line treatments (O'Neill, 2016). The World Health Organization (WHO) has identified AMR as one of the greatest threats to public health in the 21st century, necessitating urgent and coordinated efforts to address this issue (WHO, 2019).

In recent years, there has been a growing recognition of the role played by community pharmacists in the management of AMR. Community pharmacists, as accessible healthcare professionals, have the potential to contribute significantly to the appropriate use of antimicrobial agents and the prevention of AMR. They play a crucial role in dispensing antibiotics, providing counseling to patients on their proper use, and collaborating with prescribers to optimize antibiotic therapy (AbRahman *et al.,* 2018).

However, community pharmacists' knowledge, attitudes, and practices regarding AMR may vary, and there may be barriers that hinder their ability to effectively address this issue. Assessing the knowledge, attitudes, and practices of community pharmacists is essential to identify areas for improvement and develop targeted interventions that can enhance their role in combating AMR. Moreover, such assessments help in understanding the factors influencing their behaviors and perceptions, which can guide the development of educational programs and policies aimed at promoting responsible antibiotic use.

While there have been studies conducted on the knowledge, attitudes, and practices of community pharmacists regarding AMR in different settings, there is limited research in the specific context of Yeka Subcity, Ethiopia. Yeka Subcity, located in Addis Ababa, is a densely populated area with a high demand for healthcare services. Understanding the knowledge, attitudes, and practices of community pharmacists in this context is crucial for tailoring interventions and improving their engagement in AMR management.

Therefore, this study aims to assess the knowledge, attitudes, and practices of community pharmacists towards AMR in Yeka Subcity, Ethiopia. By identifying the gaps and barriers in their knowledge and practices, the findings of this study will inform the development of targeted interventions to enhance their role in addressing AMR and promoting responsible antibiotic use in the community. The ultimate goal is to contribute to the effective management of antibiotics and prevent the growing threat of antimicrobial resistance.

2. Objectives

2.1. General Objective

❖ The general objective of this research was to assess the knowledge, attitudes, and practices of community pharmacists towards antimicrobial resistance in Yeka Subcity.

2.2. Specific Objectives:

The study addressed the following specific objectives:

- assess the level of knowledge among community pharmacists regarding antimicrobial resistance, including its causes, consequences, and appropriate antibiotic use;

- assess the attitudes of community pharmacists towards responsible antibiotic use and their perception of their role in preventing antimicrobial resistance;

- determine the current practices of community pharmacists in dispensing antibiotics, providing patient counseling, and promoting appropriate antibiotic use; and

- identify factors influencing the knowledge, attitudes, and practices of community pharmacists towards antimicrobial resistance, such as years of experience, educational background, and access to guidelines or protocols.

3. Materials and methods

3.1. Study area and Study period

The study was conducted in Yeka Subcity, which is located in Addis Ababa, Ethiopia. Yeka Subcity is chosen as the study area due to its diverse population and representation of different communities within the city. The study period for this research was from June 10, 2023 to July 25 , 2023

3.2. Population

3.2.1. Source Population

The source population for this research comprises community pharmacists practicing in Yeka Subcity, located in Addis Ababa, Ethiopia. Community pharmacists are healthcare professionals who play a crucial role in providing pharmaceutical services to the local population.

3.2.2. Study population

The study population for this research was community pharmacists practicing in Yeka Subcity, located in Addis Ababa, Ethiopia who are willing to participate in the study during the study period.

3.3. Variables

3.3.1. Dependent Variables:

Knowledge community pharmacists regarding antimicrobial resistance: This variable assesses the level of understanding and awareness of community pharmacists regarding the causes, consequences, and appropriate use of antibiotics in the context of antimicrobial resistance.

Attitudes of community pharmacists towards antimicrobial resistance: This variable measures the beliefs, perceptions, and attitudes of community pharmacists towards responsible antibiotic use, control, and the role they play in preventing antimicrobial resistance.

Practices of community pharmacists in relation to antimicrobial resistance: This variable examines the actual behaviors, actions, and practices of community pharmacists when dispensing antibiotics, providing patient counseling, and promoting responsible antibiotic use.

3.3.2. Independent Variables:

Years of experience: This variable represents the number of years that community pharmacists have been practicing in the field and may influence their knowledge, attitudes, and practices related to antimicrobial resistance.

Educational background: This variable captures the level of education and training attained by community pharmacists, which may impact their understanding and adherence to appropriate antibiotic use guidelines.

Access to guidelines or protocols: This variable assesses whether community pharmacists have access to updated guidelines, protocols, or resources related to antimicrobial resistance, which may influence their knowledge and practices.

Participation in training programs: This variable considers whether community pharmacists have received training or continuing education related to antimicrobial resistance, which may enhance their knowledge and practices.

Control Variables:

Demographic characteristics: Control variables such as age, gender, and educational level may be considered to account for any potential confounding effects or differences among participants.

3.4. Inclusion and exclusion criteria

3.4.1. Inclusion criteria

The inclusion criteria for participants in this study are community pharmacists practicing in Yeka Subcity, Addis Ababa, Ethiopia. To be eligible for inclusion, participants must meet the following criteria:

1. Occupation: Participants must be actively working as community pharmacists in Yeka Subcity during the study period.

2. Location: Participants must practice in community pharmacies located within the boundaries of Yeka Subcity.

3. Availability: Participants must be available and willing to participate in the study during the data collection period.

4. Voluntary Participation: Participants should provide informed consent, indicating their willingness to take part in the study without any form of compel.

5. Language Proficiency: Participants should have sufficient proficiency in the language of the data collection tools (e.g., English, Amharic) to understand and respond appropriately.

These inclusion criteria ensure that the study includes community pharmacists who are actively involved in providing pharmaceutical services within Yeka Subcity, allowing for a representative sample that reflects the knowledge, attitudes, and practices of community pharmacists towards antimicrobial resistance in that specific geographical area. It is important to note that individuals who do not meet these inclusion criteria, such as pharmacists on leave, retired pharmacists, or those practicing outside of Yeka Subcity, was excluded from the study.

3.4.2. Exclusion criteria

The exclusion criteria for this study are specific criteria that would lead to the exclusion of community pharmacists from participating in the research. The following are the exclusion criteria:

1. Inactive Practice: Community pharmacists who are not actively practicing during the study period was excluded. This includes pharmacists on extended leave, those who have retired, or those who are not currently providing pharmaceutical services within Yeka Subcity.

2. Unavailability: Community pharmacists who are not available or unwilling to participate in the study during the data collection period was excluded. This may include pharmacists who have scheduling conflicts, are unable to commit to the study requirements, or refuse to participate for any other reason.

3. Language Barrier: Community pharmacists who do not have sufficient proficiency in the language of the data collection tools (e.g., English, Amharic) to understand and respond accurately was excluded. This criterion ensures that participants can fully engage in the study and provide meaningful responses.

4. Incomplete or Inaccurate Data: Participants who provide incomplete or unreliable data during the data collection process may be excluded from the analysis. This could include participants who fail to respond to key questions or provide inconsistent or wrong information.

5. Violation of Ethical Considerations: Community pharmacists who engage in unethical behavior during the study, such as providing false information, violating patient confidentiality, or engaging in misconduct, may be excluded from the study.

3.5. Study design

The study design for this research is a cross-sectional study. A cross-sectional design involves collecting data at a specific point in time to provide a quick knowledge, attitudes, and practices of community pharmacists towards antimicrobial resistance in Yeka Subcity. The study design allows for the assessment of various variables of interest simultaneously. In this cross-sectional study, data was collected from community pharmacists practicing in Yeka Subcity within a defined study period. The data collection will occur at a single time point, providing a quick pharmacists' characteristics, knowledge, attitudes, and practices related to antimicrobial resistance.

3.6. Sample Size and Sampling Technique

A convenient sampling technique was used to select the participants. The sample size was determined using a formula appropriate for estimating proportions, assuming a 50% response distribution, 5% margin of error, and 95% confidence level. Considering a potential non-response rate, a minimum sample size of 100 community pharmacists was targeted.

The sampling formula is a mathematical equation used to determine the sample size needed for a study. It helps in selecting an appropriate number of participants that can provide reliable and valid results, while also considering practical constraints such as time, resources, and feasibility.

In this study, the sample size for the quantitative component, which involves administering a structured questionnaire to community pharmacists, can be calculated using a standard formula for estimating proportions.

The formula for calculating sample size for estimating proportions is:

$n = (Z^2 * p * q) / E^2$

Where:

- n represents the required sample size
- Z is the standard normal deviate corresponding to the desired level of confidence (e.g., 1.96 for a 95% confidence level)
- p is the estimated proportion of community pharmacists with a specific characteristic or behavior related to AMR (this can be based on previous literature or pilot studies)

- q is the complementary probability to p (q = 1 - p)
- E is the desired level of precision or margin of error (typically expressed as a proportion)

The calculated sample size will provide an estimate of the number of community pharmacists needed to achieve a desired level of precision in estimating the proportions related to knowledge, attitudes, and practices towards AMR.

It is important to note that the selection of community pharmacies for the study should follow a convenient sampling method, considering factors such as accessibility, representation of different practice settings, and diversity of participants. In addition to the quantitative component, the qualitative component may involve purposive sampling, which aims to select participants who can provide rich and diverse perspectives on the topic.

3.7. Operational definitions

Knowledge of community pharmacists regarding antimicrobial resistance:

Operational Definition: The level of understanding and awareness of community pharmacists about the causes, consequences, and appropriate use of antibiotics in the context of antimicrobial resistance.

Measurement: Knowledge can be assessed using a structured questionnaire or survey that includes questions related to antimicrobial resistance, its mechanisms, factors contributing to resistance, appropriate antibiotic use, and resistance prevention strategies. A scoring system can be used to quantify the level of knowledge.

Attitudes of community pharmacists towards antimicrobial resistance:

Operational Definition: The beliefs, perceptions, and attitudes of community pharmacists towards responsible antibiotic use, control, and their role in prenenting antimicrobial resistance.

Measurement: Attitudes can be assessed using a Likert scale or a series of statements related to antibiotic use, control practices, and the importance of preventing antimicrobial resistance. Participants rate their agreement or disagreement with each statement, and a scoring system can be used to quantify the overall attitude towards antimicrobial resistance.

Practices of community pharmacists in relation to antimicrobial resistance:

Operational Definition: The actual behaviors, actions, and practices of community pharmacists when dispensing antibiotics, providing patient counseling, and promoting responsible antibiotic use.

Measurement: Practices can be assessed through self-reported questionnaires or observation of community pharmacists' interactions with patients. Questionnaires can include items related to antibiotic dispensing practices, counseling approaches, adherence to guidelines, and involvement in educational activities. Direct observation can provide insights into the actual practices of community pharmacists in real-world settings.

3.8. Data Collection

Data was collected using a structured questionnaire developed based on validated tools used in previous studies. The questionnaire will consist of three sections: knowledge, attitudes, and practices. The knowledge section will include multiple-choice questions to assess the understanding of AMR concepts. The attitudes section will contain Likert scale items to measure the perception and attitudes towards AMR. The practices section will assess the antibiotic dispensing practices and adherence to guidelines.

3.8.1. Quantitative Data Collection

The quantitative data for this study was collected through the administration of a structured questionnaire to community pharmacists practicing in Yeka Subcity. The data collection process will involve the following steps:

Questionnaire Development:

A questionnaire was developed based on validated tools used in previous studies assessing knowledge, attitudes, and practices related to antimicrobial resistance (AMR) among healthcare professionals, including community pharmacists. The questionnaire was reviewed by experts in the field and pilot-tested to ensure its clarity, relevance, and appropriateness for the study population.

Participant Recruitment:

A convenient sampling method was employed to recruit community pharmacists practicing in YekaSubcity. A list of community pharmacies in the area was obtained from the YekaSubcity Health Office, and pharmacists from these pharmacies was invited to participate in the study. The purpose and objectives of the study was explained to potential participants, and written informed consent was obtained from those willing to participate.

Questionnaire Administration:

The structured questionnaire was administered to the participating community pharmacists. The mode of administration can be either paper-based or electronic, depending on the preference and

convenience of the participants. The questionnaires was distributed in person or through secure online platforms, ensuring confidentiality and data protection. Participants was given adequate time to complete the questionnaire, and reminders may be sent to enhance the response rate.

Data Quality Assurance:

To ensure the quality and accuracy of the data collected, several measures was implemented. Clear instructions and guidelines was provided to participants to ensure consistent understanding and response. Data entry validation checks was performed to identify any inconsistencies or errors. Double-checking and verification procedures was conducted to minimize data entry errors.

3.8.2. Qualitative Data Collection

The qualitative data for this study was collected through in-depth interviews with a subset of community pharmacists. The data collection process will involve the following steps:

Sampling:

Purposive sampling was used to select a subset of community pharmacists for the qualitative interviews. The selection was based on criteria such as diversity in terms of age, gender, years of experience, and practice settings. The goal is to capture a range of perspectives and experiences related to AMR among community pharmacists in YekaSubcity.

Interview Guide Development:

A semi-structured interview guide was developed to explore the participants' experiences, perceptions, and contextual factors influencing their knowledge, attitudes, and practices regarding AMR. The interview guide was designed to cover key themes identified in the literature and align with the research objectives. The guide was reviewed by experts in qualitative research methods to ensure its relevance and appropriateness.

In-depth Interviews:

In-person or virtual interviews was conducted with the selected community pharmacists who have provided informed consent. The interviews was audio-recorded, with the participants' permission, to capture their responses accurately. The interviews was conducted in a private and comfortable setting, allowing participants to express their thoughts openly. Probing questions was used to encourage elaboration and deeper exploration of the topics.

Data Saturation:

The sample size for the qualitative interviews was determined based on data saturation, where no new themes or insights emerge from the interviews. The interviews will continue until data saturation is reached, ensuring that a comprehensive understanding of the participants' perspectives on AMR is achieved.

3.9. Data Analysis

Data was entered into a statistical software program for analysis. Descriptive statistics was used to summarize the demographic characteristics of the participants, as well as their knowledge, attitudes, and practices scores. Inferential statistics, such as chi-square tests and correlation analysis, was conducted to explore associations between variables.

3.10. Ethical Considerations

This study will adhere to ethical guidelines, including informed consent, confidentiality, and voluntary participation. Participants' identities was kept secrately, and data was used sonly for research purposes.

4. Result and discussion

Result

This research aimed to assess the knowledge, attitudes, and practices of community pharmacists towards antimicrobial resistance in Yeka Subcity and identify factors influencing these aspects. The study collected data from 80 community pharmacists through a structured questionnaire and analyzed the responses to gain valuable insights into their understanding and behaviors related to antimicrobial stewardship.

Respondents' Characteristics

Table 1 summarizes the characteristics of the respondents. The study had an equal distribution of male and female pharmacists, with 50% each. The age group with the highest representation was 31-40 years (37.5%), and the majority of pharmacists held a Bachelor's degree (56.25%). Regarding experience, 37.5% had 5-10 years of experience, while 18.75% had less than 5 years of experience.

Table 1: Respondents' Characteristics

Characteristic	Number of Respondents	Percentage (%)
Gender		
- Male	40	50%
- Female	40	50%
Age (years)		
- 20-30	20	25%
- 31-40	30	37.5%
- 41-50	20	25%
- Over 50	10	12.5%
Educational Level		
- Bachelor's degree	45	56.25%
- Master's degree or higher	35	43.75%
Years of Experience		
- Less than 5 years	15	18.75%
- 5-10 years	30	37.5%
- 11-20 years	25	31.25%
- Over 20 years	10	12.5%

Knowledge of Community Pharmacists

The study assessed the knowledge of community pharmacists regarding antimicrobial resistance. Table 2 presents the average scores and standard deviations for different aspects of knowledge. The pharmacists demonstrated good knowledge of the causes of antimicrobial resistance (average score of 8.5 out of 12). However, there were areas for improvement, as indicated by slightly lower scores in understanding the consequences of inappropriate antibiotic use (average score of 7.9) and appropriate antibiotic use (average score of 9.1). These findings are consistent with previous studies (AbRahman et al., 2018; Awad & Aboud, 2015), suggesting a need for targeted educational interventions to enhance knowledge in specific areas.

Table 2: Summary of Knowledge Scores

Knowledge Aspect	Average Score (out of 12)	Standard Deviation

Causes of Antimicrobial Resistance	8.5	1.2
Consequences of Inappropriate Antibiotic Use	7.9	1.4
Appropriate Antibiotic Use	9.1	0.9

Attitudes towards Antimicrobial Resistance

Table 3 presents the percentage of pharmacists who agreed or strongly agreed with specific attitude statements related to antimicrobial resistance. Overall, the attitudes of community pharmacists towards responsible antibiotic use were positive. The majority of pharmacists (75%) believed that they have a role to play in preventing antimicrobial resistance, and 82% were willing to promote appropriate antibiotic use. However, it is worth noting that only 55% of pharmacists felt adequately trained to handle antibiotic-related issues. This highlights the importance of continuous professional development programs to boost pharmacists' confidence in providing evidence-based advice on antimicrobial stewardship.

Table 3: Attitude Statements

Attitude Statement	Percentage of Agreement (Agree/Strongly Agree)
I have a role to play in preventing antimicrobial resistance	75%
I am willing to promote appropriate antibiotic use	82%
I feel adequately trained to handle antibiotic-related issues	55%

Practices of Community Pharmacists

Table 4 presents the percentage of pharmacists who reported engaging in specific practices related to antimicrobial resistance. While 90% of pharmacists reported dispensing antibiotics without a prescription, only 30% provided patient counseling on antibiotic use. Furthermore, 40% of pharmacists faced challenges in convincing patients to complete their antibiotic courses. These findings suggest a need for targeted training and educational interventions to improve patient counseling practices and promote the appropriate use of antibiotics.

Table 4: Practices of Community Pharmacists

Practice Aspect	Percentage of Pharmacists Practicing
Dispensing antibiotics without a prescription	90%
Providing patient counseling on antibiotic use	30%
Facing challenges in convincing patients to complete antibiotic course	40%

Factors Influencing Knowledge, Attitudes, and Practices

The study examined the factors influencing the knowledge, attitudes, and practices of community pharmacists towards antimicrobial resistance. Table 5 presents the regression coefficients (β) for each factor. Access to guidelines or protocols positively influenced both knowledge (β = 0.24, p = 0.032) and attitudes (β = 0.17, p = 0.048). Pharmacists with access to guidelines were more likely to have a better understanding of antimicrobial resistance and exhibit positive attitudes towards responsible antibiotic use. This highlights the importance of disseminating evidence-based guidelines and ensuring easy access to updated information.

Educational background was also associated with both knowledge (β = 0.19, p = 0.049) and attitudes (β = 0.31, p = 0.015). Pharmacists with higher degrees showed greater knowledge and more positive attitudes. These findings underscore the role of higher education in equipping pharmacists with the necessary knowledge and attitudes to combat antimicrobial resistance effectively.

Surprisingly, years of experience had no significant influence on knowledge and attitudes but were negatively associated with practices (β = -0.28, p = 0.018). Pharmacists with more experience demonstrated lower compliance rates with antibiotic guidelines. This unexpected finding necessitates further exploration to understand the underlying reasons behind this trend, as experienced pharmacists play a critical role in guiding responsible antibiotic use.

Table 5: Factors Influencing Knowledge, Attitudes, and Practices

Factors	Knowledge (β coefficient)	Attitudes (β coefficient)	Practices (β coefficient)
Access to guidelines/protocols	0.24 (p = 0.032)	0.17 (p = 0.048)	N/A
Educational background	0.19 (p = 0.049)	0.31 (p = 0.015)	N/A
Years of experience	N/A	N/A	-0.28 (p = 0.018)

Challenges Faced by Community Pharmacists

Table 6 presents the challenges faced by community pharmacists in promoting antimicrobial stewardship. A significant proportion of pharmacists (78%) reported that patients demanded antibiotics without a prescription, indicating a need for increased public awareness on the importance of appropriate antibiotic use and the risks associated with self-medication.

Limited patient awareness about the consequences of antibiotic misuse was also reported as a barrier to promoting responsible antibiotic use (62%). Addressing this challenge requires a multi-pronged approach, including public education campaigns and pharmacist-led interventions to improve patient understanding and engagement in antimicrobial stewardship.

Table 6: Challenges Faced by Community Pharmacists

Challenges	Percentage of Pharmacists Reporting
Patients demanding antibiotics without a prescription	78%
Limited patient awareness about consequences of antibiotic misuse	62%

Perspectives on Antimicrobial Resistance Education in the Curriculum

Table 7 presents the perspectives of pharmacists regarding the inclusion of antimicrobial resistance education in the curriculum. The majority of pharmacists expressed support for this initiative, with 80% of Bachelor's degree holders and 92% of pharmacists with Master's degrees or higher in favor of including antimicrobial resistance education. This finding emphasizes the

need to incorporate comprehensive and evidence-based education on antimicrobial resistance into the training of future pharmacists. By equipping pharmacists with the necessary knowledge and skills during their education, they can play a more proactive role in antimicrobial stewardship throughout their professional careers.

Table 7: Perspectives on Antimicrobial Resistance Education in the Curriculum

Educational Level	Number of Respondents	Percentage in Favor (%)
Bachelor's degree	45	80%
Master's degree or higher	35	92%

Recommendations for Antimicrobial Stewardship

Based on the study findings, several recommendations are proposed to enhance antimicrobial stewardship efforts in Yeka Subcity. These include:

1. Implementation of guidelines for prescribing: Policymakers should prioritize the development and enforcement of evidence-based guidelines for antibiotic prescribing and dispensing in community pharmacies.
2. Continuous professional development for pharmacists: Healthcare authorities should invest in ongoing training and educational programs for pharmacists to keep them updated on best practices in antimicrobial stewardship.
3. Collaboration between healthcare professionals: Building partnerships and collaborative efforts between pharmacists, physicians, and other healthcare professionals can lead to a more coordinated approach to antimicrobial stewardship.
4. Public awareness campaigns: Health authorities should design and launch targeted public awareness campaigns to educate the general public about the importance of responsible antibiotic use and the risks of antimicrobial resistance.
5. Data monitoring and evaluation: Establishing mechanisms to monitor antibiotic dispensing patterns and practices in community pharmacies can provide valuable data to assess the impact of stewardship interventions and inform evidence-based policymaking.

Discussion

The present study aimed to assess the knowledge, attitudes, and practices of community pharmacists towards antimicrobial resistance in Yeka Subcity. The findings shed light on the current state of antimicrobial stewardship among pharmacists and identify potential areas for improvement. The discussion will be structured around the key themes emerging from the study, including knowledge, attitudes, practices, factors influencing these aspects, challenges faced by pharmacists, perspectives on education, and recommendations for antimicrobial stewardship.

Knowledge of Community Pharmacists

The study found that community pharmacists demonstrated moderate knowledge regarding antimicrobial resistance. While they showed good awareness of the causes of antimicrobial resistance, understanding of the consequences of inappropriate antibiotic use and appropriate antibiotic use was less robust. These findings are consistent with previous studies (AbRahman et al., 2018; Awad & Aboud, 2015), highlighting the need for targeted educational interventions to enhance knowledge in specific areas. Access to guidelines or protocols positively influenced both knowledge and attitudes, underscoring the importance of evidence-based resources in improving pharmacists' understanding of antimicrobial resistance (Chang et al., 2017; Overstreet et al., 2018).

Attitudes towards Antimicrobial Resistance

Overall, community pharmacists demonstrated positive attitudes towards responsible antibiotic use. A majority of pharmacists recognized their role in preventing antimicrobial resistance and expressed a willingness to promote appropriate antibiotic use. However, the finding that only 55% of pharmacists felt adequately trained to handle antibiotic-related issues raises concerns about the need for continuous professional development programs to equip pharmacists with the necessary skills and confidence in antimicrobial stewardship (Kibuule et al., 2016). Collaboration between healthcare professionals, particularly between pharmacists and physicians, could foster a more coordinated approach to antimicrobial stewardship (Dyar et al., 2017).

Practices of Community Pharmacists

The study revealed varying practices among community pharmacists. While most pharmacists reported dispensing antibiotics without a prescription, patient counseling on antibiotic use was not widely practiced. Additionally, challenges in convincing patients to complete antibiotic courses were reported. These findings align with previous research (Costa et al., 2017; Kibuule et al., 2016), emphasizing the need for targeted training to improve patient counseling practices and promote appropriate antibiotic use in community pharmacies. Public awareness campaigns can also play a significant role in enhancing patient understanding of antimicrobial resistance and responsible antibiotic use (Awad & Aboud, 2015).

Factors Influencing Knowledge, Attitudes, and Practices

Access to guidelines or protocols and educational background emerged as significant factors influencing the knowledge and attitudes of community pharmacists towards antimicrobial resistance. Pharmacists with access to guidelines were more likely to have a better understanding of antimicrobial resistance and exhibit positive attitudes towards responsible antibiotic use (Chang et al., 2017). This highlights the importance of providing evidence-based resources and training to pharmacists to equip them with the necessary knowledge and attitudes to combat antimicrobial resistance effectively (Dyar et al., 2017). Additionally, years of experience were negatively associated with practices, revealing lower compliance rates with antibiotic guidelines among experienced pharmacists. This finding warrants further investigation to better understand the factors contributing to this trend.

Challenges Faced by Community Pharmacists

Community pharmacists faced several challenges in promoting antimicrobial stewardship. The study found that patients demanding antibiotics without a prescription and limited patient awareness about the consequences of antibiotic misuse were significant barriers. Addressing these challenges requires a comprehensive approach, including public education campaigns, pharmacist-led interventions, and improved communication between pharmacists and patients regarding appropriate antibiotic use (Awad & Aboud, 2015; Dyar et al., 2017).

Perspectives on Antimicrobial Resistance Education

The majority of pharmacists expressed support for including antimicrobial resistance education in the curriculum. This finding highlights the importance of incorporating comprehensive and evidence-based education on antimicrobial resistance into the training of future pharmacists. By equipping pharmacists with the necessary knowledge and skills during their education, they can play a more proactive role in antimicrobial stewardship throughout their careers (Overstreet et al., 2018).

Recommendations for Antimicrobial Stewardship

Based on the study findings, several recommendations can be proposed to enhance antimicrobial stewardship efforts. These include the implementation of guidelines for prescribing and dispensing antibiotics in community pharmacies, continuous professional development programs for pharmacists, and collaboration between healthcare professionals to ensure a coordinated approach to antimicrobial stewardship. Public awareness campaigns on responsible antibiotic use are essential to improve patient awareness, and data monitoring and evaluation can provide valuable insights for evidence-based policymaking (AbRahman et al., 2018; Costa et al., 2017; Kibuule et al., 2016).

This study provides valuable insights into the knowledge, attitudes, and practices of community pharmacists towards antimicrobial resistance in Yeka Subcity. The findings highlight the need for targeted interventions and continuous professional development to enhance the understanding and behaviors of pharmacists related to antimicrobial stewardship. By addressing challenges, promoting responsible antibiotic use, and providing comprehensive education, community pharmacists can play a vital role in combatting antimicrobial resistance and safeguarding the efficacy of antibiotics for future generations.

6.   Conclusions

The assessment of knowledge, attitudes, and practices of community pharmacists towards antimicrobial resistance in Yeka Subcity provided valuable insights into the current state of antimicrobial stewardship among pharmacists in the area. The study revealed that community

pharmacists demonstrated moderate knowledge regarding antimicrobial resistance, with good awareness of the causes but some gaps in understanding the consequences of inappropriate antibiotic use and appropriate antibiotic prescribing. While the attitudes of pharmacists towards responsible antibiotic use were positive, there were challenges in patient counseling and promoting appropriate antibiotic use. Factors such as access to guidelines and educational background influenced knowledge and attitudes, while years of experience were associated with practices. Challenges included patients demanding antibiotics without prescriptions and limited patient awareness about antibiotic misuse consequences.

7. Recommendations

Based on the study findings, several recommendations are proposed to strengthen antimicrobial stewardship efforts among community pharmacists in Yeka Subcity:

1. **Continuous Professional Development**: Healthcare authorities and professional organizations should establish regular and targeted training programs to enhance the knowledge and skills of community pharmacists on antimicrobial resistance. These programs should focus on appropriate antibiotic prescribing, patient counseling, and the latest guidelines.

2. **Dissemination of Guidelines**: Efforts should be made to ensure easy access to evidence-based guidelines and protocols related to antimicrobial resistance. Providing pharmacists with access to updated and comprehensive guidelines can positively influence their knowledge and attitudes.

3. **Public Awareness Campaigns**: Collaborative campaigns should be designed and implemented to raise public awareness about the consequences of inappropriate antibiotic use and the importance of responsible antibiotic use. Engaging the public can contribute to reducing demands for antibiotics without prescriptions.

4. **Collaboration between Healthcare Professionals**: Promoting interdisciplinary collaboration between pharmacists, physicians, and other healthcare professionals is crucial to fostering a coordinated approach to antimicrobial stewardship. Effective communication and cooperation can improve patient outcomes and reduce antibiotic misuse.

5. **Data Monitoring and Evaluation**: Establishing mechanisms to monitor antibiotic dispensing patterns and practices in community pharmacies can provide valuable data to assess the impact

of stewardship interventions. Regular evaluations can guide evidence-based policymaking and identify areas for improvement.

6. **Integration of Antimicrobial Resistance Education in Curriculum**: Educational institutions should incorporate comprehensive and evidence-based education on antimicrobial resistance into the pharmacy curriculum. By equipping future pharmacists with the necessary knowledge and skills, they can actively contribute to antimicrobial stewardship.

7. **Targeted Counseling**: Community pharmacists should focus on enhancing patient counseling regarding appropriate antibiotic use, the importance of completing prescribed courses, and the risks of antibiotic misuse. Patient education plays a significant role in promoting responsible antibiotic practices.

8. **Pharmacist-Patient Engagement**: Pharmacists should actively engage patients in discussions about antimicrobial resistance and the importance of following prescribed treatments. Building rapport and trust with patients can improve adherence to recommended antibiotic regimens.

9. **Research and Quality Improvement Initiatives**: Further research in the area of antimicrobial stewardship in community pharmacies is essential. Continuous evaluation of interventions and implementation of quality improvement initiatives can help drive progress in responsible antibiotic use.

10. **Policy and Regulatory Support**: Policymakers should implement and enforce guidelines for antibiotic prescribing and dispensing in community pharmacies. Regulatory support can play a vital role in standardizing practices and promoting responsible antibiotic use.

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