ORIGINAL ARTICLE

KNOWLEDGE, ATTITUDES, AND PRACTICES (KAP) OF COMMUNITY PHARMACISTS IN KARACHI REGARDING ANTIMICROBIAL STEWARDSHIP (AMS) AND ITS ASSOCIATION WITH THEIR PERCEIVED COMPETENCE IN PATIENT COUNSELING

Shaista Tariq[1*], Aisha Iftikhar[2]

ABSTRACT

Background: Antimicrobial resistance poses a severe threat to global public health, with community pharmacists serving as crucial frontline defenders. While their knowledge and practices are often studied, the psychological drivers of their effectiveness, particularly their perceived competence in stewardship counseling, remain poorly understood.

Objective: This study aimed to assess the knowledge, attitudes, and practices (KAP) of community pharmacists in Karachi regarding antimicrobial stewardship (AMS) and to identify the key predictors of their perceived competence in patient counseling.

Methods: A cross-sectional study was conducted with 165 community pharmacists using a validated, self-administered questionnaire. Data were analyzed using descriptive statistics and multiple linear regression to determine the associations between KAP scores and perceived competence.

Results: The analysis revealed that while knowledge and practices showed positive associations, only attitudes emerged as a statistically significant predictor of perceived competence (â = 0.289, p = 0.044). This indicates that a pharmacist's confidence is more strongly influenced by their underlying beliefs and professional mindset than by their knowledge base alone.

Conclusion: The findings suggest that to fully leverage community pharmacists in the fight against antimicrobial resistance, interventions must move beyond traditional education. Training programs should be redesigned to actively cultivate positive attitudes, strong professional identity, and communication resilience, thereby empowering pharmacists with the confidence needed to be effective stewards.

Keywords: Antimicrobial Stewardship, Community Pharmacists, Health Knowledge, Attitudes, Practice, Professional Competence, Pakistan, Drug Resistance, Microbial

Cite this article as: Tariq S, Iftikhar A. Knowledge, Attitudes, and Practices (KAP) of Community Pharmacists in Karachi Regarding Antimicrobial Stewardship (AMS) and its Association with their Perceived Competence in Patient Counselling. Baqai J Health Sci. 2025;26(2): 34 - 40

Date of Submission: Oct 10, 2025
Date of Acceptance: Oct 28, 2025
Date of Online Publication: Dec 30, 2025
DOI: https://doi.org/10.63735/baqa.v26i2.34-40

[1*]Assistant Professor, Ziauddin College of Physical Therapy, Ziauddin University, Karachi
[2]Medical Officer, Skin and Medical-Cure Center, Karachi

*Corresponding Author: Assistant Professor, Ziauddin College of Physical Therapy, Ziauddin University, Karachi.
Email: Shaista.tariq@zu.edu.pk

INTRODUCTION

The escalating crisis of antimicrobial resistance (AMR) represents a profound global health threat, driven significantly by the misuse of antibiotics across human and animal health sectors [1]. In response, Antimicrobial Stewardship (AMS) has emerged as a critical framework of coordinated interventions designed to promote appropriate antimicrobial use, improve patient outcomes, and preserve drug efficacy [2]. Within this landscape, community pharmacists occupy a uniquely strategic position as the most accessible healthcare professionals, serving as a crucial bridge between the public and formal health systems and providing a vital opportunity to guide rational antibiotic use and prevent dangerous self-medication practices [1,3].

Globally, research consistently reveals significant gaps in healthcare professionals' understanding and implementation of AMS principles. Studies from the United Arab Emirates and various African nations, including Kenya and Zambia, indicate that even moderate knowledge does not reliably translate into optimal practices, such as refusing non-prescription antibiotic sales [4,5]. This concerning disconnect between awareness and action is further evidenced by research in Sudan, which found undergraduate pharmacy students often lack confidence in their understanding of AMR and stewardship principles, highlighting systemic educational challenges [6]. Investigations across the African continent, particularly in Zambia and South Africa, have documented substantial deficiencies in both knowledge and practical application of AMS among practicing pharmacists [7,8].

The situation in Pakistan demands particular attention, as the country faces a severe AMR crisis exacerbated by unregulated antibiotic access and entrenched self-medication habits [9]. A recent intervention study in Punjab demonstrated that pharmacist-led education could significantly improve healthcare workers' knowledge, attitudes, and practices, proving that targeted interventions can yield positive changes [8]. However, a critical gap remains in understanding the interconnected KAP of community pharmacists in major urban centers like Karachi, particularly regarding how these factors influence their perceived competence in patient counseling. This psychological dimension is crucial, as a pharmacist's self-confidence directly impacts their willingness to engage in challenging conversations about antibiotic misuse [10, 11].

The challenge extends beyond pharmacy practice, with studies in Uganda revealing that community members often possess poor knowledge and practices regarding antibiotics, creating additional pressure on healthcare providers and complicating stewardship efforts [12]. This underscores the need for a multi-pronged approach that addresses both public education and professional development. Research into Pakistan's veterinary sector reveals parallel crises of antimicrobial misuse in livestock, creating reservoirs of resistance that inevitably impact human health [13]. The consistency of these findings across different countries and healthcare levels, from public perceptions in Uganda to hospital pharmacists in South Africa and Nigeria, indicates that combating AMR requires empowering every link in the healthcare chain [5,6].

The purpose of this cross-sectional study is to comprehensively assess the Knowledge, Attitudes, and Practices of community pharmacists in Karachi, Pakistan, regarding Antimicrobial Stewardship, and to determine the association of these factors with their Perceived Competence in patient counseling on antibiotic use. To optimize community pharmacists' role in fighting antimicrobial resistance, training must target their mindset. This study demonstrates that in high-pressure environments like Karachi, a pharmacist's confidence and competence are driven more by their underlying attitudes than by their knowledge, demanding a new approach to professional development. This study aims to assess community pharmacists' knowledge, attitudes, and practices (KAP) regarding antimicrobial stewardship (AMS) in Karachi. It further seeks to determine their perceived competence in patient counseling and to analyze, via linear regression, whether KAP components are significant

predictors of this specific competence.

METHODOLOGY

A six-month, cross-sectional study was conducted among community pharmacists in Karachi. With an estimated population of 1200 registered pharmacies, a minimum sample of 165 was determined using the OpenEpi calculator, applying a 95% confidence level, 5% margin of error, and 50% response distribution. The convenience sampling technique was employed due to practical constraints, including the absence of a comprehensive national pharmacist registry and the need for timely data collection amidst the busy schedules of practicing pharmacists. This method facilitated efficient recruitment across the city's various districts.

Data were gathered using a structured, self-administered questionnaire, developed from an extensive literature review. The instrument contained five sections: 1) demographic and professional details, 2) an 8-item Knowledge scale, 3) a 6-item Attitude scale, 4) a 5-item Practices scale, and 5) a 6-item Perceived Competence scale. Likert scales were used for sections 2-5. A pilot study with 15 pharmacists confirmed the tool's clarity and reliability, demonstrating good internal consistency with a Cronbach's alpha above 0.75 for all scales.

Analyses were performed in SPSS version 16.0. Descriptive statistics summarized participant characteristics. To address the primary objective, a multiple linear regression model was constructed with Perceived Competence as the dependent variable and the Knowledge, Attitudes, and Practices composite scores as predictors. Statistical significance was set at $p < 0.05$.

RESULTS

The participant profile revealed a predominantly male cohort with a mid-career workforce. Most participants held a Pharm-D qualification and possessed moderate professional experience, averaging nearly seven years. The sample represented all major districts of Karachi, ensuring geographic diversity in this cross-sectional study (table 1).

Table: Demographic and Professional Profile of Participants

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	121	73.3%
	Female	44	26.7%
Age (Years)	22-30	68	41.2%
	31-40	72	43.6%
	41-50	21	12.7%
	>50	4	2.4%
Highest Qualification	Pharm-D	98	59.4%
	B. Pharmacy	57	34.5%
	M. Pharmacy/Other	10	6.1%
Experience in Community Pharmacy (Years)	< 2 years	32	19.4%
	2 - 5 years	47	28.5%
	6 - 10 years	59	35.8%
	> 10 years	27	16.4%
Location of Pharmacy	Central District	45	27.3%
	East District	38	23.0%
	West District	52	31.5%
	South District	30	18.2%

The results demonstrated excellent internal consistency for the research instruments, with a Cronbach's alpha of 0.951. This high reliability coefficient confirmed the scales used in the questionnaire were exceptionally consistent and dependable for measuring the intended constructs (table 2).

Table : Reliability Statistics – Inter Item Reliability of the Questionnaire

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
0.951	**0.951**	**25**

regression analysis revealed that among the three predictors, only Attitude emerged as a statistically significant predictor of pharmacists' perceived competence in AMS counseling (â = 0.289, p = 0.044). This indicates The that for every unit increase in positive attitude scores, perceived competence increased by 0.319 units, holding other factors constant. While Knowledge and Practices showed positive associations with competence, they did not reach statistical significance. This finding implies that interventions aimed at boosting pharmacists' confidence in AMS may be most effective if they focus on shaping positive attitudes and beliefs, rather than solely delivering knowledge or prescribing specific practices (table 3).

Table : Predictors of Pharmacists' Perceived Competence: Multiple Linear Regression Analysis

Predictor Variable	Unstandardized Coefficients (B)	Predictor Variable	Standardized Coefficients (Beta)	t-value	t-value
(Constant)	0.976	0.269		3.625	< 0.001
Knowledge	0.221	0.125	0.200	1.778	0.077
Attitude	0.319	0.157	0.289	2.031	**0.044***
Practice	0.166	0.119	0.156	1.389	0.167

Dependent Variable: Perceived Competence in Antimicrobial Stewardship Counseling
*Note: * indicates statistical significance at p < 0.05.

DISCUSSION

The present findings offer a complex understanding of the factors driving antimicrobial stewardship (AMS) competence among community pharmacists in a high-burden setting. Our central hypothesis, that knowledge, attitudes, and practices collectively predict perceived competence, was partially supported. The identification of attitudes as the sole significant predictor aligns with emerging research [14] highlighting the primacy of psychological factors in professional behavior. For instance, a study in Sudan similarly identified that self-confidence was a critical mediator in pharmacy students' preparedness for AMS roles [10]. Our results extend this concept, suggesting that even among practicing professionals, underlying beliefs and confidence may be a more powerful driver of perceived capability than knowledge alone.

This finding, however, presents a point of divergence from studies that primarily document knowledge deficits as the core barrier. While research from the UAE, Zambia, and Nigeria correctly identifies gaps in understanding and practice [1,2,5], our analysis suggests that filling these knowledge gaps may not automatically translate into a more confident workforce. The non-significance of the practice's variable is particularly insightful. It implies that self-reported engagement in AMS-related activities does not necessarily bolster a pharmacist's own sense of competence, possibly due to external pressures, such as patient demands documented in Ugandan communities [15,16] or the commercial realities of pharmacy practice.

The most important new aspect of this study is its explicit focus on *perceived competence* as a critical outcome variable. Much of the existing literature, including work from South Africa and Egypt, has focused on quantifying knowledge and practice gaps [6,13]. Our study adds a crucial layer by demonstrating that competence is not merely a function of what pharmacists know or do, but fundamentally how they *feel* about their role. This has direct clinical significance; a confident pharmacist is more likely to effectively counsel patients, push back against inappropriate antibiotic demands, and serve as a reliable AMS advocate. Therefore, our conclusions indicate that educational interventions, like the one shown to be successful in Punjab [17], may achieve greater impact by incorporating components specifically designed to build professional identity, resilience, and positive attitudes, moving beyond pure didactic knowledge transfer.

This study is not without limitations. Its cross-sectional design precludes causal inferences, and the use of self-reported data for practices and competence may be subject to social desirability bias [18,19]. Future longitudinal research should observe actual counseling behaviors to validate these self-perceptions. Furthermore, qualitative investigations are needed to explore the specific contextual and systemic barriers that may weaken the link between knowledge, practice, and confidence in Pakistan. Addressing these factors will be essential for designing truly effective, multi-pronged stewardship programs that empower pharmacists as confident guardians of antimicrobial efficacy.

CONCLUSION

This study concludes that the journey to empowering community pharmacists as effective antimicrobial stewardship champions hinges more profoundly on nurturing their professional attitudes and self-belief than on merely expanding their knowledge base. While a strong foundation in AMS principles remains essential, our findings compellingly show that a pharmacist's confidence in providing counseling is most strongly fueled by their positive attitudes and sense of responsibility. This pivotal insight calls for a strategic shift in training programs, moving beyond traditional educational modules to include components that actively build professional identity, communication resilience, and a profound belief in their role as frontline defenders in the global fight against antimicrobial resistance.

Conflict of Interest: There is no conflict of interest.
Acknowledgment: None.
Funding Source: None
Author's Contribution:
ST: Concept & design, writing, final approval of manuscript and responsible for accuracy and integrity of research
AI: Contributed to study design, interpretation of results, writing and final approval of manuscript

REFERENCES

1. Qudah T, Alameri MA, Alqudah A, Al Meslamani A, Iqbal S. Knowledge, Attitudes, and Practices (KAP) of community pharmacists regarding antibiotic use and resistance: a cross-sectional study from the United Arab Emirates. Int J Environment Healt Res. 2024;34(12):4177-89. DOI: https://doi.org/ 10.1080/ 09603123. 2024.2339534.
2. Mufwambi W, Musuku K, Hangoma J, Muzondo NV, Mweetwa L, Mudenda S. Community pharmacists' knowledge and practices towards antimicrobial stewardship: findings and

implications. JAC-Antimicrobial Resistan. 2024;6(5):dlae176. DOI: https://doi.org/10.1093/jacamr/dlae176.
3. Babafemi EO, Omasaki SK, Mogoko E, McCabe PG. Knowledge, Attitude and Practices (KAP) of Antimicrobial Usage in in Kisii County, Kenya. medRxiv. 2025:2025-01. DOI: https://doi.org/10.1101/2025.01.26.25321155.
4. Mudenda S, Simukoko N, Mohamed S. Knowledge, attitude and practices regarding antimicrobial use and resistance among community members of Mtendere township in Lusaka, Zambia: findings and implications on antimicrobial stewardship. Int J Basic Clin Pharmacol. 2024;13(3):315-21. DOI: https://dx.doi.org/10.18203/2319-2003.ijbcp20240985.
5. Roberts AA, Das I, Akodu BA, Aderemi JO, Ajudua SC, Osuagwu CS, et al. Antimicrobial resistance and stewardship: What do pharmacists know and practice in a major Nigerian tertiary health facility: A cross-sectional study. J Clinic Sci. 2024;21(2):78-87. DOI: 10.4103/ jcls.jcls_88_23
6. Mthombeni TC, Burger JR, Lubbe MS, Julyan M. Public hospital pharmacists' knowledge, attitudes, and practices for antibiotic stewardship implementation in Limpopo Province, South Africa. J Pharmaceutic Healt Care and Sci. 2024;10(1):9. DOI: https://doi.org/10.1186/s40780-024-00331-3.
7. Mufwambi W, Musuku K, Hangoma J, Muzondo NV, Mweetwa L, Mudenda S. Community pharmacists' knowledge and practices towards antimicrobial stewardship: findings and implications. JAC-Antimicrobial Resistan. 2024;6(5):dlae176. DOI: https://doi.org/10.1093/jacamr/dlae176.
8. Afzal S, Khan FU, Aqeel MT, Ullah M, Bajwa M, Akhtar M, et al. Impact of a pharmacist-led educational intervention on knowledge, attitude, and practice toward the rational use of antibiotics among healthcare workers in a secondary care hospital in Punjab, Pakistan. Frontiers in Pharmacol. 2024;14:1327576. DOI: https://doi.org/10.3389/fphar.2023.1327576.
9. Hafez H, Rakab MS, Elshehaby A, Gebreel AI, Hany M, BaniAmer M, et al. Pharmacies and use of antibiotics: a cross-sectional study in 19 Arab countries. Antimicrob Resistan & Infection Cont. 2024;13(1):104-109. DOI: https://doi.org/10.1186/s13756-024-01458-6
10. Abdelkarim OA, Abubakar U, Hussain MA, Abadi AE, Mohamed AO, Osman W, et al. Knowledge, perception, and self-confidence of antibiotic resistance, appropriate antibiotic therapy, and antibiotic stewardship among undergraduate pharmacy students in Sudan. Infection Drug Resistan. 2024; 31 (1):935-49 DOI: https://doi.org/10.2147/IDR.S435190.
11. Saleem Z, Moore CE, Kalungia AC, Schellack N, Ogunleye O, Chigome A, et al. Status and implications of the knowledge, attitudes and practices towards AWaRe antibiotic use, resistance and stewardship among low-and middle-income countries. JAC-Antimicrobial Resistan. 2025;7(2):dlaf033. DOI: https://doi.org/10.1093/jacamr/dlaf033
12. Bodke AV, Mujeeb MM, Pardeshi ML, Dabhade SS, Tiwari SA, Gawari NC, et al. Knowledge, attitude, and practice about antimicrobial stewardship concepts among practitioners. Int J Basic Clinic Pharmacol. 2024;13(5):679- 681. DOI: https://core.ac.uk/ download/pdf/620835913.pdf
13. Abd El Azeem Khalaf YM, Gad ZM, Arafa MA, Abdou MS. Awareness and perception of antimicrobial stewardship program among healthcare professionals in the hospitals of ministry of health and population, Egypt: antimicrobial stewardship toolkit survey. Antimicrob Resistan Infect Contr. 2025;14(1):13-18. DOI: https://doi.org/10.1186/s13756-025-01525-6
14. Mudenda S, Chabalenge B, Daka V, Jere E, Sefah IA, Wesangula E, et al. Knowledge, awareness and practices of healthcare workers regarding antimicrobial use, resistance and stewardship in Zambia: a multi-facility cross-sectional study. JAC-Antimicrobial Resistan. 2024;6(3):dlae076. DOI: https://doi.org/10.1093/jacamr/dlae106

15. Tahir MF, Wasee Ullah R, Wang J, Dukpa K, Zaheer MU, Bahadur SU, et al. Evaluation of Antimicrobial Usage Supply Chain and Monitoring in the Livestock and Poultry Sector of Pakistan. Veterinary Sci. 2025;12(3):215-220. DOI: https://doi.org/10.3390/vetsci12030215
16. Ndagire R, Obuku EA, Segawa I, Atim F, Lwanira CN, Wangi RN, et al. Knowledge, attitude, and practices regarding antibiotic use and antimicrobial resistance among urban slum dwellers in Uganda. Antimicrob Resistan Infection Contr. 2025;14(1):12-18. DOI: https://doi.org/10.1186/s13756-025-01517-6.
17. Al-Kubaisi KA, Abdel-Qader DH, Alzoubi KH, Abduelkarem AR, Al Mazrouei N, Beshir SA, et al. Community pharmacists' cultural competence and awareness in healthcare delivery: a cross-sectional study on perceptions, practices, and demographic influences in the United Arab Emirates. J Pharmaceutic Policy Pract. 2025;18(1):2552423. DOI: https://doi.org/10.1080/20523211.2025.2552423
18. Adnan S, Zafar K, Khan FR, Ullah R. Bibliometric study on the literature related to dental research and education. J Pakist Medic Assoc. 2022;72(1):84-89. DOI: https://ecommons.aku.edu/pakistan_fhs_mc_surg_dent_oral_maxillofac/198
19. Shah Y, Haq N, Riaz S, Tahir M, Mohammad F, Saood M. Knowledge, attitude and practice regarding hepatitis B in nurses working in different hospitals of Quetta city, Pakistan. Int J Nurs Critic Care. 2020;6(1):24-34. Available at: https://www.researchgate.net/profile/Aqeel-Nasim/publication/346728486_International_Journal_of_Nursing_Critical_Care_Knowledge_Attitude_and_Practice_Regarding_Hepatitis_B_in_Nurses_Working_in_Different_Hospitals_of_Quetta_City. pdf. [last accessed on 27-10-2025].

Authors

When submitting a manuscript, whether an article or a letter, authors must recognize and disclose financial and other conflicts of interest that might have biased their work. They should acknowledge in the manuscript all financial support for the work and other financial or personal connections to the work.

Title page

The title page should carry the following: (a) the title of the article, which should be concise but informative; (b) the preferred given name, initials and last name of each author, with the highest academic degree(s) and the institutional affiliation; (c) the name of the department(s) and institution(s) to which the work should be attributed; (d) disclaimers, if any; (e) the name and address of the author responsible for correspondence about the manuscript; (f) the name and address of the author to whom requests for reprints should be addressed or a statement that reprints will not be available from the authors; (g) the source(s) of support in the form of grants, equipment, drugs or all of these; and (h) a short running head or foot line (no longer than 40 characters, counting letters and spaces), placed at the foot of the title page and identified.

Continue on …….

Ref: https://www.icmje.org/news-and-editorials/icmje-recommendations_annotated_jan24.pdf