

Knowledge, Attitude and Practice of Pharmacy Professionals Against Dispensing Antibiotics Without Prescription in Ethiopia

Kaleab Taye Haile ¹, Abdella Birhan Yabeyu ²

¹Department of Pharmaceutics and Social Pharmacy, University of Gondar, Gondar, Ethiopia; ²Department of Pharmacy, Ambo University, Ambo, Ethiopia

Correspondence: Kaleab Taye Haile, Department of Pharmaceutics and Social Pharmacy, University of Gondar, Gondar, Ethiopia, Email teezysam@gmail.com

Introduction: Antibiotic resistance is a global public health threat that warrants immediate intervention. Dispensing of antibiotics without prescription (DAWP), is an inappropriate practice that contributes significantly to the emergence and spread of antibiotic resistance. The current study aimed to assess the knowledge, attitude and practice of community pharmacists and pharmacy assistants towards DAWP.

Methods: A cross-sectional study was conducted, and data was collected from community pharmacists and pharmacy assistants during the eighth national pharmacist's day, which was held on December 4, 2021, in Addis Ababa, Ethiopia. A pre-tested self-administered questionnaire comprise of four sections (socio-demographic characteristics, and knowledge, attitude and practice towards DAWP) was used. The data was analyzed using SPSS version 26 and descriptive statistics (mean, percentage, standard deviation) were computed. Binary logistic regression was used to predict determinates of DAWP.

Results: A total of 175 community pharmacy professional were invited in the study, with 158 (111 pharmacists and 47 pharmacy assistants) completing the survey for 90.3% response rate. Most of the participants (86.7%) were aware that DAWP is illegal in Ethiopia. Despite their knowledge, the extent of DAWP was found to be 67.7%. The most common reason given by study participants for DAWP was that most patients do not want to consult prescribers unless the infection appears serious (53.2%). Pharmacy professionals with educational background of masters and above (AOR= 0.354, 95% CI: 0.013–0.744, P= 0.045), and with two to five years of working in community pharmacy (AOR= 0.745, 95% CI: 0.595–0.933, P= 0.010) had a lower tendency to DAWP, respectively.

Conclusion: Despite majority of pharmacy professional are aware that DAWP is illegal and contributes to antibiotic resistance, they commonly DAWP for common cold and diarrheal diseases. Strict enforcement of existing antibiotic supply policies, and ongoing educational support for community pharmacy professionals on the judicious use of antibiotics is recommended.

Keywords: community pharmacy, dispensing antibiotics without prescription, Ethiopia, pharmacy professionals

Introduction

Antibiotic resistance is a global public health threat that warrants immediate intervention.¹ Dispensing of antibiotics without prescription (DAWP), is a major contributor to the overuse and misuse of antibiotics.^{2–5} It has been reported that antimicrobial-resistant agents are common in communities due to non-prescription use of antimicrobials. Multidrug-resistant organisms have been shown to be caused by the inappropriate use of antibiotics, include methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant Enterococci species, carbapenemase-producing Enterobacteriaceae, and Gram-negative bacteria that produce extended spectrum beta-lactamases becomes prevalent.^{3,6–9} To deal with this issue, 68th world health assembly passed a resolution on World Health Organization recommendations based on the global action plan for antimicrobial resistance, that directs all member states to establish a national strategic plan for the antimicrobial resistance.^{5,10,11}

Community pharmacies and drug stores are the main sources of antimicrobials, healthcare professionals especially pharmacy professionals, play a major role in DAWP impacted by myriad factors.^{3,6,12–14} Accessibility of community pharmacies, customer pressure, time and financial cost, weak regulatory enforcement mechanisms, and patients' trust in pharmacy professionals are the commonly quoted determinants of DAWP.^{3,6,13,15–18}

Self-medication and DAWP in drug retail outlets is inappropriate practice that can accelerate the emergence and spread of antibiotic resistance.^{19,20} According to the World Health Organization latest estimate, the annual worldwide death toll due to antimicrobial resistance can be as high as 50,000.²¹ Although, DAWP in the developed world is minimal,^{19,20} the problem is much higher in Africa and other low-income countries.^{17,22–24}

Accessibility and availability are commonly involved in public health issues, particularly in circumstances with limited resources. About the usage of primary healthcare and its contribution to universal health coverage, detailed and systematic data are scarce in Ethiopia.^{25–27} To the best of authors literature review, the knowledge, attitude and practice of DAWP is not studied in Ethiopia, knowing this could help in identifying potential areas that contribute to DAWP. Hence, the current study aimed to assess the knowledge, attitude and practice of community pharmacists and pharmacy assistants towards DAWP, Addis Ababa, Ethiopia.

Methods

Study Design, Period and Setting

A cross-sectional study was carried out among community pharmacists and pharmacy assistants on December 4, 2021 in Addis Ababa, Ethiopia.

Population

Source population of the study were all pharmacists and pharmacy assistants working in community pharmacies or drug stores in Addis Ababa, Ethiopia. Whereas study population included all pharmacists and pharmacy assistants working in community pharmacies or drug stores in Addis Ababa who attended the 8th National Pharmacist Day on December 4th, 2021, in Addis Ababa, Ethiopia.

Sampling and Eligibility Criteria

The data was gathered during the eighth national pharmacist's day, which was held on December 4th, 2021, in Addis Ababa, Ethiopia, with the theme "Pharmacists Your Medicine Experts and Health Service Front Liners." The questioner was distributed to all of the pharmacists and pharmacy assistants who attended the conference, and the study included all pharmacy professionals who were willing to participate in the study. Pharmacy professionals with less than 6 months of experience working in community pharmacy were excluded (they work under supervision of the license holders, they hardly provide pharmaceutical services independently).

Data Collection Instrument, Procedure and Quality Assurance

A thorough search of electronic databases was conducted, and relevant studies were reviewed in order to prepare the questionnaire for the current study.^{13,28–32} The questionnaire was prepared in English first, then translated into the local language (Amharic), and then back into English to ensure meaning equivalence between the English and Amharic versions. Experts from a pharmacy school of Ambo University assessed the face and content validity of the questioner. The questionnaire had four sections. The first of which deals with the socio demographic characteristics of respondents. Second, third, and fourth sections addressed the knowledge, attitude, and practice of DAWP. For each question, respondents had three options: "yes", "no", and "I don't know."

Five pharmacists (B.Pharm) were recruited for the data collection and given a two-day training to ensure consistency in their understanding and interpretation of the study instrument, as well as uniform implementation. Prior to the actual data collection, a pre-test on 25 community pharmacists and pharmacy assistants was performed to evaluate the validity of the instrument, the Cronbach's alpha score was 0.858.

Data Analysis

The collected data was checked for completeness, sorted, and categorized accordingly. Then, the data was entered into SPSS version 26 and mean, percentage, standard deviation were computed to describe the data and tables, and figures

were used to summarize the descriptive statistics. To predict the determinants of the practice of DAWP, binary logistic regression was used, with a p-value of <0.05 considered statistically significant.

Results

Socio-Demographic Characteristics

A total of 175 community pharmacists and pharmacy assistants were approached, and 158 of them were voluntary and completed back the survey, giving a response rate of 90.28%. The majority of the study participants were males (62.0%). The mean \pm SD age of the study participants was 31.76 \pm 7.88 years, range from 23–60. More than 2/3rd (67.1%) of the respondents have 2–5 years' of experience in the community pharmacy. Nearly one-fourth of study participants (24.1%) employed under chain type of community pharmacies (Table 1).

Table 1 Socio-Demographic Characteristics of Study Participants, Addis Ababa, Ethiopia, (N= 158)

Variables	Number (%)
Gender	
Male	97 (61.4)
Female	61 (38.6)
Age category	
<25	24 (15.2)
26–40	112 (70.9)
>41	22 (13.9)
Qualification	
Diploma	47 (29.7)
Degree	96 (60.8)
Masters and above	15 (9.5)
Job status	
Owner	35 (22.2)
Staff pharmacist	123 (77.8)
Types of community pharmacy	
Chain	38 (24.1)
Under government	58 (36.7)
Independent	62 (39.2)
Years of experience	
6–12 months	17 (10.1)
1–2 years	32 (20.3)
2 years - 5 years	58 (36.7)
>5 years	51 (32.9)

(Continued)

Table 1 (Continued).

Variables	Number (%)
Job types	
Full time	111 (70.3)
Par time	47 (29.7)
Approximate number antibiotics dispensed per day	
<100	98 (62.0)
100–300	44 (27.8)
>300	16 (10.2)

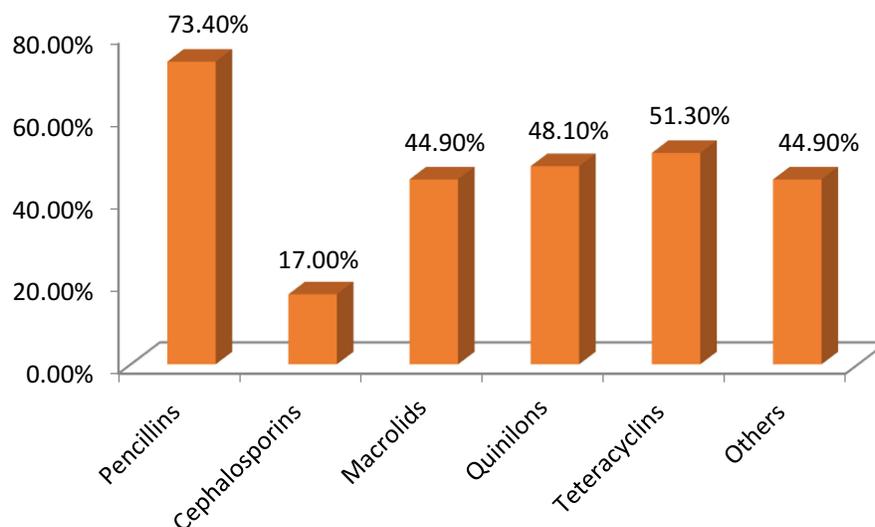
Type of Antibiotics and Indications for DAWP

Penicillin (73.4%) and tetracycline (51.3%) were the most commonly dispensed antibiotics without prescription followed by macrolides (44.9%) (Figure 1).

In terms of medication route, study participants revealed that antibiotics were commonly dispensed via the oral route (88.0%), followed by topical medication (70.3%). The most common reason for DAWP was a common cold (76.6%), followed by diarrheal disease (70.9%) (Table 2).

Knowledge Towards DAWP

Almost all respondents were aware that DAWP contribute to the development of antibiotics resistance (151, 95.6%), and that antibiotic resistance is becoming a public health issue (149, 94.3%). Majorities of them predicted the problem with DAWP (147, 93.3%). A higher percentage of respondents recognized that DAWP is a major contributor to the development of inappropriate use of antibiotics by the patients (138, 87.3%), that DAWP is not legal practice in Ethiopia (137, 86.7%), and that pharmacist should stop DAWP (146, 92.4%). Nearly two-thirds of the respondents believe that DAWP is common practice among community pharmacies in Ethiopia (99, 62.6%) (Table 3).



Others: chloramphenicol; cotrimoxazole

Figure 1 Types of dispensed antibiotics without prescription, Addis Ababa, Ethiopia, (n= 158).

Table 2 Type of Antibiotics and Indications for Dispensing Antibiotics Without Prescription, Addis Ababa, Ethiopia, (N= 158)

Variables	Yes %	No %
Route of administration		
Oral	139 (88.0)	19 (12.0)
Parenteral	14 (8.9)	144 (91.1)
Eye or ear drop	86 (54.4)	72 (45.6)
Topical	111 (70.3)	47 (29.7)
Indications for antibiotics		
Common cold or flu	121 (76.6)	37 (23.4)
Diarrhea	112 (70.9)	46 (29.1)
Toothache	100 (63.3)	58 (36.7)
ENT	81 (51.3)	77 (48.7)
Eye infection	82 (51.9)	76 (48.1)
UTI	57 (36.1)	101 (63.9)
Topical wounds	85 (53.8)	73 (46.2)
Others	26 (16.5)	132 (83.5)

Abbreviations: ENT, ears, nose and throat; UTI, urinary tract infection.

Table 3 Pharmacy Professionals Knowledge Towards Dispensing Antibiotics Without Prescription, Addis Ababa, Ethiopia, (N= 158)

Variables	Yes (%)	No (%)	I Do not Know (%)
DAWP is legal practice in Ethiopia	17 (10.8)	137 (86.7)	4(2.5)
DAWP is common practice among community pharmacies in Ethiopia	99 (62.6)	57 (36.1)	2 (1.3)
Do you think there will be any problem by DAWP	147 (93.3)	7 (4.4)	4 (2.3)
DAWP is contribute to the development of antibiotics resistance	151 (95.6)	4 (2.5)	3 (1.9)
Antibiotic resistance become a public health issue	149 (94.3)	6 (3.8)	3 (1.9)
DAWP is contribute to the development of irrational use of antibiotics by the patients	138 (87.3)	13 (8.2)	7 (4.4)
Pharmacists can be penalized for DAWP	104 (65.8)	24 (15.1)	30 (19.0)
Pharmacist should stop DAWP	146 (92.4)	8 (5.0)	4 (2.5)
If I do not DAWP, patients will try to obtain it from another pharmacy	96 (60.8)	38 (24.1)	24 (15.1)
Refusing to DAWP will negatively affect the profit of the pharmacy	112 (70.9)	36 (22.8)	10 (6.3)

Attitude Towards DAWP

The most common reasons given by study participants for DAWP were that most patients do not want to consult prescribers unless the infection appears serious (84, 53.2%), there are patients who cannot afford to consult a prescriber (83, 52.5%), regulatory agencies have poor control mechanisms (82, 51.9%), and increased pressure from owners to maximize profit margins (75, 47.5%) (Table 4).

Table 4 Attitude Towards Dispensing Antibiotics Without Prescription of Study Participants, Addis Ababa, Ethiopia, (N= 158)

Variables	Yes (%)	No (%)
Pharmacists have good knowledge about the use of antibiotics	61 (38.6)	97 (61.4)
Patients do not want to see prescribers unless the infection is serious	84 (53.2)	74 (46.8)
Increased pressure from owner to maximize profit	75 (47.5)	83 (52.5)
Patients cannot afford to consult a prescriber	83 (52.5)	75 (47.5)
Fear of losing clients	64 (40.5)	94 (59.5)
Lack of awareness about the rule and regulation against DAWP	67 (42.4)	91 (57.6)
Poor controlling mechanism from regulatory agencies	82 (51.9)	76 (48.1)

Practice Towards DAWP

In this study, the extent of DAWP was found to be 67.7%. Close to one-third (48, 30.4%) of the respondents disclosed that they never ask clients about allergic history prior to DAWP. More than one third (61, 38.6%) of the pharmacy professionals responded they never educate patients or care givers about adherence and the importance of completing the full course of treatment. Almost one-quarter (35, 22.2%) of the respondents admitted they always DAWP (Table 5).

Predictive Factors Associated with DAWP

A binary logistic regression was used to determine whether there is a significant relationship between socio-demographic characteristics and community pharmacists' practice of DAWP. Study participants, with educational background of masters and above were had a 64.6% of lower tendency to DAWP (AOR= 0.354, 95% CI: 0.013–0.744, P= 0.045). Compared to pharmacy professionals employed by independent community pharmacies, those employed by government hospitals had an 86.7% lower risk DAWP (AOR= 0.133, 95% CI: 0.024–0.725, P= 0.020). Pharmacy professionals with two to five years of community pharmacy experience had a 25.5% lower likelihood of DAWP (AOR= 0.745, 95% CI: 0.595–0.933, P= 0.010) (Table 6).

Discussion

The aim of this study was to determine community pharmacists' and pharmacy assistant's knowledge, attitudes, and practices regarding DAWP. The study found that DAWP is a common practice in Addis Ababa community pharmacies and drug stores. DAWP is an inappropriate practice that contributes significantly to antibiotic overuse and misuse. This unregulated non-prescription antibiotic access has been identified as a major contributor to the emergence of antimicrobial resistance as well as a variety of negative health outcomes.^{31,33}

The three most often DAWP were penicillin's (73.4%), tetracycline's (51.3%), and macrolides (44.9%). Contrary to this, an Eritrean study using a simulated client visit methodology found that the most frequently DAWP was

Table 5 Practice of Pharmacy Professionals Towards DAWP Prescription, Addis Ababa, Ethiopia, (N= 158)

Variable	Always (%)	Never (%)	Sometimes (%)
When I DAWP, I ask about allergy profile	27 (17.1)	48 (30.4)	83 (52.5)
When I DAWP, I ask about liver and kidney status	25 (15.8)	70 (44.3)	63 (39.9)
When I DAWP, I inform patients about possible side effects	34 (21.5)	56 (35.4)	68 (43.0)
When I DAWP, I educate patients about the importance of completing the full course	57 (36.1)	61 (38.6)	40 (25.3)
When I DAWP, I ask patient whether they are taking concomitant other medications	28 (17.7)	62 (39.2)	68 (43.1)
I do DAWP	35 (22.2)	55 (34.8)	68 (43.1)

Table 6 Predictive Factors Associated with DAWP

Variables	Practice of Community Pharmacists to DAWP		P-value	Adjusted OR (CI 95%)
	Yes	No		
Gender				
Male	32	65	1.00	
Female	25	36	0.494	0.631 (0.168–2.364)
Qualification				
Diploma	14	33	1.00	
Degree	42	54	0.097	10.674 (0.654–17.4351)
Masters and above	3	12	0.045*	0.354 (0.013–0.744)
Job status				
Staff	9	26	1.00	
Owner	48	75	0.288	0.386 (0.067–2.231)
Type of pharmacy				
Independent	18	44	1.00	
Under government	7	51	0.020*	0.133 (0.024–0.725)
Chain	11	27	0.086	0.241 (0.047–1.227)
Experience				
6–12 month	4	13	1.00	
1–2years	12	20	0.405	2.246 (0.334–15.086)
2–5years	41	17	0.010*	0.745 (0.595–0.933)
>5 years	23	28	0.595	0.516 (0.045–5.916)
Job type				
Full time	44	67	1.00	
Par time	14	33	0.086	0.241 (0.047–1.227)

Note: *Variables which showed statistically significant association towards DAWP.

ciprofloxacin.⁵ Similarly, a Pakistani study found that two of the most frequently DAWP were ciprofloxacin and azithromycin.²⁰ The observed discrepancy may be caused by variations in the sample size, methodological approach and available and reasonably priced of medications for the larger community.

In the current study, the most common reason for DAWP was common cold (76.6%), followed by diarrheal disease (70.9%). A recent systematic review showed that the most common indications stated by study participants for DAWP were upper respiratory disease and diarrheal disease.³⁴ However, most upper respiratory tract infections, including the common cold and non-dysentery type of diarrhea, are caused by viruses, are typically self-limiting, and merely call for symptomatic and/or fluid balance care.

The majority of study participants (86.7%) were aware that DAWP is illegal in Ethiopia. This finding was much higher than in a Saudi Arabian study, where more than two-thirds of community pharmacists were unaware that DAWP was illegal.²⁸ This discrepancy might be brought on by a new Saudi Arabian rule from 2018 that prohibited the retail sale

of antibiotics without a prescription in neighborhood pharmacies. Despite the fact that most of study participants were more aware of that giving out antibiotics without a prescription is prohibited in Ethiopia, the practice is common, suggesting that the laws already in place must be strictly followed.

The study found that only 4.4% of respondents believed that DAWP could not contribute to the development of antibiotic resistance. The finding was in line with a qualitative study from Iraq found that community pharmacists lacked knowledge about antibiotic resistance and were unaware of antibiotic stewardship, which led to the DAWP.³⁵ Antibiotic resistance is a public health issue, according to the majority of survey participants 149 (94.3%), however pharmacy professionals' DAWP while knowing about its effects could be the result of negligence, financial gain, or insufficient regulatory and enforcement action.

The most common reasons given for DAWP were a lack of willingness to consult a physician unless the infection appeared to be too serious, a lack of control mechanisms from regulatory agencies, and the consumers' economic status; this finding was consistent with other studies.^{28,35,36} To effectively address the issue of DAWP in Ethiopia, a multidimensional approach is required, and national regulations governing the sale of antibiotics must be strictly enforced.

The extent of DAWP was found to be 67.7% in this study, which is lower than the majority of previous studies. The magnitude of DAWP in previous studies ranges between 69.0% and 90.5%.^{5,20,24,34,37} This variation could be attributed to the type of study design used, as most of the above studies used a client simulated visit. When asked if they ever inquired about their customers' allergy histories before DAWP, 30.4% said they never did. According to a Pakistani study, only 4.2% of staff members ask for information about allergic history before dispensing antibiotic.²⁰ Such malpractices have the potential to result in far-reaching health-care consequences, as well as to erode public trust in the health care system.

Participants in the study with a master's degree or higher, pharmacy professionals working in government health facilities, and professionals with 2–5 years of work experience had a lower rate of DAWP compared to their counterparts, these findings were supported by Eritrean and Saudi Arabian studies.^{28,36}

This study is the first of its type to evaluate pharmacy professionals' knowledge, attitudes, and practices about DAWP in Ethiopia, and the study could be used as an input for future study. There were a few limitations to this study, 1; most of participants were drawn from the country's capital city, which had a better demographic and socioeconomic profile. As a result, our findings may not be generalizable throughout the country. 2; self-administered questionnaires, such as the one used in this study, are prone to social desirability bias.

Conclusion

Despite the majority of community pharmacy professionals are aware that DAWP is illegal and contributes to antibiotic resistance, they commonly DAWP for common cold and diarrheal diseases. Pressure from patients, poor controlling mechanism from regulatory side and unaffordability of clients/patients to visit prescribers are the major reasons for DAWP. This study recommends strict enforcement of existing antibiotic supply policies, as well as ongoing educational support for community pharmacy professionals on the judicious use of antibiotics and the importance of antimicrobial stewardship.

Abbreviation

DAWP, Dispensing Antibiotics without Prescription.

Data Sharing Statement

The data sets analyzed in the current study are available from the corresponding author on request.

Ethical Approval and Consent to Participation

The study was approved by the ethics review committee of the pharmacy school at Ambo University. The current study complies with the Declaration of Helsinki in that written and verbal informed consent was obtained from each participant.

Acknowledgment

The authors sincerely acknowledge the assistants of the School of Pharmacy at Ambo University and appreciate the willingness of the study subjects to participate in the study.

Funding

No financial support was gained to conduct the study.

Disclosure

The authors declared no conflicts of interest in relation to this work.

References

1. Bronzwaer SLAM, Cars O, Udo Buchholz SM., et al. The relationship between antimicrobial use and antimicrobial resistance. *Emerg Infect Dis.* 2002;8(3):278–282. doi:10.3201/eid0803.010192
2. Global Action WHO. Plan on Antimicrobial Resistance. *Microbe Mag.* 2015;10(9):354–355.
3. Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, Weisenberg S. Non-prescription antimicrobial use worldwide: a systematic review. *Lancet Infect Dis.* 2013;23(1):1–7.
4. Nusair MB, Al-azzam S, Alhamad H, Momani MY. The prevalence and patterns of self-medication with antibiotics in Jordan: a community-based study. *Int J Clin Pract.* 2021;75(1):1–25. doi:10.1111/ijcp.13665
5. Bahta M, Tesfamariam S, Weldemariam DG, et al. Dispensing of antibiotics without prescription and associated factors in drug retail outlets of Eritrea: a simulated client method. *PLoS One.* 2020;15(1):1–10. doi:10.1371/journal.pone.0228013
6. Servia-Dopazo M, Figueiras A. Determinants of antibiotic dispensing without prescription: a systematic review. *J Antimicrob Chemother.* 2018;73(12):3244–3253. doi:10.1093/jac/dky319
7. Muhie OA. Antibiotic Use and Resistance Pattern in Ethiopia: systematic Review and Meta-Analysis. *Int J Microbiol.* 2019;1(1):1–8. doi:10.1155/2019/2489063
8. Tan SY, Khan RA, Khalid KE, Chong CW, Bakhtiar A. Correlation between antibiotic consumption and the occurrence of multidrug-resistant organisms in a Malaysian tertiary hospital: a 3-year observational study. *Sci Rep.* 2022;12(1):1–9. doi:10.1038/s41598-022-07142-2
9. Yang P, Chen Y, Jiang S, Shen P, Lu X, Xiao Y. Association between the rate of fluoroquinolones-resistant gram-negative bacteria and antibiotic consumption from China based on 145 tertiary hospitals data in 2014. *BMC Infect Dis.* 2020;20(1):1–7. doi:10.1186/s12879-020-04981-0
10. Laxminarayan R, Sridhar D, Blaser M, Wang M, Woolhouse M. Achieving Global Targets for Antimicrobial Resistance. *Science.* 2016;9286(August):1–5.
11. Saleem Z, Hassali MA, Godman B, et al. Sale of WHO AWaRe groups antibiotics without a prescription in Pakistan: a simulated client study. *J Pharm Policy Pract.* 2020;13(1):1–8. doi:10.1186/s40545-020-00233-3
12. Auta A, Hadi MA, Oga E, et al. Global access to antibiotics without prescription in community pharmacies: a systematic review and meta-analysis. *J Infect.* 2019;78(1):8–18. doi:10.1016/j.jinf.2018.07.001
13. Gebretekle GB, Serbessa MK. Exploration of over the counter sales of antibiotics in community pharmacies of Addis Ababa, Ethiopia: pharmacy professionals' perspective. *Antimicrob Resist Infect Control.* 2016;5(1):1–7. doi:10.1186/s13756-016-0101-z
14. Elmahi OKO, Musa RAE, Shareef AAH, et al. Perception and practice of self-medication with antibiotics among medical students in Sudanese universities: a cross-sectional study. *PLoS One.* 2022;17(1):5–8. doi:10.1371/journal.pone.0263067
15. Alhomoud F, Almahasnah R, Alhomoud FK. “You could lose when you misuse” - Factors affecting over-the-counter sale of antibiotics in community pharmacies in Saudi Arabia: a qualitative study. *BMC Health Serv Res.* 2018;18(1):1–9. doi:10.1186/s12913-018-3753-y
16. Chowdhury M, Stewart Williams J, Wertheim H, Khan WA, Matin A, Kinsman J. Rural community perceptions of antibiotic access and understanding of antimicrobial resistance: qualitative evidence from the Health and Demographic Surveillance System site in Matlab, Bangladesh. *Glob Health Action.* 2019;12(S1):1–10. doi:10.1080/16549716.2020.1824383
17. Vazquez-Lago J, Gonzalez-Gonzalez C, Zapata-Cachafeiro M, et al. Knowledge, attitudes, perceptions and habits towards antibiotics dispensed without medical prescription: a qualitative study of Spanish pharmacists. *BMJ Open.* 2017;7(10):1–7. doi:10.1136/bmjopen-2016-015674
18. Bahnassi A. A qualitative analysis of pharmacists' attitudes and practices regarding the sale of antibiotics without prescription in Syria. *J Taibah Univ Med Sci.* 2015;10(2):227–233. doi:10.1016/j.jtumed.2014.09.001
19. Bisht R, Katiyar A, Singh R, Mittal P. Antibiotic resistance - A global issue of concern. *Asian J Pharm Clin Res.* 2009;2(2):34–39.
20. Ahmad T, Khan FU, Ali S, Rahman AU, Khan SA. Assessment of without prescription antibiotic dispensing at community pharmacies in Hazara Division, Pakistan: a simulated client's study. *PLoS One.* 2022;17(2):1–13. doi:10.1371/journal.pone.0263756
21. Goossens H, Ferech M. Outpatient antibiotic use in Europe and association with resistance: a cross-national database stud. *Dict Pharm Med.* 2009;1:145.
22. Chang J, Ye D, Lv B, et al. Sale of antibiotics without a prescription at community pharmacies in urban China: a multicentre cross-sectional survey. *J Antimicrob Chemother.* 2017;72(4):1235–1242. doi:10.1093/jac/dkw519
23. Hoxha I, Malaj A, Tako R, Malaj L. Survey on how antibiotics are dispensed in community pharmacies in Albania. *Int J Pharm Pharm Sci.* 2015;7(7):449–450.
24. Ndaki PM, Mushi MF, Mwanga JR, et al. Dispensing antibiotics without prescription at community pharmacies and accredited drug dispensing outlets in Tanzania: a cross-sectional study. *Antibiotics.* 2021;10(8):1–15. doi:10.3390/antibiotics10081025
25. Assefa Y, Hill PS, Gilks CF, Admassu M, Tesfaye D, Van Damme W. Primary health care contributions to universal health coverage, Ethiopia. *Bull World Health Organ.* 2020;98(12):894–905A. doi:10.2471/BLT.19.248328

26. Olyaeemanesh A, Woldemichael A, Takian A, Sari AA. Availability and inequality in accessibility of health centre-based primary healthcare in Ethiopia. *PLoS One*. 2019;14(3):1–16.
27. Hogan DR, Stevens GA, Hosseinpoor AR, Boerma T. Monitoring universal health coverage within the Sustainable Development Goals: development and baseline data for an index of essential health services. *Lancet Glob Heal*. 2018;6(2):e152–68. doi:10.1016/S2214-109X(17)30472-2
28. Hadi MA, Karami NA, Al-Muwalid AS, et al. Community pharmacists' knowledge, attitude, and practices towards dispensing antibiotics without prescription (DAwP): a cross-sectional survey in Makkah Province, Saudi Arabia. *Int J Infect Dis*. 2016;47(1):95–100. doi:10.1016/j.ijid.2016.06.003
29. Roque F, Soares S, Breitenfeld L, López-Durán A, Figueiras A, Herdeiro MT. Attitudes of community pharmacists to antibiotic dispensing and microbial resistance: a qualitative study in Portugal. *Int J Clin Pharm*. 2013;35(3):417–424. doi:10.1007/s11096-013-9753-4
30. Zapata-Cachafeiro M, González-González C, Vázquez-Lago JM, et al. Determinants of antibiotic dispensing without a medical prescription: a cross-sectional study in the north of Spain. *J Antimicrob Chemother*. 2014;69(11):3156–3160. doi:10.1093/jac/dku229
31. Haddadin RN, Alsous M, Wazaify M, Tahaineh L. Evaluation of antibiotic dispensing practice in community pharmacies in Jordan: a cross sectional study. *PLoS One*. 2019;14(4):1–15. doi:10.1371/journal.pone.0216115
32. Al-Mohamadi A, Badr A, Bin Mahfouz L, Samargandi D, Al Ahdal A. Dispensing medications without prescription at Saudi community pharmacy: extent and perception. *Saudi Pharm J*. 2013;21(1):13–18. doi:10.1016/j.jsps.2011.11.003
33. Nepal G, Bhatta S. Self-medication with Antibiotics in WHO Southeast Asian Region: a Systematic Review. *Cureus*. 2018;10(4):1–17.
34. Belachew SA, Hall L, Selvey LA. Non-prescription dispensing of antibiotic agents among community drug retail outlets in Sub-Saharan African countries: a systematic review and meta-analysis. *Antimicrob Resist Infect Control*. 2021;10(1):1–15. doi:10.1186/s13756-020-00880-w
35. Alkadhimi A, Dawood OT, Hassali MAA. Dispensing of antibiotics in community pharmacy in Iraq: a qualitative study. *Pharm Pract*. 2020;18(4):1–9. doi:10.18549/PharmPract.2020.4.2095
36. Bahta M, Weldemariam DG, Tesfamariam S, Tesfamariam EH, Russom M. Determinants of dispensing antibiotics without prescription in Eritrea: a mixed-method qualitative study on pharmacy professionals' perspective. *BMJ Open*. 2021;11(8):1–8. doi:10.1136/bmjopen-2021-049000
37. Alrukban M, Alruthia Y, Almasaoud M, et al. Community pharmacists' views of the enforced antibiotics dispensing law and its impact on oral antibiotics sales in Saudi Arabia. *Risk Manag Healthc Policy*. 2020;13(1):2899–2907. doi:10.2147/RMHP.S278404

Integrated Pharmacy Research and Practice

Dovepress

Publish your work in this journal

Integrated Pharmacy Research and Practice is an international, peer-reviewed, open access, online journal, publishing original research, reports, reviews and commentaries on all areas of academic and professional pharmacy practice. This journal aims to represent the academic output of pharmacists and pharmacy practice with particular focus on integrated care. All papers are carefully peer reviewed to ensure the highest standards as well as ensuring that we are informing and stimulating pharmaceutical professionals. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <http://www.dovepress.com/integrated-pharmacy-research-and-practice-journal>