



Original article

Dispensing of antibiotics in community pharmacy: an analytical study

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Abstract: Worldwide, the threat created by antibiotic resistance to public health calls for immediate action. Antibiotic resistance is one of the main causes of the emergence and spread of dispensing of antibiotics without a prescription. This study aims to investigate the dispensing of antibiotics without a prescription and the reason behind that in the community pharmacy in Libya. The study was randomized analytical conducted between March and April 2023 among pharmacists and assistant pharmacists employed by community pharmacies in various Libyan areas Tripoli, Zawia, and Sabratha. The data were analyzed by Fisher's exact and Chi-square tests to predict the determinations of dispensing antibiotics without prescriptions. In this study, a total of 293 participants were included, 63 had been excluded because they did not meet the inclusion of the study. The remaining 230 were enrolled for final analysis, most of them were female subjects (70.7%). Findings showed that 78.7% of the participants consulted with patients about the reason for requesting a specific type of antibiotic, while 68.7% dispensed antibiotics with probiotics. Study participants with 2 - 4 years' work experience were 76.6% higher toward dispensing of antibiotics without a prescription ($P=0.683$). The major reason for dispensing antibiotics without prescriptions were pharmacists knowledgeable enough to give a patient antibiotics without a prescription (68.3%). In Libya, misuse of antibiotics by the public is widespread. People can purchase antibiotics without prescription. Thus, dispensing of antibiotics without a prescription in community pharmacies is an alarming issue in Libya which can increase antibiotics resistance. Pharmacists' knowledgeable is high in dispensing patients antibiotics without a prescription, but patient pressure and financial issues are the major reasons behind dispensing antibiotics without a prescription. It can be recommended that the importance of antimicrobial stewardship and the need for ongoing education support for community pharmacy professionals is of importance.

Introduction

Antibiotics (ABs), which were first discovered in 1928, have revolutionized the way that diseases brought on by microorganisms are treated. ABs have also significantly decreased in mortality rate globally. The antimicrobial resistance (AMR) has,

however, increased at a similar rate to the global expansion of ABs use [1]. In several countries, over a 15-year period (2000-2015), the World Health Organization (WHO) conducted a systematic analysis of ABs consumption. The results showed that overall use per capita increased by 26.0% in

first- and second-line therapies and by 91.0% in those used only under specific circumstances due to high resistance [2]. ABs use without a prescription is frequently linked to incomplete or shortened treatment courses, as well as the use of the wrong ABs and doses [3]. Several factors, including poor public health, a high burden of diseases, rising income, and unrestricted sales of ABs, have contributed to the development of AMR in Libya. In addition, there are no strict restrictions on the dispensing of ABs and they are not included on the list of prescription-only medications [4-8]. Antimicrobial consumption in Tanzania was reported to be 80.8 ± 39.4 defined daily doses (DDDs) per 1000 inhabitants, with amoxicillin ranking second after doxycycline as the most commonly consumed antimicrobial. The total consumption was higher than in many high-income countries in Europe, Japan, and China, but there was no data from Sub-Saharan African countries to compare [9]. ABs resistance is expected to become the leading cause of death globally by 2050 if it is not addressed, resulting in an estimated 50,000 deaths annually from AMR infections in just Europe and the US. Because of AMR, it is getting harder to treat common infections with first-line ABs, necessitating the use of newer, and more targeted, but also more expensive ABs [10]. One of the primary sources of ABs in the entire world is community pharmacies. According to current regulations, ABs cannot be sold without a physician's prescription and are never to be regarded as OTC medications, without a prescription [11]. ABs can be legally purchased over the counter in some nations. For instance, according to a recent survey, pharmacists had experience treating patients with these medications responsibly and within the proper legal parameters in 19 out of 44 (43.0%) European countries, including former Soviet Union Republics [7, 12]. However, is only allowed to be purchased with a prescription from a licensed medical professional in Brazil, Nigeria, Mexico, Saudi Arabia, South Africa, and Zimbabwe [10]. One of the main factors contributing to increased ABs use and the emergence of AMR resistance is the sale of ABs without a prescription [13, 14]. To the best of our

knowledge, this is the first study being done in Libya that specifically focuses on community pharmacies. Therefore, the main goal is to estimate the number of ABs sold in Libyan community pharmacies without a prescription, to know which ABs are sold this way, and to describe how difficult it is to get ABs without a prescription.

Materials and methods

Study design: Between March and April 2023, a randomized analytical study was carried out in Libya in three different western cities (Tripoli, Zawia, and Sabratha) conducted among pharmacists and assistant pharmacists employed by community pharmacies.

Inclusion and exclusion criteria: This study included all the pharmacists and assistant pharmacists who worked in community pharmacies and were willing to participate. Pharmacy professionals with less than seven months of experience working in community pharmacies were excluded from the study as pharmacists were in training time.

Data collection: A semi-structured online self-designed questionnaire with open and closed-ended questions was used. The questionnaire link was distributed to the pharmacists via Facebook group in each Libyan state where the majority of pharmacists gather in groups during March and April 2023. The questionnaire consists of 20 questions divided into three main sections. The first section was a demographic profile of pharmacist including gender, age, years of experience, and qualifications. The second section included practice of community pharmacist assessment (seven items), and the third section was to investigate the reason behind dispensing of ABS without a prescription in the community pharmacy.

Ethical consideration: The proposal of the study was reviewed and approved by the ethical committee of Sabratha University, Faculty of Pharmacy Aljmail, Libya (12-2022), whereas the participant provided verbal consent with a signed form including permission to use the data in research after describing the study in detail.

Statistical analysis: The collected data were entered into a statistical package to analyze by SPSS Package software version 22. Fisher's exact and Chi-square tests were used to predict the determinations of dispensing of ABs without a prescription. A significant level of $p < 0.05$ was considered.

Results

Of a total of 293 Libyan participants, 63 were excluded because they did not meet the inclusion

criteria of this study (21.5%). The remaining 230 participants were enrolled for the final analysis. Most of the participants were female subjects (70.0%), regarding the qualification, most of them had with Bachelor of degree in pharmaceutical sciences (68.7%) as shown in **Table 1**. About age, 43.0% of the participants were of the age range of 20-25 years. Most of the participants (52.2%) out of 230, were with the work experience ranging from one to four years as shown in **Table 1** and **Figure 1**.

Table 1: Socio-demographic characteristics of the participants

Variable		Frequency	Percentage
Gender	Male	67	29.13
	Female	163	70.86
Age, years	20 - 25	99	43.00
	26 - 30	75	32.60
	> 30	56	24.34
Qualification degree	Bachelor	158	68.69
	Diploma	58	25.21
	M. Sc.	11	04.78
	Ph. D.	03	01.30
City	Tripoli	108	46.95
	Sabratha	78	33.91
	Zawia	44	19.13
Work Experience	< 4 years	120	52.17
	5 - 8 years	48	20.80
	> 9 years	62	26.95

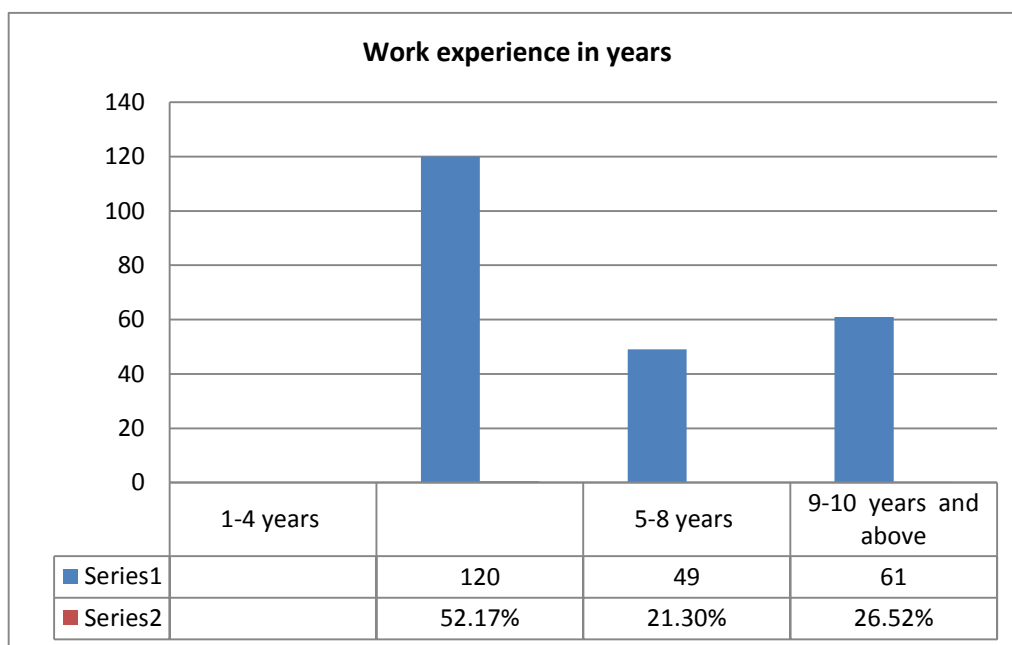


Figure 1: Work experience in years of the participants

Table 2: Practice of community pharmacy towards dispensing of antibiotics without prescription

Variable	Yes n, %	No n, %
If a patient asks for sell antibiotics by name did you consult with the patient about reason for asking about that type of antibiotics and their symptom	181 78.69%	49 21.30%
When you dispense antibiotics, do you dispense alone or with probiotics	158 68.68%	72 31.30%
Explained how long the antibiotics should be taken and completing the full course of antibiotics.	217 94.34%	13 5.65%
Asked patient about possible drug allergies	156 67.82%	74 32.17%
Asked the patient about other symptom	190 82.60%	40 17.39%
Did you ask the patient about the medical history	175 76.08%	55 23.91%

Data in **Table 2** showed that 78.7% of the participants consulted with patients about the reason for requesting a specific type of antibiotic while 68.7% dispensed ABs with probiotics. Additionally, the practice of community pharmacists towards dispensing ABs without a prescription is shown in **Table 2**. Results showed

indicated that 78.7% of the participants consulted with patients about the reason for requesting a specific type of antibiotic, while 68.7% dispensed ABs with probiotics. Additionally, 94.4% of the participants explained the duration of antibiotic use and emphasized completing the full course while 67.8% asked patients about possible drug allergies.

Table 3: Reason for dispensing of antibiotics without a prescription

Variable	Frequency	Percentage
Financial purpose	27	11.73
Save patient time	15	06.52
Pharmacists knowledgeable enough to give a patient antibiotics without prescription	157	68.26
Patient pressure	31	13.47

Table 4: Predictive factor with antibiotics without a prescription

Variable	Yes	No	P value
Male	54	13	0.117
Female	115	48	
Age			0.011
20 - 24	69	30	
30 - 26	65	10	
> 30 years	37	19	
Work experience			0.683
1 - 4 years	92	28	
5 - 8 years	35	13	
> 9 years	44	18	

The reasons behind dispensing ABs without prescriptions were explored in **Table 3**, the most common reasons cited were pharmacists' perceived knowledgeability to provide ABs without a prescription (68.3%) and patient pressure (13.5%). **Table 4** examined the major factors associated with dispensing ABs without a prescription. Pharmacists' work experience with 9 - 12 years and

above, age from 30 and above and male gender were lower to disposing of ABs without prescription ($p=0.683$, $p=0.011$ and $p=0.117$, respectively) as shown in **Table 4**. The results showed that gender and age were not significant factors while work experience did not significantly influence the practice.

Discussion

The study findings highlight the prevalent practice of dispensing ABs without prescriptions in Libyan community pharmacies. The high percentage of pharmacists consulting with patients about their symptoms and explaining the course of ABs demonstrates a positive aspect of their practice. However, the current study also revealed room for improvement, such as increasing the frequency of asking patients about allergies and medical history. The reasons behind this practice mainly revolved around pharmacists' perceived knowledgeability, suggesting a need for continuous professional development and education regarding appropriate antibiotic use. Patient pressure was also identified as a contributing factor indicating the importance of patient education on the risks of self-medication. This study provides valuable insights into the current practices and determinants of antibiotic dispensing without prescription in Libyan community pharmacies, contributing to the understanding of factors influencing this practice. Future interventions and educational programs should be developed to address these determinants and promote responsible antibiotic use in community pharmacy settings. Few of the participants (04.4%) explained the duration of antibiotic use and emphasized completing the full course, while the majority (67.8%) asked patients about possible drug allergies. The reasons behind dispensing ABs without prescriptions were explored in this study. The most common reasons cited were pharmacists' perceived knowledgeability to provide ABs without a prescription and patient pressure.

The goal of the study is to qualify the percentage of pharmacists selling ABs without prescription and the reason for the prescription. Thus, most of the participants were dispensing ABs without a prescription slightly higher than study conducted in Ethiopia were found the extent of distribution of ABs without prescription [15] and another study in Eritrea [16]. Most of the pharmacists in this study asked patients about possible medical allergies. According to a Pakistani study, only 04.2% of staff

-members ask for information about allergic history before dispensing ABs [17]. In another study in Saudi Arabia, more than two-thirds of the pharmacists claimed that they asked patients about drug allergies and explained the side effects before dispensing ABs [7, 18]. This variation could be attributed to the type of study design used. Work experience with 9-12 years and above, age from 30 and above and male gender were lower to disposing of ABs without prescription. Our study demonstrates that patients seeking ABs (by trade name) for self-medication are not the only ones buying them off the shelf without a prescription; Some patients prefer to consult a pharmacist for an antibiotic prescription rather than spending time and money seeing a physician. A similar study was conducted in Tamil Nadu [13]. The reasons behind this practice mainly revolved around pharmacists' perceived knowledgeability, suggesting a need for continuous professional development and education regarding appropriate antibiotic use [7, 18]. Additionally, patient pressure was identified as a contributing factor, indicating the importance of patient education on the risks of self-medication. This study provides valuable insights into the current practices and determinants of antibiotic dispensing without a prescription in Libyan community pharmacies, contributing to the understanding of factors influencing this practice. Intervention and educational program should be developed to address these determinants and promote responsible antibiotic use in community pharmacy settings.

Conclusion: Dispensing of antibiotics without perspiration in community pharmacies in Libya is alarming which can increase issues of antibiotic resistance. In this study pharmacist was knowledgeable enough to give a patient antibiotics without a prescription, Patient pressure, and financial purpose were the most common reason behind dispensing antibiotics without prescription. We recommended the importance of antimicrobial stewardship and the need for ongoing education support for community pharmacy professionals.

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Author contribution: FEA, KMA & LAS collected the data. FEA & KMA performed data analysis. FEA designed the study, interpreted of data, drafted, & revised the manuscript. All authors approved the final version of the manuscript and agreed to be accountable for its contents.

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Ethical issues: Including plagiarism, informed consent, data fabrication or falsification, and double publication or submission have completely been observed by authors.

Data availability statement: The raw data that support the findings of this article are available from the corresponding author upon reasonable request.

Author declarations: The authors confirm that all relevant ethical guidelines have been followed and any necessary IRB and/or ethics committee approvals have been obtained.

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