



DISPENSING ANTIBIOTICS WITHOUT PRESCRIPTION IN THE ARAB WORLD: A NARRATIVE REVIEW OF THE PREVALENCE, APPROPRIATENESS, FACILITATORS AND PREVENTIVE INTERVENTIONS

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Inappropriate antibiotic-related practices are common worldwide but feature more strongly in developing countries. An example of such practices is dispensing antibiotics without prescription [DAwP] in community pharmacies, despite being illegal in most countries around the globe. The aim of this review is to discuss in-depth all aspects related to the practice of DAwP in Arab countries. We searched SCOPUS, PubMed and Google Scholar for articles involving studies addressing the practice of DAwP, conducted in any Arab country, and published from 2000 to 2022. We found that DAwP is very common with extremely high prevalence rates that differ according to methodologies used in those studies. Malpractices associated with DAwP include poor information-gathering before dispensing, poor counseling, inappropriate choice of the antibiotic, recommending antibiotics when they are not indicated, wrong duration and wrong dosing. Common factors shown to contribute to this practice include lax enforcement of regulations, misconceptions about antibiotics by the public, accessibility of community pharmacies, trustability of pharmacists, and the business orientation of pharmacies. Enforcement of regulations, increasing the competency of pharmacists by enhancing undergraduate pharmacy plans and establishing well-planned continuing education programs, reframing regulations to account for the expanding role of competent pharmacists, and increasing the awareness of the public towards antibiotics may limit DAwP and other antibiotic-related inappropriate practices.

Keywords: Antibiotics; Community; Pharmacist; Non-prescription; Arab world

INTRODUCTION

Antibiotic consumption continues to increase worldwide, despite alerts from international organizations about hazards of antibiotic misuse and overuse¹. Such hazards include recurrent infections, increased costs, adverse effects of treatment and most noticeably; the increase in antimicrobial resistance [AMR] and its burden². The world health organization [WHO] considered AMR a global security threat that negatively affects global health and development². Every year; about 700,000 people die from resistant infections worldwide, and this number is expected to increase exponentially, to reach

around 10 million deaths /year by the year 2050 if proper actions are not taken³.

Antibiotic consumption in the community significantly exceeds that in hospitals and it may account for 85%-95% of total antibiotic consumption⁴. This can be attributed to over-prescription of, and self-medication with antibiotics. Both practices are common worldwide problems but feature more strongly in developing countries^{5&6}. The contribution of such practices to AMR is well documented⁷, and higher AMR rates (>50%) against antibiotics commonly used in community as compared to those used only in hospitals (resistance rates < 25%), were reported⁸. The prevalence of self-medication with antibiotics

in the middle east ranges from 19 to 82% as reported in a systematic review of 22 studies⁹. The antibiotics were most commonly obtained from community pharmacies without prescription, though other sources were reported including stored leftover antibiotics and family members/friends¹⁰⁻¹². Dispensing antibiotics without prescription [DAwP] may be upon customer's request by giving the name or description of the drug, and thus it has a potential role in facilitating self-medication with antibiotics^{13&14}. Yet, DAwP can sometimes be according to the recommendations of pharmacist in response to patients' consultations¹⁴. This practice is common despite being illegal, and it is considered a well-known cause of antibiotic misuse and overuse¹³⁻¹⁵. Evidence shows that DAwP may contribute to half of the global antibiotic sales¹⁶. It is also reported that this practice is frequently inappropriate in terms of indication, choice, dosing or duration of treatment^{17&18}. A systematic review and meta-analysis of 38 studies in 24 countries from all over the world found that 78% of antibiotic requests by customers as well as 60% of consultations (related to infectious disease symptoms) resulted in DAwP. In the majority of these consultations; the antibiotic was not needed as the condition was a viral infection. In other cases; the antibiotic provided was, unnecessarily, a broad spectrum antibiotic¹⁷.

Many studies have addressed the problem of DAwP in Arab-countries by adopting different methodologies and targeting different populations. This comprehensive review aimed at discussing the practice of DAwP in community pharmacies in the Arab world by reviewing the literature available on this topic. The objectives were to:-

1. Identify different methodologies adopted in studies investigating the prevalence and other aspects of DAwP practice, and to discuss advantages and disadvantages of each methodology.
2. Determine the prevalence of DAwP in Arab countries.
3. Identify the most common conditions and antibiotics associated with DAwP practice in Arab countries.
4. Discuss the quality of DAwP practice in Arab countries.
5. Identify the facilitators of DAwP practice.

6. Discuss evidence-based strategies to combat the practice of DAwP.

The Legislative Status Of Antibiotics In Arab Countries

Restrictions on drug availability to the public are imposed to control and limit the risks of drug use. Drugs are generally classified as prescription or non-prescription drugs based on their characteristics, safety profile and nature of the disease/s they are supposed to treat¹⁹. Drugs may be classified differently among countries, but antibiotics are examples of drugs that are classified as prescription-only drugs in most regions of the globe⁶. In many Arab countries, such as Saudi Arabia, Jordan, United Arab Emirates, and Oman, clear regulations prohibit the dispensing of antibiotics without prescription by a licensed physician²⁰. In some countries, such as in Jordan, it is even requested that all antibiotic packs should have a statement to indicate that the antibiotic is a prescription-only drug¹⁴. Yet, in other Arab countries clear regulations are lacking. In Egypt, for example, no strict regulations on the dispensing of antibiotics are available, nor are they listed as prescription-only medications²¹, and in Palestine, there is no official list of non-prescription medications issued by the Palestinian Ministry of health²².

Common Methodologies Adopted In Studies Investigating DAwP In Arab Countries

Different methods have been utilized to assess the degree or other aspects of DAwP, each with its advantages and disadvantages. These methods include: questionnaires/interviews involving community pharmacists or patients, observations and simulated patients visit.

Surveys/ interviews involving community pharmacists or customers/patients

In this methodology, questionnaires are distributed to community pharmacists or, less commonly, community pharmacists are interviewed. Questions usually focus on the degree of DAwP, most common conditions for which antibiotics are recommended, most common antibiotics dispensed, reasons for DAwP and, to a lesser extent, information provided by the pharmacist to the patient. The prevalence of DAwP is most commonly

presented as the percentage of pharmacists or pharmacies that practice DAwp to the total number of pharmacists or pharmacies included in the study¹⁶.

Other questionnaire/interviews-based studies target patients or the general public. Questions are usually related to the degree of self-medication with antibiotics, source of antibiotic used, and reasons for self-medication. The prevalence of DAwp in such studies is presented as the percentage of participants practicing self-medication with antibiotics obtained from community pharmacies to the total number of participants²³.

Questionnaire/interview-based studies are easier to conduct than observations or simulated patient studies, and they are less resource-intensive²⁴. However, this type of studies is considered as potentially falsifiable¹⁴; due to the tendency of respondents to choose acceptable responses rather than choosing responses that reflect their true practices²⁵. Therefore, the degree of DAwp may actually be underestimated in such studies, and any positive practices (I.e counseling by pharmacists) may rather be overestimated.

Direct observation

In this methodology, the researcher or research collaborator observes pharmacy-patient interactions that involve antibiotics, and records all information needed based on the study objectives. This includes, but is not limited to, the dispensing practice of antibiotics whether by prescription or non-prescription, symptoms and complaints, and antibiotics dispensed¹⁴. The prevalence of DAwp is presented in relation to the total number of antibiotics dispensed. This type of studies is very useful in uncovering what happens in everyday actual pharmacy practice rather than relying only on questionnaires, in which the outcomes are subjective^{14,26}. Yet, observation is mentally and physically a demanding activity. Besides, it is time-consuming. Thus, it is resource-intensive as it requires multiple highly trained observers²⁴. Another concern with direct observation methods is the effect of the observer on the person being observed or what's called the "Hawthorne effect". Therefore, observed pharmacists may change

their behavior because they feel they are observed which may result in biased findings²⁷.

Simulated patient visit

In this methodology, pharmacies are visited by investigators who simulated having a clinical illness, either themselves or any of their relatives, and asking for antibiotics^{16,28}. Immediately after the visit ends, the investigator reports the pharmacist's dispensing behavior on a checklist²⁸. The most common clinical scenarios in those studies are viral infections (sore throat, acute bronchitis, colds, flu), diarrhea and urinary tract infections [UTIs] in childbearing-age women. The prevalence of DAwp is presented in relation to the total number of pharmacies visited or total number of visits¹⁶. This method is also known as the "mystery patient/shopper" method and it is a well-accepted method for evaluating community pharmacist's services and behavior²⁹. Like the observation method; this method can reveal real behavior, yet, bias from the Hawthorne effect is avoided. In addition, while both methods can correctly estimate the "extent" of DAwp in response to patients' requests or consultations of a certain condition, the simulated patient method is a better method to assess the appropriateness of this practice³⁰. This is because as researchers design a case scenario, they can correctly assess the care received against prespecified standards for the condition of interest³⁰. However, this method needs very well trained research collaborators to play the role of typical patients for each case scenario, which might be challenging²⁴.

The Prevalence of DAwp

Interviews/questionnaire-based studies conducted in different Arab countries during the last 20 years revealed that DAwp is quite common, with the vast majority of pharmacists admitted practicing DAwp (Table 1). All interviewed pharmacists in Syria³¹, Iraq³² and 93.4% of pharmacists in Sudan³³ stated they do dispense antibiotics without prescription. In Lebanon, 84.6% of pharmacists recommend antibiotics for children³⁴, and more than 80% of pharmacists interviewed in an Egyptian study reported recommending and dispensing antibiotics for colds³⁵.

Table 1: The prevalence of DAwP in different Arab countries.

Study ID	Country	Methodology	Target group	Prevalence of DAwP
Bahnassi, 2015 ³¹	Syria	Interview/Questionnaire	Community pharmacists	100% ¹
Alkadhimi et al, 2020 ³²	Iraq	Interview/Questionnaire	Community pharmacists	100% ¹
Abdelrahman Hussain et al, 2022 ³³	Sudan	Interview/Questionnaire	Community pharmacists	93.4% ¹
Hallit et al, 2019 ³⁴	Lebanon	Interview/Questionnaire	Community Pharmacists	84.6% ¹
Dooling et al, 2014 ³⁵	Egypt	Interview/Questionnaire	Community pharmacists	81% ¹
Awad et al, 2005 ³⁶	Sudan	Interview/Questionnaire	Public	73.9% ²
Sawalha et al, 2008 ³⁷	Palestine	Interview/Questionnaire	Public	64.1% ²
Naseef et al, 2022 ²³	Palestine	Interview/Questionnaire	Public	60.5% ²
Albawani et al, 2016 ³⁸	Yemen	Interview/Questionnaire	Public	79.1% ²
El-Hawy et al, 2017 ³⁹	Egypt	Interview/Questionnaire	Public	64% ²
Al- Qahtani et al, 2018 ⁴⁰	Saudi Arabia	Interview/Questionnaire	Public	40% ²
Bin-Nafesa et al, 2017 ⁴¹	Saudi Arabia	Interview/Questionnaire	Public	48% ²
Dameh et al, 2010 ⁴²	United Arab Emirates	Direct observation	Community pharmacies	68.4% ³
Sabry et al, 2014 ⁴³	Egypt	Direct observation	Community pharmacies	23.3% ³
Al-Bakri et al, 2005 ⁴⁴	Jordan	Direct observation	Community pharmacies	46% ³
Haddadin et al, 2019 ¹⁴	Jordan	Direct observation	Community Pharmacies	30.2% ³
Abdulhak et al, 2011 ⁴⁵	Saudi Arabia	Simulated patient	Community pharmacies	77.6% ⁴
Al-Faham et al, 2011 ⁴⁶	Syria	Simulated patient	Community pharmacies	87% ⁴
Al-Tannir et al, 2020 ⁴⁷	Saudi Arabia	Simulated patient	Community pharmacies	12.1% ⁴
Alrasheedy et al, 2020 ²⁸	Saudi Arabia	Simulated patient	Community pharmacies	12.5% ⁴
Khojah, 2022 ⁴⁸	Saudi Arabia	Simulated patient	Community Pharmacies	15.8% ⁴
Almaaytah et al, 2015 ⁵¹	Jordan	Simulated patient	Community pharmacies	74.1% ⁴
Abdelaziz et al, 2019 ²¹	Egypt	Simulated patient	Community pharmacies	98.3% ⁴
Tawfik et al, 2021 ⁵²	Egypt	Simulated patient	Community pharmacies	99.1% ⁴
Halboup et al, 2020 ⁵³	Yemen	Simulated patient	Community pharmacies	73.3% ⁴
Yaacoub et al, 2019 ⁵⁴	Lebanon	Simulated patient	Community pharmacies	30.8% ⁴

¹Presented in relation to the total number of pharmacists included in the study.

²The prevalence of self-medication and presented in relation to the total number of participants.

³ Presented in relation to the total number of antibiotics dispensed.

⁴ Presented in relation to the total number of the visited pharmacies or total number of visits.

Likewise, a considerable use of nonprescription antibiotics among the general public was reported at rates ranging from 40% to 80%. In Sudan, 73.9% of participants had used non-prescription antibiotics within the last

month prior to the study, mostly purchased from community pharmacies³⁶. A study conducted among school teachers in Palestine found that 64.1% of participants used nonprescription antibiotics within the 6 months

prior to the study³⁷, while in a very recent study, 60.5% of participants used antibiotics without prescription with community pharmacies as the primary source of antibiotics for the majority (87.1%)²³. In Yemen, 79.1% of consumers admit self-medication of antibiotics which were mostly recommended by community pharmacists followed by family members³⁸. In Alexandria/ Egypt, 64% of the studied population stated they used non-prescription antibiotics in the last 12 months prior to the study³⁹. In Saudi Arabia, 40-48% of patients admitted self-medication with antibiotics; most of which (82.8- 90%) obtained from community pharmacies^{40&41}.

The very few studies adopting direct observation methodology reported that 20-70% of dispensed antibiotics in community pharmacies were without prescription (Table 1). In the United Arab Emirates, 68.4% of the observed antibiotic sales and 45.5% of injection antibiotics sales were without prescription⁴². Sabry et al⁴³ reported that 23.3% of antibiotics dispensed by community pharmacies in Egypt during their study period were without prescription. An earlier study from Jordan found that 46% of all dispensed antibacterial drugs were without prescription, either by self-medication or pharmacist's recommendations⁴⁴, while a more recent study found that 30.2% of all dispensed antibiotics were without prescription¹⁴.

Studies utilizing mystery patient methodology reported very high rates of DAWP in all studied countries, with the exception of recent studies from Saudi Arabia (Table 1). Differences in the rates of DAWP were found among different case scenarios with the highest rates being observed in response to case scenarios with upper respiratory tract infection [URTI] symptoms. The earliest studies adopting this methodology came from Saudi Arabia⁴⁵ and Syria⁴⁶, and reported DAWP in 77.6%, and 87% of visited pharmacies, respectively. Rates even increased more when the investigators insisted on having the antibiotics⁴⁶. More recent studies from Saudi Arabia after the reinforcement of regulations related to antibiotic dispensing in 2018 shows a significant decrease in DAWP that was reported in only 12.15-12.5% of visited pharmacies^{47,28}. Yet, a slight increase in antibiotic dispensing was reported during the COVID-19 pandemic

in a much recent study where 15.8% of visited pharmacies dispensed antibiotics in response to simulated cases with manifestation of URTI⁴⁸. Those findings were concordant with the global increase in antibiotic misuse and overuse during the pandemic which was – in part due to self-medication^{49&50}.

In Jordan, 74.1% of all investigated pharmacies dispensed antibiotics without prescription in response to simulated case scenarios. Over 97% of pharmacies dispensed antibiotic for sore throat cases, and 83% for diarrhea cases⁵¹. A recent study from Egypt found that antibiotics requested by simulated patients, were dispensed by 98.3% of pharmacies for acute bronchitis and common cold scenarios. Yet, results from pharmacy staff interviews in the same pharmacies revealed that 47.5% of them disagree to dispense antibiotics for such conditions²¹. A very recent study reported a 99.1% dispensing rate of doxycycline upon requests from simulated clients among community pharmacies in upper Egypt⁵². Similarly, 73.3% of pharmacies in Yemen dispensed antibiotics without prescription; for 99.5% of simulated sore throat cases, for 92% of cough cases, for 75.5% of diarrhea cases, 52% of otitis media cases and for 48% of UTI cases⁵³. In Lebanon, a nationwide patient simulated study reported DAWP for bacterial rhinosinusitis in 30.8% of pharmacies⁵⁴.

Conditions And Antibiotics Associated With DAWP

The most common reported reason for DAWP was URIs (sore throat, colds and flu, rhinitis). Antibiotics were also commonly dispensed without prescriptions for other conditions such as UTI, diarrhea, toothache, fever, earache, skin conditions, and wound infections^{33&37&38&42&43&55&56}. The vast majority of antibiotics dispensed without prescription are oral, but injectables are frequently dispensed without prescription^{14&42}. Penicillins; notably amoxicillin and amoxicillin clavulanate, cephalosporins, macrolides and quinolones; notably ciprofloxacin were among the most commonly dispensed antibiotics without prescription^{14,31,42&43&54&55&57&58}. Penicillins were mostly requested by patients^{14&43&44}, while cephalosporins were most likely recommended by pharmacists^{14,43}.

Amoxicillin-clavulanate was the most common antibiotic dispensed without prescription to children < 12 years in one study¹⁴. It is important to recall that most of those commonly used antibiotics without prescription including amoxicillin, azithromycin and the fluoroquinolones have been classified by the WHO as critically important antibiotics [CIAs]. Furthermore, quinolones and macrolides are considered “highest priority” CIAs⁵⁹.

In interpreting the results of the most common conditions and antibiotics associated with DAWP, one should consider the different methodologies used in the reviewed studies. We think that studies adopting direct observation methodology may give the most accurate picture regarding the conditions mostly encountered by pharmacists in real practice that result in DAWP, as well as which antibiotics are mostly dispensed. This is because such studies involve the observation of real patient-pharmacist interactions, in contrast to the simulated patient studies with specific predesigned case scenarios. Table 2 presents the most common conditions and antibiotic classes reported in direct observation studies investigating DAWP.

The Quality of DAWP Practice *Information-gathering and counseling practices*

Many studies have shown suboptimal community pharmacist’s practice associated with DAWP (Table 3). There are two main weakness points in community pharmacist’s practice that are worth discussion. The first is poor gathering of patient’s data that can help the pharmacist in deciding the proper treatment of the patient or if the patient really needs the antibiotic. The second point of interest is poor counseling regarding antibiotics dispensed to patients. Such weaknesses might – in part- be attributed to not addressing the clinical and counseling roles of community pharmacists in pharmacy laws in most Arab countries²¹. In Syria, 64% of pharmacists didn’t ask patients about the indication of the requested antibiotic. Besides, none of the pharmacists asked patients about allergies, concurrent illness, nor other medications they were taking. Moreover, 66% of pharmacists admit they didn’t counsel patients on the proper use of antibiotics³¹. A

study utilized simulated patient methodology in Saudi Arabia reported that none of the pharmacists asked about allergy history or pregnancy status nor counsel patients about drug interactions⁴⁵. A similar study from Jordan found that only 17.3% of pharmacists inquired about allergic history before dispensing the antibiotic, and only 25.7% explained the duration of therapy⁵¹. A study from Lebanon reported that none of the pharmacists counseled patients regarding drug interactions and what to do in case a dose was missed⁵⁴. In a more recent study from Yemen; only 11.9% of pharmacists asked simulated patients about pregnancy status⁵³.

In Egypt; it was found that the majority of pharmacies visited by simulated patients of URTIs asking for amoxicillin, didn’t request any information about the clinical conditions of the patients nor did they counsel patients about any aspect of drug use unless they were asked. Interestingly, by interviewing staff of the visited pharmacies later on; most of them reported they often ask patients about their conditions²¹. Very similar results were reported in another study where 99.1% of pharmacy staff dispensed doxycycline for simulated female patients without gathering any information, but upon interviewing the same staff; 91.5% reported they asked patients about pregnancy status⁵². Similarly, a questionnaire-based study from Saudi Arabia⁵⁵ found much better practice from community pharmacists as compared to a simulated patients study⁴⁸. About 89 % of pharmacists in the former study stated they educate patients about antibiotic use, 81% ask about other conditions, and 77% ask about allergies⁵⁵. While in the later study, 63% of pharmacists didn’t provide the basic information to patients such as frequency, duration of treatment nor did they ask about allergies, pregnancy, or breastfeeding⁴⁸. Such differences in the findings between self-reported (questionnaire/interview) studies and simulated patients studies are expected as discussed earlier in the advantages and disadvantages of each methodology.

Table 2: Most common conditions and antibiotic classes associated with DAwP as reported in direct observation studies.

Study ID	Country	Most common conditions associated with DAwP ¹	Most common ABs/ AB classes dispensed without prescription ¹	Most common ABs/ AB classes requested by patients ¹	Most common ABs/ AB classes recommended by the pharmacist ¹
Haddadin et al, 2019 ¹⁴	Jordan	<ul style="list-style-type: none"> ➤ Upper respiratory tract infections (cold and flu) ➤ Genito-urinary infections ➤ Skin infections 	<ul style="list-style-type: none"> ➤ Penicillins especially amoxicillin-clavulanate ➤ Cephalosporins especially cefixime ➤ Macrolides especially azithromycin ➤ Quinolones 	<ul style="list-style-type: none"> ➤ Penicillins especially amoxicillin-clavulanate ➤ Macrolides ➤ Cephalosporins ➤ Quinolones 	<ul style="list-style-type: none"> ➤ Cephalosporins especially cefixime ➤ Penicillins especially amoxicillin-clavulanate ➤ Macrolides ➤ Quinolones
Dameh et al, 2010 ⁴²	United Arab Emirates	<ul style="list-style-type: none"> ➤ Upper respiratory tract infections 	<ul style="list-style-type: none"> ➤ Penicillins: <ul style="list-style-type: none"> • Amoxicillin-clavulanate • Amoxicillin ➤ Cephalosporins: <ul style="list-style-type: none"> • 2nd generation cephalosporins ➤ Quinolones ➤ macrolides 	N/A	N/A
Sabry et al, 2014 ⁴³	Egypt	<ul style="list-style-type: none"> ➤ Upper respiratory tract infections ➤ Urinary tract infections ➤ Fever ➤ Toothache 	<ul style="list-style-type: none"> ➤ Penicillins: <ul style="list-style-type: none"> • Amoxicillin • Amoxicillin-clavulanate ➤ Cephalosporins: <ul style="list-style-type: none"> • 1st generation cephalosporins ➤ Quinolones ➤ Macrolides 	<ul style="list-style-type: none"> ➤ Penicillins: <ul style="list-style-type: none"> • Amoxicillin • Amoxicillin-clavulanate • Amoxicillin /floxacillin • Ampicillin /Salbactam ➤ Cephalosporins: <ul style="list-style-type: none"> • 1st generation • 2nd generation • 3rd generation ➤ Quinolones: <ul style="list-style-type: none"> • levofloxacin 	<ul style="list-style-type: none"> ➤ Cephalosporins : <ul style="list-style-type: none"> • 1st generation cephalosporins • 3rd generation • 2nd generation ➤ Penicillins: <ul style="list-style-type: none"> • Amoxicillin-clavulanate • Amoxicillin/ floxacillin • Ampicillin/ Salbactam ➤ Quinolones: <ul style="list-style-type: none"> • Ciprofloxacin
Al-Bakri et al, 2005 ⁴⁴	Jordan	<ul style="list-style-type: none"> ➤ Upper respiratory tract infections ➤ Oral and Gastrointestinal tract infections ➤ Skin and eye infections 	<ul style="list-style-type: none"> ➤ Penicillins: <ul style="list-style-type: none"> • Amoxicillin • Amoxicillin-clavulanate ➤ Macrolides ➤ 1st generation cephalosporins 	<ul style="list-style-type: none"> ➤ Penicillins: <ul style="list-style-type: none"> • Ampicillin or amoxicillin² • Amoxicillin-clavulanate ➤ Cephalosporins: <ul style="list-style-type: none"> • 1st generation • 2nd generation • 3rd generation ➤ Macrolides 	<ul style="list-style-type: none"> ➤ Penicillins: <ul style="list-style-type: none"> • Ampicillin or amoxicillin² • Amoxicillin-clavulanate ➤ Cephalosporins : <ul style="list-style-type: none"> • 1st generation • 2nd generation • 3rd generation ➤ Clindamycin ➤ Quinolones

AB, antibiotics

¹Presented in a descending order

²Described in the study as “penicillins with extended spectrum”

Table 3: Malpractices associated with DAWP

Malpractice	Examples
<i>Poor data-gathering before dispensing</i>	<ul style="list-style-type: none"> ➤ Not asking about indication for the requested AB^{21&31&52} ➤ Not asking about allergies^{31&45&48&51} ➤ Not asking about concurrent illnesses³¹ ➤ Not asking about concomitant drug use³¹ ➤ Not asking about pregnancy/ breast feeding status in child-bearing women^{45&48&51&53}
<i>Poor patient counselling</i>	<ul style="list-style-type: none"> ➤ Not providing information about frequency of administration or duration of therapy^{45&51} ➤ Not counselling about drug interactions⁵⁴ ➤ Not explaining what to do in case of missed doses⁵⁴
<i>Dispensing AB when it is not indicated</i>	<ul style="list-style-type: none"> ➤ ABs for cold^{21&35} ➤ ABs for acute bronchitis^{21&45} ➤ ABs for diarrhea^{45&51&53} ➤ ABs for sore throat^{45&51&53}
<i>Nonadherence to guidelines when dispensing AB for bacterial infections</i>	<ul style="list-style-type: none"> ➤ Dispensing ciprofloxacin for uncomplicated UTI^{45&51}
<i>Dispensing a contraindicated AB</i>	<ul style="list-style-type: none"> ➤ Dispensing doxycycline for pregnant women²¹
<i>Incorrect dosing</i>	<ul style="list-style-type: none"> ➤ Not referring to standard dosing and not calculating doses based on weight for pediatric patients³⁴

AB, antibiotics; UTI, urinary tract infection

Appropriateness of antibiotics dispensed without prescription

The practice of DAWP is a clear breaching of laws that regulate the dispensing of antibiotics⁶. This practice is, therefore, an issue of considerable concern. Yet, perhaps of greater concern is how appropriate is this practice in terms of indications, choice, dosing, contraindications, and duration of therapy.

Studies, especially those adopting simulated patient methodology, reported that the practice of DAWP was frequently inappropriate (Table 3). In Saudi Arabia, antibiotics were not indicated, yet dispensed in 97% of simulated cases of diarrhea, 90% of simulated cases of sore throat and in 73% of simulated cases of acute bronchitis. Besides, for uncomplicated UTIs that are commonly bacterial, ciprofloxacin was dispensed in 85% of cases irrespective of not being first line therapy in clinical guidelines. Interestingly, none of the UTI cases were dispensed first line antibiotic therapy and none of the cases were asked if they were pregnant or not⁴⁵. Similarly, in Jordan; 97.6% of pharmacies dispensed antibiotics inappropriately to simulated case scenarios for sore throat, 81% for diarrhea and the antibiotic dispensed was a quinolone in 80% of uncomplicated UTI cases in a childbearing age women without assessment of their pregnancy status⁵¹.

In Egypt, 97.7% and 99.1% of pharmacies inappropriately dispense amoxicillin for acute

bronchitis and common cold case scenarios upon request, respectively²¹. In a recent study from Egypt where simulated clients ask for doxycycline for pregnant women, about 25% of pharmacies dispensed the drug even after knowing about pregnancy⁵². In Lebanon, however, the majority of pharmacists (69.8%) prescribed antibiotics for simulated acute rhinosinusitis patients according to infectious diseases society of America [IDSA] guidelines, and only 2% and 1.6% of participants prescribed a wrong dose and a wrong duration, respectively⁵⁴. Yet, in another study from Lebanon, 23.5% of the pharmacists admitted recommending a small or large spoon two to three times daily, irrespective of the standard dose or the child's weight when DAWP for children³⁴.

Appropriateness of non-prescription antibiotics compared to prescription antibiotics

Inappropriate use of antibiotics is not limited to nonprescription antibiotics. Internationally, evidence that non-prescription antibiotics are used less appropriately than prescription antibiotics does not exist, and both physicians and pharmacists are equally as likely to overuse antibiotics in any given setting⁶. In the Arab world, evidence shows that antibiotic prescription practice by physicians in the community is frequently irrational. A study conducted in Qatar found that 29% of antibiotic prescriptions received by

community pharmacists were inappropriate for the indication⁶⁰. In Jordan, it was reported that 22.9% of physicians prescribe antibiotics over the phone and >50% routinely prescribe antibiotics for common cold⁵⁶. Interestingly, the few studies that compared prescription to non-prescription dispensed antibiotics in community pharmacies found no significant differences in appropriateness. A study from Jordan found that 29.9% and 34% of the prescribed and non-prescribed antibiotics, respectively, were inappropriate⁴⁴. Similarly, an Egyptian study found that 30% and 39% of physician-prescribed and non-prescription antibiotics were inappropriate for indication⁴³. A more recent study from Jordan found that only 31.5% and 24.5% of antibiotics dispensed with and without prescription, respectively were with appropriate dosage and duration¹⁴.

Facilitators Of DAwP

Several, inter-related factors were identified as potential facilitators of DAwP in different studies. They are summarized in (Figure 1) and are discussed with detail below.

Public demand pressure and expectations

Patients frequently seek antibiotics directly from pharmacies, and put pressure on the pharmacist to dispense antibiotics without prescription. The fact that pharmacies are easier and less expensive to access than other health care facilities, coupled with the public's misconceptions related to antibiotics uses and risks, (as will be discussed later), may contribute to this behavior. Nevertheless, from the community pharmacist's perspective;

public demand pressure is a major reason for the practice of DAwP³⁴. The pharmacist may respond to this pressure because he/she appreciates patients' trust, or because of fears of failing to meet the expectations of their regular customers³². In a study from Qatar, 39% of interviewed pharmacists reported DAwP under the pressure of patients, and 6.1% said they fear of losing patients if not responding to their requests⁶¹. Similarly, in Sudan; 37.5% and 8% of pharmacists stated patient's pressure and fear of losing patients, respectively as causes of DAwP³³. In countries, like Arab countries, where populations have poor knowledge and awareness about antibiotics, pharmacists find difficulties to abstain from DAwP or to convince clients not to take the antibiotic even when it is not indicated²¹. Moreover, they think that if patients didn't purchase the antibiotic from their pharmacy; they would simply purchase it from another pharmacy. Additionally, many pharmacists find it is important to gain a reputation as clever health care practitioners who can diagnose and prescribe drugs that work. Thus, they can make loyal customers and guarantee sustainability of their business³⁵.

Poor knowledge of the public towards antibiotic use

Poor knowledge of antibiotics and their effects is a common finding in many studies from the Arab world¹², and it was found to be correlated with nonprescription consumption of antibiotics⁶². Many misconceptions were revealed by those studies and can be summarized as follows:



Fig.1: Facilitators of DAwP .

Antibiotics are indicated for viral infections

A very common misconception is that antibiotics are effective for viral infections¹². In a study from Jordan, 90% of participants listed viral infections as indication for antibiotics¹¹, while nearly half participants in a Lebanese study declared antibiotics can be used for both viral and bacterial infections⁶³. Upper respiratory tract infections, which are mostly viral in origin, such as colds, are believed to be treated with antibiotics by 39%, 43.5%, 54%, 67%, 73%, 73% of participants from Oman⁶⁴, Qatar¹², Kuwait⁶⁵, Jordan¹¹, Lebanon⁶⁶, and Palestine⁶⁷, respectively. An interesting finding in one study is that only 26.9% of participants believe that antibiotics should be used to treat UTIs, which are bacterial in nature⁶⁶.

Antibiotics are indicated for fever:

Another common misbelief is that antibiotics treat fever. In a qualitative study from Emirates, participants were likely to self-medicate with antibiotics whenever they suffer fever¹⁰. In a Lebanese study, 37.2% of participants thought antibiotics can be used for fever⁶⁶. Studies involving parents found that 64% and 55.9% of parents believe antibiotics should be given to feverish children in Palestine⁶⁷ and Lebanon⁶³, respectively.

Antibiotics relieve pain and boost immunity

One interesting finding from a qualitative study targeting antibiotics self-medicated patients in Saudi Arabia is the belief that antibiotics can fasten recovery from any infection, can boost immunity and that an antibiotic such as “Augmentin” can work for everything⁶⁸. In Palestine, 68% of parents believe antibiotics should be given for earache, and surprisingly; 24.2 % of them identified “Ibuprofen” as an antibiotic⁶⁷. Taking antibiotics for pain was reported in 28.1% and 31.9% of participants from Jordan⁵⁶ and Saudi Arabia⁴¹, respectively.

Antibiotics are with no risks

Antibiotics are falsely seen by many customers to be very safe drugs with minimal or no risks to adults, children or the community. In a study from Saudi Arabia, 67% of customers were unaware that some antibiotics are harmful for children’s teeth and 64.9% were unaware that antibiotics may cause

allergy and death⁶⁹. Likewise, in a study from Jordan; only 53.5% of participants were aware of the possible death due to antibiotic allergy⁷⁰. A study from Lebanon reported that only 38.8% of customers knew antibiotics could affect the kidney or the liver⁷¹. Most customers (67% and 64.1%) were unaware of what antibiotic resistance means in Saudi and Lebanese studies, respectively^{69,71}. Besides, only 49% of participants related misuse of antibiotics to the development of resistance in a study from Kuwait⁶⁵.

Patient’s-related economic reasons

Some data suggest that DAwp may be higher in lower socioeconomic areas⁷². Many clients, especially those with low economic status cannot afford doctor’s visit and find it much less expensive to directly purchase antibiotics from pharmacies than it to pay for physicians consultation and probably diagnostic investigations^{10,34,36,38,55,73}. Moreover, customers can also discuss drug options with the pharmacy staff based on their financial capacity⁷⁴. Such a privilege is not easily found with doctor’s visits; probably due to busy schedules and preference of doctors to certain brands over others. The latter is a common emerging practice driven mainly by promotional activities of pharmaceutical companies that may even include giving gifts and commissions to physicians to market their brands¹³. In some countries, like Palestine, where non-generic prescription is dominating; legislations don’t permit generic substitutions by community pharmacists without the consent of the prescribing physician⁷⁵, which can put an additional economic burden on the patient.

Accessibility and trustability of community pharmacies

Community pharmacies are easy to access facilities compared to other health care ones⁷⁶, and pharmacists are generally trusted by the public in prescribing medications, especially antibiotics^{32,63}. A study from Jordan found that one of the most common reasons for self-medication was the long waiting time to be seen by doctors⁷⁷. Similarly, time constraints or difficulties of scheduling a meeting with the physicians were reasons for using antibiotics

without a prescription in Yemen³⁸, Emirates¹⁰, Sudan⁷³ and Saudi Arabia⁶⁸. Moreover, Some patients believe physicians are difficult to discuss their conditions with, they usually don't pay much attention to their patients⁶⁸, and even they are less likely to give instructions about the drugs compared with pharmacists¹¹. Therefore, the pharmacist may be considered by patients as a better overall health care provider and more trusted than the physician^{73,78}.

Absence or weak enforcement of regulations

As mentioned earlier in this review; clear regulations for antibiotic dispensing in some Arab countries are unavailable^{21&22}. Even in countries where DAwP is prohibited by regulations; lax enforcement of such regulations predominates^{28,47}. Surprisingly, some pharmacists in those countries may not be aware that DAwP is illegal⁵⁵. Indeed, the only prescription -medicines where regulations are strictly enforced in Arab countries are narcotics and some controlled drugs¹⁴. Evidence suggests that strict implementation and enforcement of such regulations does decrease DAwP^{28,47}.

Knowledge, believes and perceptions of community pharmacists towards the practice of DAwP

Gaps in pharmacy staff knowledge about antibiotics dispensing regulations have been identified in studies conducted in some Arab countries. Hadi and his colleagues found that 70.5% of community pharmacists participating in their study were not aware that DAwP is an illegal practice in Saudi Arabia⁵⁵. Even for pharmacists who were aware of the legislative status of antibiotic dispensing in their countries; DAwP was not a malpractice, had no negative impact on public health and safe in their opinions^{31&32,78&79}. Around 40% of interviewed pharmacists in Jordan⁷⁸, and 47% of those in Sudan³³ believed they have sufficient knowledge required for DAwP. In two qualitative studies conducted in Saudi Arabia¹³ and Iraq³² to explore the reasons behind DAwP, community pharmacists believe that they are qualified, well experienced and knowledgeable enough to diagnose and treat

common infections. They also think that law should promote their role and encourage them to display their proficiency rather than prohibiting them from prescribing or dispensing antibiotics to patients in need¹³. In Egypt, many pharmacists think that prescribing drugs is crucial to build the image of a "clever pharmacist" who can treat his patients by choosing effective therapies³⁵.

The business orientation of community pharmacies

Community pharmacists are health care practitioners responsible for the provision of professional services based on their knowledge and expertise. Community pharmacies, however, are a profitable business and one of the main concerns of pharmacies' owners is how to increase their profit margins, especially in the light of market competition [80]. In many Arab countries, community pharmacy owners assess their staff's efficiency by the volume of medications sales²¹. This can explain community pharmacists' profit-driven practices such as the illegal sale of prescription medications, including antibiotics³³. Such a behavior is further facilitated by the loose implementation of regulations related to drug dispensing on the one hand, and the lack of a strong pharmaceutical pricing policy to regulate and monitor drug prices in some Arab countries on the other hand⁸¹. Pharmacists interviewed in Egypt and Sudan stated that their primary objective is to make financial profit^{35,73}. Moreover, in a very recent study from Sudan, 41.5% of pharmacists believe that forbidding the practice of DAwP will decrease pharmacy profits³³. An alarming finding from a study from Lebanon is that 38% of interviewed pharmacists admitted choosing treatment, in response to patients' complaints, according to offers and discounts provided to them by pharmaceutical companies⁷². Likewise, in a qualitative study from Iraq to explore more about the reasons behind DAwP, some pharmacists explained that promotions from pharmaceutical companies may encourage them to increase the sales of antibiotics³².

Suggested Solutions: Measures To Decrease Dawp Practice

As described above, the problem of DAWP is multidimensional and many interacting factors seem to contribute to its occurrence. Pharmacists, customers and authorities share the responsibility for this problem. Therefore, the collaboration of all these parts is essential to combat DAWP and its risks. Multifaceted measures including educational and regulatory interventions are strongly needed (Figure 2).

Regulatory interventions

Legislative enforcement of antibiotic dispensing regulations

Law enforcement necessitates well-functioning registration systems for drugs and drug suppliers, sufficient inspection capacity and a strong legal system capable of imposing penalties for breaking the regulations⁸². Law enforcement should also be accompanied with activities to disseminate information about any changes in law or policies and consequences of law breaches. These should be targeting both pharmacists and the public; most notably through media and social media^{28,82}.

A systematic review of studies from 15 LMICs countries shows that the impact of law enforcement activities on DAWP practice varied widely among countries. Such activities vary but all include regulatory inspections to pharmacies. Other activities include

mandatory retention of antibiotic prescriptions by pharmacists, media campaigns to educate the public regarding such laws, education of pharmacists, and implying penalties for non-compliant pharmacists. A significant decrease in the practice of DAWP was reported with more enforcement strictness and when comprehensive multifaceted activities were employed on regular basis and for a long time⁸².

A success story was reported in Saudi Arabia where strict enforcement of law, by imposing penalties and cancellation of the license in case of violations, resulted in a significant decrease in DAWP, though sustainability of such changes was not confirmed^{28,47}. Alrasheedy et al.²⁸ reported a decrease in DAWP for pharyngitis from 96.9% to 12.15 %, while Al-Tannir et al.⁴⁷ found a significant decrease in antibiotics sales in 2018 compared to 2011 (12.5% compared to 77.6%), after the implementation of disciplinary regulations.

Yet, fears from restrictions of antibiotic use to prescription-only were addressed by Belachew and his colleagues. They assumed that such restrictions, if enforced, may jeopardize access to needed antibiotics treatment in areas with limited or costly healthcare facilities⁸³. Therefore, balance has to be hit between reducing excess-inappropriate use of antibiotics and improving access to needed antibiotics⁸⁴.

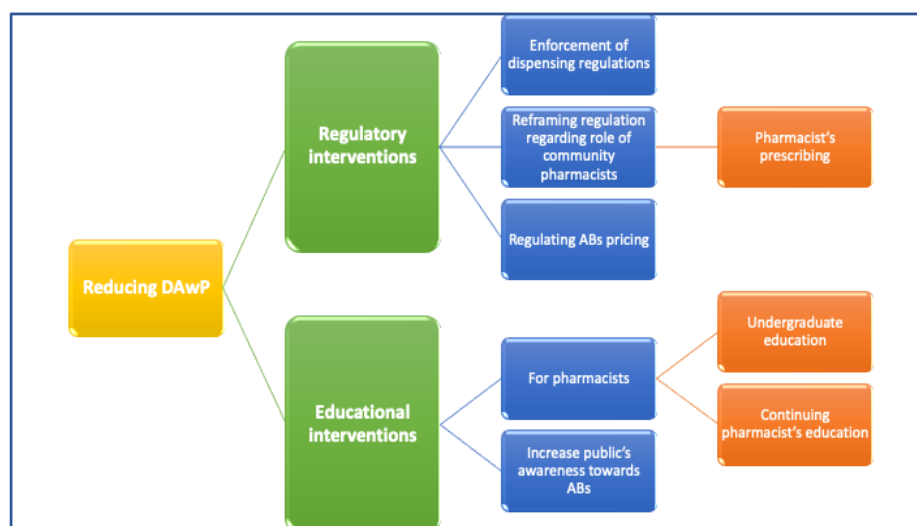


Fig. 2: Recommended interventions to combat the practice of DAWP.

Reframing regulations: expanding the role of community pharmacists

Through comprehensive pharmacy services, and with collaboration with other health care practitioners, pharmacists could have a leading role in promoting the appropriate use of antibiotics at different health care settings including the community⁸⁵. Yet, antiquated laws that underutilize and underestimate pharmacists are considered an obstacle that hinders the drive to a positive change in pharmacy practice in most developing countries. Interviewed pharmacists from Saudi Arabia believe that authorities should promote the role of pharmacists in the community rather than prohibiting them from prescribing and dispensing antibiotics. One suggestion was to enable pharmacists to choose the appropriate antibiotic for patients already diagnosed with infections by physicians. Another suggestion was to allow pharmacist's prescription for antibiotics especially for mild infections¹³.

Experience from developed countries, shows that pharmacists in the community do provide services that significantly improve clinical outcomes⁸⁶. Pharmacists' prescribing, including antibiotics prescribing, is now one of those services, and it is well established in the UK⁸⁷, New Zealand⁸⁸ and Canada⁸⁹. Different models of pharmacist's prescribing were described, including: 1) allowing pharmacists to prescribe within their definite area of expertise based on additional training or postgraduate education; 2) prescribing from limited list of medications; or 3) prescribing for certain clinical conditions⁹⁰. In Canada, nearly all provinces allow pharmacists to prescribe antibiotics for selected infectious conditions⁸⁹.

Pharmacist's prescribing in general was shown to have improved patient outcomes, better use of pharmacists' skills and knowledge, improved pharmacists' job satisfaction, and reduced physician workload. Moreover, it saves time, is affordable and more convenient to the patient⁹⁰. Pharmacists' antibiotic prescribing in particular was shown to be safe, effective with high rates of cure, low rates of infection recurrence as well as high levels of patients' satisfaction. Moreover, it was shown to be more cost-effective than physicians' prescribing in certain infections⁹¹.

Yet, benefits of such a practice cannot be guaranteed in Arab countries unless it was done appropriately and responsibly, considering all aspects of good prescribing are followed. The challenge is thus to balance improved access to antibiotics with appropriate and rational use. This is all about preparing a "competent pharmacist" through enhancing educational and continuing educational programs for pharmacists as will be discussed below.

Regulating drug prices

Many countries worldwide, including some Arab countries, lack sufficiently strong pharmaceutical pricing policies to control drug prices^{81,83}. Drugs, including antibiotics, are among highly valued goods. Therefore, failure to control drug pricing could result in many community pharmacies increasing their sales of antibiotics to increase their profit [92]. Some pharmacies may even offer lower-priced antibiotics to the public; as they make use of sales commissions offered in response to increased purchasing of drug products from pharmaceutical companies. Controlling drug prices and prohibiting the offer of sales commission to community pharmacies and to any other health care professionals may decrease profit-oriented malpractice of community pharmacy including DAWP⁸³.

Educational interventions

Pharmacists' education and continuing education

Undergraduate pharmacy education

The WHO considers educating and training health care professionals as one major intervention to decrease antibiotic misuse⁹³. Education of pharmacists should be thought of as a continuous process that generally starts with undergraduate education as the first step to build up basic knowledge and skills for practice⁹⁴. Therefore, schools of pharmacy in developing countries should improve their plans to cope with the expanded role of pharmacists as care providers. Clinical skills, critical thinking skills, problem solving skills, communication and patient counseling skills should all be emphasized during undergraduate study years⁹⁵.

Special attention should be paid to issues of global and national health concerns such as

AMR. Undergraduate plans should focus on recent advances in the management of infectious diseases, the concept of antibiotic stewardship and the role of pharmacists in stewardship programs to enhance the rational use of antibiotics^{94,96}. Good education and training of pharmacists regarding proper antibiotic use in different disease conditions will not only decrease the problem of inappropriate DAwP, but it can also improve community antibiotic use in general⁹⁷.

A recent study compared antibiotic knowledge and consumption of pharmacy students in two countries with different undergraduate pharmacy curricula; Sri Lanka and Australia. Australian students had better knowledge about antibiotic use in different clinical scenarios and about AMR as compared to students from Sri Lanka. The undergraduate pharmacy program in Australian universities is more clinically and practice-oriented as compared to Sri Lankan one. Moreover, the Sri Lankan program doesn't cover aspects related to antibiotic use and AMR as extensively as Australia, which may reflect on pharmacist's knowledge and practice towards antibiotics⁹⁸. Another study found that pharmacy students in Malaysia have higher knowledge of antibiotic therapy and AMR than Nigerian students. This may be due to better infectious diseases experiential training in the Malaysian universities as compared to the Nigerian ones⁹⁹.

Pharmacists' continuing education

Continuing Education (CE) is internationally recommended to allow pharmacists to acquire the skills, ethical attitudes and updated knowledge needed to stay competent in delivering best care for their patients¹⁰⁰. Mandatory CE is implemented in some Arab countries such as the United Arab Emirates, Qatar and Lebanon where CE is a prerequisite to renew pharmacists' licenses on a yearly basis^{101&102}. More recently, in 2018 participation in CE activities became mandatory for all health care professional licensure renewals in Jordan¹⁰³. In the rest of the Arab world including Palestine, Egypt, Syria and Yemen, CE implementation is still lacking^{31,104&105}. Yet, even in countries where CE became mandatory such as in Jordan, a structured program is unavailable and there is no clear plan to implement CE yet¹⁰³.

CE programs should be developed to address local needs and malpractices related to pharmacy in each country. For example, incorporating antibiotic stewardship courses in CE is essential to improve practices related to antibiotic dispensing practice. Kandeel and his colleagues evaluated the impact of a 5-day training workshop for pharmacists on the appropriate management of respiratory tract infections and on the differences between bacterial and viral infections, and the contribution of antibiotic overuse to the development of antibiotic resistance. Trained pharmacists showed improved knowledge and attitude scores toward antibiotic need in cold lasting for more than 5 days and giving antibiotics based on nasal discharge color. Moreover, pharmacist's prescribing of antibiotics for acute respiratory tract infections decreased by 31%, and for common colds decreased by 59%¹⁰⁶. However, studies to assess the impact of mandatory regular CE on pharmacists' knowledge, attitude and actual practice of DAwP are lacking

Antibiotic awareness and educational interventions targeting the public

One of the known facilitators of self-medication and DAwP is poor public's knowledge about antibiotics⁶², and therefore, efforts to combat such a practice should be targeted towards the public. Improving the public awareness about antibiotics and AMR is one of the five key priorities of the WHO's global action plan on AMR⁹³. Educational interventions targeting the public not only can reduce self-medication and DAwP but also can reduce over-prescription of antibiotics by physicians. These interventions can take several forms, including lectures, posters, and seminars emphasizing hazards of antibiotic misuse and encouraging the judicious use of those drugs⁹. Evidence shows that pharmacists can play a significant role in such interventions. A recent study from India reported better knowledge, attitudes and practices of the public towards antibiotics as a result of video-based and pamphlet-based education by pharmacists in a medical camp¹⁰⁷.

Public media such as television, radio, and social networks on the internet can also be utilized to post advertisements, programs, and lectures containing educational materials about

antibiotics⁹. National mass media campaigns were shown important and effective in educating patients about the dangers of antibiotic overuse. A significant decrease in antibiotic prescribing in children was reported after a nationwide campaign entitled “Antibiotics are not automatic” had been launched in France¹⁰⁸. Likewise, lower antibiotics dispensing rates were reported in Spain as a result of awareness campaigns within the country¹⁰⁹. Very few studies from the Arab world were conducted to assess the effects of the public's targeted educational interventions on antibiotics use. A pre-and post-intervention study in Egypt found that antibiotic awareness campaign targeting children's caregivers and adults significantly improved their knowledge, beliefs and attitudes towards antibiotics use. The campaign intervention included a Facebook page and a YouTube channel discussing antibiotic use as well as posters with simple messages to decrease the public's demand for antibiotics. Posters were displayed in physicians' clinic waiting areas, pharmacies, gathering areas, universities, and schools. Following the intervention; the caregivers/adults were less likely to apply pressure on physicians or pharmacists to prescribe or dispense antibiotics¹⁰⁶.

Conclusions And Recommendations

The available literature on DAWP in Arab countries shows that this practice is quite common and frequently inappropriate. Multifaceted actions are needed to combat this practice, though access to needed antibiotics should be guaranteed. Undergraduate pharmacy education should be upgraded to prepare pharmacists to be care providers and to enhance the rational use of drugs, including antibiotics. Antibiotic stewardship programs should be implemented in the community with the involvement of community pharmacies. Continuing pharmacy education should become mandatory provided well -designed structured CE programs are available. Regulations related to antibiotic dispensing and prescribing should be updated to account for an expanded role of competent pharmacists and measures to enforce such regulations should be undertaken. Finally, faculties of pharmacy in cooperation with community pharmacists should take the

lead in increasing the awareness of the public towards the hazards of antibiotic misuse and its close contribution to AMR.

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نشرة العلوم الصيدلانية جامعة أسيوط



بحث مرجعي لدراسة ظاهرة صرف المضادات الحيوية بدون وصفة طبية في العالم العربي من حيث مدى الانتشار، الجودة، المسببات و استراتيجيات الحد منها

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تعتبر ظاهرة صرف المضادات الحيوية بدون وصفة طبية من قبل صيدليات المجتمع من الممارسات الشائعة في العالم، ولا سيما في الدول النامية، رغم كونها ممارسة غير قانونية وفق الأنظمة المعتمدة في أغلب دول العالم. الهدف من هذا البحث هو دراسة هذه الظاهرة في العالم العربي من ناحية مدى انتشارها، جودتها، مسبباتها واستراتيجيات الحد منها وذلك من خلال مراجعة الدراسات المنشورة بخصوصها في أي من دول العالم العربي في الفترة من عام ٢٠٠٠ و حتى ٢٠٢٣ .

بينت الدراسات أن صرف المضادات الحيوية بدون وصفة طبية منتشر بشدة في العالم العربي و مرتبط بأشكال متعددة من سوء الممارسة من قبل الصيدلي وهذا بدوره يشمل: عدم أخذ معلومات كافية من المريض بخصوص شكواه و تاريخه المرضي قبل صرف المضاد الحيوي، عدم إعطاء معلومات كافية للمريض عن كيفية استخدام الدواء عند الصرف، الصرف الغير مبرر في حالة العدوى الفيروسية، اختيار مضاد حيوي غير مناسب للحالة، أو اختيار جرعة غير مناسبة.

تعددت أسباب هذه الممارسة و منها على سبيل المثال لا الحصر: ضعف فرض القوانين المتعلقة بصرف المضادات الحيوية، ضعف المعرفة بخصوص المضادات الحيوية من قبل العامة، سهولة الوصول للصيديات والثقة في الصيدلي من قبل العامة، و التوجه الربحي لدى صيديات المجتمع. من الاستراتيجيات التي يمكن أن تحد من هذه الظاهرة و تدعم الاستهلاك الرشيد للمضادات الحيوية في المجتمع: متابعة الالتزام بالأنظمة التي تحد صرف المضادات الحيوية بدون وصفة، زيادة كفاءة الصيدلي لدعم دوره في خدمة و نصح المرضى من خلال تحسين التعليم الصيدلاني الجامعي و التعليم المستمر للصيادلة و زيادة وعي العامة تجاه مخاطر سوء استخدام المضادات الحيوية.