

REVIEW

Self-medication misuse in the Middle East: a systematic literature review

Malak M. Khalifeh^{1,2} , Nicholas D. Moore¹ & Pascale R. Salameh²¹INSERM U 1219 - Pharmaco-épidémiologie et évaluation de l'impact des produits de santé sur les populations, University of Bordeaux, Bordeaux, France²Clinical and Epidemiological Research Laboratory, Faculty of Pharmacy, Lebanese University, Beirut, Lebanon**Keywords**

Eastern Mediterranean countries, Middle East, misuse, over-the-counter, Prescription medicines, Self-medication

Correspondence

Malak M. Khalifeh, Department of pharmacology, Bordeaux University, 33076 Bordeaux, France. Tel: +96170609147; Fax: +00961223349; E-mail: malak.k9@hotmail.com

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Abstract

Regulations usually distinguish between prescription-only (POM) and over-the-counter (OTC) medicines. The former requires medical prescription; the latter are available for SM of common minor or easily treated ailments. However, in the Eastern Mediterranean countries, theoretical prescription medicines can easily be purchased without a prescription, as self-medication (SM) resulting in potential misuse and unnecessary risk for patients. The magnitude of this activity is uncertain. The aim of this article, therefore, is to undertake a comprehensive review to identify the different types of medicines that can easily be purchased as SM in Middle East and recognized as misused. An extensive review of the published literature (1990–2015) was conducted using Pubmed, web of science, Cochrane, and Google Scholar databases, for OTC medicine misuse in the Middle East. A total of 72 papers were identified. Medicines involved in misuse included: codeine containing products, topical anesthetics, topical corticosteroids, antimalarial, and antibiotics. Self-medication misuse of medicines seemed widespread. Individual treatment patterns were not clearly identified. Studies were not standardized, limiting the comparability between studies and the estimation of the scale of misuse. Pharmacists, friends, or parents were found to be the main sources of SMs. Knowledge and attitudes are an important contributing factor in the misuse of these medications. Strategies and interventions to limit misuse were rarely identified in literature. In conclusion, a massive problem involving a range of medicines was found in Middle East. Standardization of studies is a prerequisite to the understanding and prevention of misuse of self-medication.

Abbreviations

EMRO, Eastern Mediterranean Region; OTC, over-the-counter; POM, prescription-only; SM, self-medication.

Introduction

Regulations usually distinguish between prescription-only (POM) and over-the-counter (OTC) medicines. The former requires medical prescription; the latter are available for SM of common minor or easily treated ailments. Many patients may treat themselves and self-medicate, using either OTC medication or prescription medicines without prescription.

OTC medicines are medicines that are approved for self-medication (SM) because their indication is easily

recognized by patients and usually self-limiting, and the medicine is thought to be safe and effective. Paracetamol and low-dose NSAIDs for pain relief are typical of these OTC medicines. However, SM is not limited to OTC medicines, and patients self-medicate with prescription medicines. These are medicines that may have been prescribed and left over from a previous treatment episode, or bought directly from the community pharmacies without a prescription. The latter is in principle not authorized. However, in practice in many countries the

dispensing of prescription medicines by pharmacists, without a prescription is not unusual, especially for the short-term treatment of common diseases.

SM has become quite common in developed (Blenkinsopp and Bradley 1996) and more common in developing countries (Kamat and Nichter 1998). In developing countries people are not only using OTC products as SM but also prescription medicines, as SM products, without supervision. SM has been studied in many different populations, showing that about 25–75% of the population consumes SM medicines (Wazaify *et al.* 2005). SM is highly prevalent in the community in Eastern Mediterranean countries. In Middle East, prescription medicines can easily be purchased without prescription, resulting in potential misuse and unnecessary risk. Patients may use medicines without a prescription from pharmacies, use old prescriptions, share medicines with friends/relatives, and use leftover medicines from previous prescription-based dispensing.

However, there is a relative lack of literature relating to SM misuse in the Middle East. There has been relatively little systematic research on this topic, partly due to the perception that SM misuse is not as problematic as other types of drug abuse. A single review article (Cooper 2013) has described the current knowledge of OTC medicine misuse and identifies the different types of OTC medicines implicated. A number of specific medicines have been implicated in literature including: opiate-based OTC analgesics, cough syrup containing dextromethorphan or pseudoephedrine, diphenhydramine, and other antihistamines (Lessenger and Feinberg 2008). Moreover, as antibiotics are available without prescription in the Middle East they were also included in the review.

Misuse has been defined as the incorrect use of an OTC product for a medical purpose, usually in terms of dosage or duration of use (Hughes *et al.* 1999).

The aim of this article, therefore, is to undertake a comprehensive review to identify the different types of medicines that can easily be purchased as SM in Middle East and recognized as misused. Other objectives were to describe current knowledge and understanding about the range of SM misuses and to identify the source of SM practice.

Materials and Methods

Search strategy

Databases, namely, Medline/Pubmed, Web of Science, Cochrane Library, and other sources, were used to identify peer-reviewed papers dealing with the review theme in WHO Eastern Mediterranean countries. Search terms were identified through a pilot review of the literature

and were used to identify articles through a systematic, standardized process.

The words/strings used for search and inclusion criteria were as follows: using combinations of the following terms: “over the counter”, “OTC”, “non-prescription”, “self prescription medicines”, “prescription medicines”, “misuse”, “abuse”, “addiction”, “dependency,” and “non-medical use”, “irrational use”, “inappropriate use”, Arab and name of countries belonging to the WHO Eastern Mediterranean Region (EMRO). The search strategy is outlined in figure 1. The search was limited to publications between 1990 and July 2015. Reviews (Lessenger and Feinberg 2008; Al-Tawfiq *et al.* 2010; Cooper 2013; Shehnaz *et al.* 2014a,b) were used for reference mining but they were not included.

Article selection

For a paper to be included in the review, four criteria were jointly required: (1) SM or over-the-counter (OTC) or prescription medications as some are available without prescription in the community pharmacy in Middle East, (2) WHO Eastern Mediterranean country, (3) Publication from 1990 to July 2015, and (4) Availability of abstract in English, French or Arabic.

Exclusion criteria included non-English, French, or Arabic language publications and reference exclusively to prescribed or illicitly obtained medicines. Articles related to alcohol or substance abuse were also excluded; although they represent an important category, they cover different objectives of the review theme related to SM misuse. Studies were also excluded via search limits if they were as follows: review articles, on animal models; hospital-based studies; clinical and/or randomized controlled trials; editorials, letters, opinions, or comment publication type.

Content reviews were performed to select articles that met these criteria. From the title review, articles were excluded if they were not relevant to the subject matter. Any articles with an ambiguous title or title suggestive of the topic were evaluated in the abstract review. Abstracts were reviewed for details that indicated the article may meet inclusion criteria. Finally, full-text articles were reviewed and assessed to determine whether inclusion criteria were met. Full-text reviews were also conducted on review articles to identify additional articles from their bibliographies.

Data abstraction

The following details were extracted from each study using an abstraction form: year of publication, country of origin, population sampled, recall period, and data pertaining to the study objectives.

Results

Literature search results

The database search yielded 696 publications for review. Fifty other records were added through other sources like health journals edited in Iran, Pakistan, and Saudi Arabia and previous reviews for reference mining but they were not included. 562 articles were excluded for reasons of duplicated records, review articles, irrelevant topic, time of publication, availability of abstract, outside eastern Mediterranean area, and clinical and/or randomized controlled trial.

A secondary search was performed to elaborate the primary concept. A total of 134 full-text articles were assessed of which 49 were excluded as they were related to prescription medications or illicit and alcohol abuse or medication storage and wastage, which did not meet our study objective. Another 21 articles (four out of time frame, two opinion pieces, four letters, five reviews, five articles outside Middle East area, and one animal model) were excluded. An additional eight articles were added after reference screening. This resulted in 72 articles, which fulfilled the inclusion criteria. (Fig. 1).

Study characteristics

The studies in the 72 publications differed substantially in sample size, recall period, and location. These studies reviewing overall prevalence, frequencies, and pattern of OTC misuse originated from different countries: Iran ($n = 16$), Pakistan ($n = 12$), Jordan ($n = 11$), Saudi Arabia ($n = 8$), Lebanon ($n = 3$), United Arab Emirates ($n = 4$), Kuwait ($n = 2$), Egypt ($n = 2$), Syria ($n = 2$), Yemen ($n = 2$), Iraq ($n = 2$), Palestine ($n = 2$), Bahrain ($n = 2$), Libya ($n = 1$), Sudan ($n = 1$), and Oman ($n = 1$). An additional paper included Lebanon, Egypt, Jordan, Tunisia, and Libya (Scicluna et al. 2009). All the studies were cross sectional in nature barring 1 case report (Risco and Millar 1992) and 1 prospective study (Nazarzadeh et al. 2014). Most studies used self-administered questionnaires or face-to-face interviews for data collection. Mixed data collection techniques were also adopted.

Prevalence of SM

SM was highly prevalent in the community in Eastern Mediterranean countries, ranging from 35.4% to 83% in Iran (Jalilian et al. 2013; Jafari et al. 2015), 42.5% in Jordan (Yousef et al. 2008), 35.4% in Saudi Arabia (Alghanim 2011), and 68.1% in Pakistan (Syed et al. 2015). It is also well prevalent among adolescents in many Middle

East countries including Jordan (87%) (ALBashtawy et al. 2015), Palestine (98%) (Sawalha 2008), Kuwait (92%) (Abahussain et al. 2005), Emirates (89.2%) (Shehnaz et al. 2013), Bahrain (44.8%) (James et al. 2006), and Pakistan (80.4%) (Mumtaz et al. 2011).

SM was also common for children and among pregnant women. Medication without prescription was given to 51.3% children in Pakistan (Haider and Thaver 1995), mostly consisting of unidentified medicines or analgesics/antipyretics. Good past experience (61.3%) with the medicine was the main reason for SM (Haider and Thaver 1995). In addition, more than 35% of the women self-medicated during pregnancy (Baghianimoghdam et al. 2013).

Scale of SM misuse

Methods used to describe the extent of OTC misuse varied. This variety is due to different methods and data sources, which make comparisons between countries difficult. Several studies relied on the perceptions or behavior of pharmacists (in Jordan, Palestine, Lebanon, Saudi Arabia, Egypt, and Syria), whereas others relied on sampling the public, pharmacy customers, or among university or school students.

Studies varied as to whether they focused on a particular product or on a range of products. Studies based on pharmacists' approaches appeared to generate more detailed and varied descriptions of medicines that may be misused. In Jordan, for example, antibiotics were commonly cited by pharmacists as being misused, as regulations restricting their supply were not always enforced (Albsoul-Younes et al. 2010). Similar studies were conducted in Palestine and Egypt by Sweileh et al. (2004) and Elhoseeny et al. (2013) based on perception of community pharmacists. In Palestine, 66% of community pharmacists believe that there is an increase in misuse of OTC medicines (Sweileh et al. 2004). Antitussives, analgesics, antihistamines, laxatives, decongestants, and sedatives hypnotics and tranquilizers were also identified by pharmacists as misused OTC medicines (Sweileh et al. 2004).

The use of nonprescription medicine among patients/consumers was reported by 66.9% of pharmacists to have increased in the past 4 years (Elhoseeny et al. 2013). Iran pharmacies sold 57% of prescription items without prescription (Zargarzadeh et al. 2008). Shehnaz study in the United Arab Emirates showed high prevalence of SM with antibiotics (53%) and sedative/hypnotics (27%) (Shehnaz et al. 2013).

Moreover, some studies showed that the practice of SM is influenced by pharmacists. In Syria, from 200 pharmacies visited, 87% agreed without insistence from the

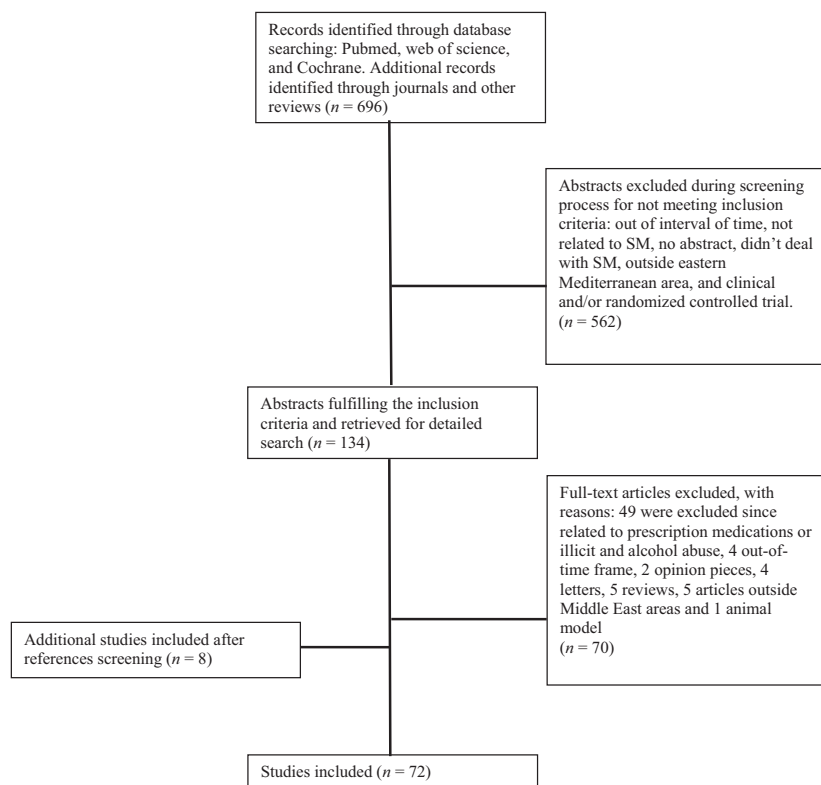


Figure 1. Selection of articles.

investigator to sell antibiotics without prescription. This figure increased to 97% when the investigators who were at first denied antibiotics insisted on having the antibiotics (Al-Faham et al. 2011). In Saudi Arabia, only one attendant pharmacist refused to dispense medications without prescription. Seventeen percent dispensed urinary antiseptic only and 82% gave antibacterial agents (Al-Ghamdi 2001).

Medicines involved in SM misuse

Medicines implicated in SM misuse belong to different pharmacologic groups: Codeine-based products, tramadol, topical ocular anesthetic, topical corticosteroids, antibiotics, and antimalarials were also described as misused medicines in many articles as seen in Table 1.

Analgesics

Codeine is usually supplied and consumed as codeine-containing pain-killer tablets that mostly also contain acetaminophen. Both acetaminophen–codeine tablets and tramadol tablets are prescription medicines, but many pharmacies sell them without a prescription (Zabihi et al. 2011). In Iran, Codeine-containing tablets, especially

acetaminophen–codeine tablets are among the most requested medicines as OTC (Zargarzadeh et al. 2008). Headache was the most common problem (Sarahroodi et al. 2012), and Sedighi showed that 91% of Iranian migraine sufferers used SM, mostly Acetaminophen and Codeine (Sedighi et al. 2006).

The prevalence of lifetime tramadol misuse among Iranian students was 4.7% (Nazarzadeh et al. 2014). This is due to easy accessibility from pharmacies without prescription. For instance, 56% of patients requesting for tramadol did not have a prescription (Zabihi et al. 2011).

Topical Anesthetics

Topical ocular anesthetics are commonly misused among Iranian welders: 80.5% declared that they had used topical anesthetics at least once during their working lives (Sharifi et al. 2013). All were Men. Mostly patients prefer self-treatment over seeking help from a physician, for cultural and financial reasons. The most commonly used topical anesthetic was tetracaine (Sharifi et al. 2013). Topical ocular anesthetic misuse is associated with many harmful adverse effects. A case report stated a 40-year-old patient in Saudi Arabia frequently self-administering

Table 1. Types of drugs misused in the retrieved publications.

Types of Drugs misused	Number of papers (n)	Countries	Prevalence of SM %	Study participants	Reference	
Analgesics (including codeine-containing medicines)	4	Iran	28.7%	564 University students	Sarahroodi et al. (2012)	
			60%	210 University and school students	Sedighi et al. (2006)	
		Saudi Arabia		504 University students	Ibrahim et al. (2015)	
				1380 Community participants	Qazi et al. (2013)	
Tramadol	2	Iran	32%	393 Pharmacists	Albsoul-Younes et al. (2010)	
			56%	162 Pharmacy customers	Zabihi et al. (2011), Nazarzadeh et al. (2014)	
Antibiotics	38	Iran	4.8%	1894 School students		
			35.8%	320 University staff	Askarian and Maharlouie (2012)	
			42.2%	195 University members	Sarahroodi et al. (2010)	
			43%	272 Patients at clinics	Jafari et al. (2015)	
			53%	153 University females	Sarahroodi and Arzi (2009)	
			57.6%	572 Community participants	Heidarifar et al. (2013)	
			Jordan	40.7%	477 Patients at clinics	Sawair et al. (2009)
				46.3	480 pharmacy customers	Al-Bakri et al. (2005)
				62%	37 Community participants	Darwish et al. (2014)
				32%	174 Patients at clinics	Scicluna et al. (2009)
				59.1%	1141 Community participants	Shehadeh et al. (2012)
				N/A	1091 Pharmacy customers	Alzoubi et al. (2013)
		Lebanon	68.8%	679 University students	Suaifan et al. (2012)	
			N/A	393 Pharmacists	Albsoul-Younes et al. (2010)	
			32%	110 Pharmacists	Farah et al. (2015)	
			42%	340 Pharmacy customers	Cheaito et al. (2014)	
			37%	119 Patients at clinics	Scicluna et al. (2009)	
			71.4%	780 University and school students	Aslam et al. (2013)	
		Saudi Arabia	N/A	1342 Households	Sturm et al. (1997)	
			30% Pharyngitis	851 Community participants	Qazi et al. (2013)	
			23% Gastroenteritis			
			25% storage	158 Households	Nasir et al. (2012)	
			35.2%	572 University students	Zafar et al. (2008)	
			10.8% storage	158 Households	Haider and Thaver (1995)	
			48%	353 School teachers	Belkina et al. (2014)	
			11.6% for children	610 Community Parents	Abobotain et al. (2013)	
			5%	1596 University and school students 88 Pharmacists	Almalak et al. (2014), Al-Ghamdi (2001)	
				365 Community participants	Barah and Goncalves (2010)	
Syria	85%	200 pharmacists	Al-Faham et al. (2011)			
	N/A	300 University students	Suleiman and Rubian (2013)			
UAE	40.2	860 Community parents	Abasaeed et al. (2009)			
	46%	324 School students	Shehnaz et al. (2013)			
Iraq	11.4%	300 Households	Jassim (2010)			
	26%	884 Pharmacy customers	Sabry et al. (2014)			
Egypt	30%	300 Patients at clinics	Scicluna et al. (2009)			
	23.3%	680 Community participants	Awad and Aboud (2015)			
Kuwait	27.50%	363 University students	Ghaieth et al. (2015)			
	43%	286 Patients at clinics	Scicluna et al. (2009)			
Libya	48%	718 Community participants	Jose et al. (2013)			
	67%	367 School teachers	Belkina et al. (2014)			
Oman	78.2%	2000 Patients at clinics	Mohanna (2010)			
	60%	1750 Households	Awad et al. (2005)			
Yemen	48.10%	264 Patients at clinics	Scicluna et al. (2009)			
	20.00%	1750 Households	Awad et al. (2005)			
Antimalarial	2	Sudan	43.4%		Abdo-Rabbo (2003)	
		Yemen				

(Continued)

Table 1. Continued.

Types of Drugs misused	Number of papers (n)	Countries	Prevalence of SM %	Study participants	Reference
Topical Anesthetics	2	Iran Saudi Arabia	80.5%	390 Welders	Sharifi <i>et al.</i> (2013) Risco and Millar (1992)
Topical Corticosteroids	1	Iraq	7.90%	1780 Patients at clinics	Al-Dhalimi and Aljawahiry (2006)
Cough/cold products	3	Pakistan Jordan Palestine	N/A N/A N/A	864 University students 393 Pharmacists 864 University students	Bano <i>et al.</i> (2012) Albsoul-Younes <i>et al.</i> (2010) Sweileh <i>et al.</i> (2004)
Decongestants	1	Jordan	N/A	393 Pharmacists	Albsoul-Younes <i>et al.</i> (2010)
Laxatives	1	Palestine	N/A	97 Pharmacists	Sweileh <i>et al.</i> (2004)
Sedatives/Hypnotics and Benzodiazepines	3	Jordan United Arab Emirates Jordan	N/A N/A N/A	393 Pharmacists 324 School students 393 Pharmacists	Albsoul-Younes <i>et al.</i> (2010) Shehnaz <i>et al.</i> (2013) Albsoul-Younes <i>et al.</i> (2010)

topical oxybuprocaine drops had developed ocular ultra-structural alterations (Risco and Millar 1992).

Topical corticosteroids

Al-Dhalimi showed that topical corticosteroids were commonly misused by 7.9% of Iraqi patients presenting at the dermatological center for lightening the skin or mild acne. The most commonly used topical steroids were potent and highly potent corticosteroids, including Clobetasole propionate and Betamethasone valerate. About half were aged 10–19 years. In 34.3% of cases, medical staff was responsible for recommending the medicines, including pharmacists (Al-Dhalimi and Aljawahiry 2006).

Cough/cold products and laxatives

Sweileh *et al.* (2004) and Albsoul-Younes *et al.* (2010) reported that antitussives, analgesics, antihistamines, decongestants, and laxatives were identified by pharmacists as misused medicines (Sweileh 2004). The antitussive products most misused were those containing the following combinations: (codeine phosphate/pseudoephedrine/triprolidine) (53.6%) or (ephedrine/ammonium chloride/codeine phosphate/pheniramine maleate) (5.2%).

Antibiotics and antimalarials

Inappropriateness of antibiotic use is defined as suboptimal use of antibiotics to treat antibiotic-responsive conditions, including use of overly broad agents, incorrect drug dosing or duration, and poor drug adherence (Sabry *et al.* 2014). Misuse of antibiotics is common in Eastern Mediterranean countries, with self-medication rates ranging from 32% to 42% as reported in Lebanon (Cheaito *et al.* 2014) (Farah *et al.* 2015), and from 32% to 62%

in Jordanian studies (Darwish *et al.* 2014) (Scicluna *et al.* 2009); rates as high as 57.6% were reported in Iran (Heidarifar *et al.* 2013), in Emirates (56%) (Abasaed *et al.* 2009), Syria (85%) (Barah and Goncalves 2010), Tunisia (20%) (Scicluna *et al.* 2009), and Yemen (60%) (Mohanna 2010). A percentage of 73.9 of Sudan population had used antibiotics or antimalarials without a prescription (Awad *et al.* 2005).

Antibiotic SM was common among university and school students in Palestine (98%) (Sawalha 2008), Libya (46%) (Ghaieth *et al.* 2015), United Arab Emirates (40%) (Sharifi *et al.* 2013), Saudi Arabia (48%) (Belkina *et al.* 2014), Pakistan (from 71.4% to 80.4%) (Aslam *et al.* 2013), and Iran (53%) (Sarahroodi and Arzi 2009). This practice was also observed among parents for their children. This practice was clear in Saudi Arabia (Darwish *et al.* 2014) and in the Scicluna study (Scicluna *et al.* 2009).

Respiratory tract symptoms were the main indication for which respondents indicated they would self-medicate. Antibiotics were mainly used for treatment of sore throat, cough, and flu. These results were found in Iran (Heidarifar *et al.* 2013), Iraq (Jassim 2010), Jordan (Sawair *et al.* 2009), Kuwait (Awad and Aboud 2015), Libya (Ghaieth *et al.* 2015), Lebanon (Cheaito *et al.* 2014), Pakistan (Qazi *et al.* 2013), Egypt (Sabry *et al.* 2014), Tunisia (Scicluna *et al.* 2009), and Saudi Arabia (Belkina *et al.* 2014). Other reasons for self-medication were for urinary tract infections (Scicluna *et al.* 2009) or gastrointestinal symptoms (Mohanna 2010).

Poor compliance with antibiotic therapy has a great impact on antibiotic misuse. Most patients did not complete the full course of antibiotic and took them for less than 3 days. This was observed in many Middle East countries and ranged from 39% to 86% as seen in Table 2. Reasons most frequently mentioned by patients

Table 2. Percentage of antibiotic compliance in the retrieved publications.

Countries	% Antibiotic Compliance	Study Setting	Reference
Jordan	39%	800 University students	Suaifan et al. (2012)
	40%	508 Community participants	Darwish et al. (2014)
Kuwait	64%	680 Community participants	Awad and Aboud (2015)
Iran	37.10%	542 Community participants	Heidarifar et al. (2013)
	26.80%	564 University students	Sarahroodi and Arzi (2009)
Libya	86%	363 University students	Ghaieth et al. (2015)
Oman	29%	718 Community participants	Jose et al. (2013)
	56%	400 School teachers	Belkina et al. (2014)
Pakistan	42%	780 University and school students	Aslam et al. (2013)
Saudi Arabia	71.30%	300 Households	Abobotain et al. (2013)
	61%	1200 School teachers	Belkina et al. (2014)
United Arab Emirates	75%	385 Women in clinics	Suleiman and Rubian (2013)

for noncompliance were as follows: rapid improvement of symptoms, forgetfulness, and frequent dosing (Al-Shammeri et al. 1995).

The most common antibiotics used were amoxicillin or ampicillin among different Middle East countries including Libya, Tunisia, Egypt (Scicluna et al. 2009), United Arab Emirates (Abasaeed et al. 2009), Pakistan (Qazi et al. 2013), Iran (68.6%) (Heidarifar et al. 2013), and Jordan (Sawair et al. 2009). In Saudi Arabia, fluoroquinolones were the most commonly dispensed antibiotic for urinary tract infections (82%) (Al-Ghamdi 2001). Amoxicillin–clavulanic acid was mostly used among Lebanese (48.9%) (Cheaito et al. 2014), among university students in United Arab Emirates, (48.9%) (Suleiman and Rubian 2013), and in Pakistan (62.8%) (Aslam et al. 2013). Metronidazole and TMP/SMX were also commonly used in Pakistan (29.2%) (Qazi et al. 2013) and in Yemen (35%) (Mohanna 2010) respectively.

Sources and reasons for self-medication

People tended to select medication based mainly on advice received from community pharmacist (see Table 3). Ease in access to antibiotics and availability of pharmacist consultation were the main factors resulting in an increase in the use of antibiotics. Cheaito et al. (2014) reported that pharmacists were the main helpers for antibiotic self-medication. Similar findings were in Sharif's study which showed that pharmacy was the main source of antibiotic self-medication (slightly more than 90%) (Sharifi et al. 2013) and among Libyan students (75%) (Ghaieth et al. 2015).

Another study reported that the most common sources of information on medicines were parents or friends. In Jordan, 51.8% of adult patients use antibiotic based on a relative's advice (Shehadeh et al. 2012). Similar results

were reported in many other Middle East countries. Prescription of antibiotics by physicians over phone is also an important contributing factor.

Use of leftover antibiotics is a major source for antibiotic use. Many patients tended also to keep antibiotics at home either for future use or for prophylaxis against infections (Ullah et al. 2013). In this case, antibiotics could be used without physician consultation. In Scicluna et al. (2009) almost half of those interviewed admitted to having stored some type of antibiotic at home, which was not for current use.

The most common reasons for self-medication were prior experience of the disease or similar symptoms (Al-Azzam et al. 2007; James et al. 2008; Yousef et al. 2008; Zafar et al. 2008; Scicluna et al. 2009; Mumtaz et al. 2011; Jalilian et al. 2013), certainty of its safety, (Jalilian et al. 2013), prior consumption of the drug (Jalilian et al. 2013), busy offices of physicians (Jalilian et al. 2013; Shoaib et al. 2013), and nonseriousness of the illness (James et al. 2008; Yousef et al. 2008; Mumtaz et al. 2011; Jalilian et al. 2013; Shoaib et al. 2013) or low severity of disease (Ullah et al. 2013). Long waiting time to be seen by doctors (James et al. 2008; Yousef et al. 2008) and avoiding the cost of doctors' visits were also reported as common reasons for self-medication (Yousef et al. 2008).

Self-medication was significantly associated with age, male gender, education level, and socioeconomic status. Young age, male, and having poor health status were more likely to practice self-medication (Alghanim 2011; Syed et al. 2015).

Knowledge and attitudes of self-medication

Knowledge of self-medication is an important factor for drug misuse. In Egypt, 82.4% of the pharmacists

Table 3. Sources for Self-Medication.

Sources of SM	Number of articles (n)	Country, %	References
Pharmacists	23	Egypt, 13.1%, 30% Iran 18.6%, 30%, 44.8%, 61.2% Jordan 14.2%, 23.1%, 30%, 53.6%, 30% Lebanon 29.8%, 35% Libya 74%, 12% Pakistan 33.49% Yemen 55.1% Saudi Arabia 21.6%, 74% Emirates 21.4%, 16.3%, 74% Iraq 18.6% Yemen N/A Tunisia 12%	Scicluna <i>et al.</i> (2009); Sabry <i>et al.</i> (2014) Sarahroodi and Arzi (2009), Heidarifar <i>et al.</i> (2013), Sharifi <i>et al.</i> (2013), Askarian and Maharlouie (2012) Al-Bakri <i>et al.</i> (2005), Yousef <i>et al.</i> (2008), Sawair <i>et al.</i> (2009)), Scicluna <i>et al.</i> (2009) Cheaito <i>et al.</i> (2014), Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009), Ghaieth <i>et al.</i> (2015) Qazi <i>et al.</i> (2013) Belkina <i>et al.</i> (2014) Alghanim (2011), Belkina <i>et al.</i> (2014) Shehnaz <i>et al.</i> (2013, 2014a,b), Abasaeed <i>et al.</i> (2009), Mohanna (2010) Al-Dhalimi and Aljawahiry (2006) Abdo-Rabbo (2003) Scicluna <i>et al.</i> (2009)
Parents/Friends	19	Iran 0.6%, 6%, 54.7%, 40.1% Jordan 51.8%, 10.3%, 12% Libya 26%, 11% Pakistan 20.09% Yemen 7.3% Saudi Arabia 19.3%, 20.3% Emirates 20.2% Iraq 20.7% Yemen N/A Kuwait N/A Egypt 11% Lebanon 10% Tunisia 13%	Sharifirad <i>et al.</i> (2011), Sarahroodi and Arzi (2009), Heidarifar <i>et al.</i> (2013), Sharifi <i>et al.</i> (2013), Nazarzadeh <i>et al.</i> (2014) Sawair <i>et al.</i> (2009), Scicluna <i>et al.</i> (2009), Shehadeh <i>et al.</i> (2012) Scicluna <i>et al.</i> (2009), Ghaieth <i>et al.</i> (2015) Qazi <i>et al.</i> (2013) Belkina <i>et al.</i> (2014) Belkina <i>et al.</i> (2014), Alghanim (2011) Shehnaz <i>et al.</i> (2013), Suleiman and Rubian (2013) Al-Dhalimi and Aljawahiry (2006) Abdo-Rabbo (2003) Abahussain <i>et al.</i> (2005) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Cheaito <i>et al.</i> (2014) Suleiman and Rubian (2013) Yousef <i>et al.</i> (2008)) Sharifi <i>et al.</i> (2013) Al-Dhalimi and Aljawahiry (2006) Suaifan <i>et al.</i> (2012)
Physician advice or health professionals	5	Lebanon 50.8% Emirates 25.8% Jordan 21.9% Iran 27.2% Iraq 11.4%	Suaifan <i>et al.</i> (2012) Sarahroodi and Arzi (2009), Askarian and Maharlouie (2012), Heidarifar <i>et al.</i> (2013) Jassim (2010) Shehadeh <i>et al.</i> (2012), Suaifan <i>et al.</i> (2012), Darwish <i>et al.</i> (2014) Cheaito <i>et al.</i> (2014) Suleiman and Rubian (2013), Abasaeed <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009), Jassim (2010) Suleiman and Rubian (2013) Sarahroodi <i>et al.</i> (2012) Yousef <i>et al.</i> (2008), Sawair <i>et al.</i> (2009) (Belkina <i>et al.</i> 2014) Belkina <i>et al.</i> (2014)
Dr. over phone	1	Jordan 37.5%	Suaifan <i>et al.</i> (2012)
Leftover	10	Iran 38.2%, 47.8%, 52% Iraq 45% Jordan 46%, 49%, 60% Lebanon 19.4% Emirates 1.1%, 28%	Sarahroodi and Arzi (2009), Askarian and Maharlouie (2012), Heidarifar <i>et al.</i> (2013) Jassim (2010) Shehadeh <i>et al.</i> (2012), Suaifan <i>et al.</i> (2012), Darwish <i>et al.</i> (2014) Cheaito <i>et al.</i> (2014) Suleiman and Rubian (2013), Abasaeed <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009), Jassim (2010) Suleiman and Rubian (2013) Sarahroodi <i>et al.</i> (2012) Yousef <i>et al.</i> (2008), Sawair <i>et al.</i> (2009) (Belkina <i>et al.</i> 2014) Belkina <i>et al.</i> (2014)
Stores at home for future use	2	Jordan 50% Tunisia 40% Libya 59% Lebanon 60% Egypt 40% Iraq 23%	Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009) Scicluna <i>et al.</i> (2009), Jassim (2010) Suleiman and Rubian (2013) Sarahroodi <i>et al.</i> (2012) Yousef <i>et al.</i> (2008), Sawair <i>et al.</i> (2009) (Belkina <i>et al.</i> 2014) Belkina <i>et al.</i> (2014)
Self present based on: previous experience of symptoms or disease or knowledge	6	Emirates 27% Iran 30.1% 48.5%, 75% Jordan 27%, 53.1% Yemen 17.1% Saudi Arabia 31.6%	Suleiman and Rubian (2013) Sarahroodi <i>et al.</i> (2012) Yousef <i>et al.</i> (2008), Sawair <i>et al.</i> (2009) (Belkina <i>et al.</i> 2014) Belkina <i>et al.</i> (2014)

(Continued)

Table 3. Continued.

Sources of SM	Number of articles (n)	Country, %	References
Previous treatment	3	Jordan 36.1%, 40% Tunisia 45% Libya 48% Lebanon 88% Egypt 40% Iran N/A	Scicluna et al. (2009), Sawair et al. (2009) Scicluna et al. (2009) Scicluna et al. (2009) Scicluna et al. (2009) Scicluna et al. (2009) Jalilian et al. (2013)
Previous suggestion by physician or Dr. always prescribe the same antibiotic	2	Iran 32.6% Lebanon 43% Egypt 11% Tunisia 21% Jordan 10% Libya 30%	Sarahroodi et al. (2010) Scicluna et al. (2009) Scicluna et al. (2009) Scicluna et al. (2009) Scicluna et al. (2009) Scicluna et al. (2009)
Old prescription	3	Yemen 20.6% Saudi Arabia 27.5%, 50.8% Emirates 26%	Belkina et al. (2014) Alghanim (2011), Belkina et al. (2014) Mohanna (2010)
Doctor prescription to friend	1	Emirates 3.4%	Suleiman and Rubian (2013)

considered the most common contributing factor for inappropriate self-medication use was lack of knowledge of patients/customers about the active ingredients in a branded product Elhoseeny et al. (2013). Tawfiq's study showed that more than 60% of the respondents did not try to read the leaflets of their medications (Al-Tawfiq et al. 2010).

The knowledge and attitude toward antibiotics are important contributing factors in the misuse of these medications. There is a limited understanding of which infections might require antibiotics and the safety and risks of such misuse. For instance, one Jordan study showed that 67.1% of the public believed that antibiotics treat common cold and cough. A percentage of 28.1 misused antibiotics as analgesics (Shehadeh et al. 2012). Many patients thought they were used for viral infections (Alzoubi et al. 2013; Darwish et al. 2014). Better knowledge was found to be a predictor for positive attitudes (Awad and Aboud 2015).

Discussion

The current review summarizes a number of themes and data to inform understanding of self-medication misuse in Eastern Mediterranean area. In addition, it highlights the different medicines involved in self-medication misuse, their prevalence, and their practice in different settings. Apparently, the uncontrolled consumption and monitoring of consumption of medicines in the Middle East is one reason for SM. This all is probably because of the easy availability of such medicines without prescription. So, people

could misuse analgesics containing codeine, despite the availability of alternative active OTC medications such as paracetamol or NSAIDs. However, they are available as prescription medicines in some developed countries. Similar findings are observed to that reported in many developed countries. For example, in England (Paxton and Chapple 1996) and Scotland (Matheson et al. 2002) 69% and 68.5% of pharmacists considered there to be some form of OTC medicine misuse in their pharmacies.

This review showed that regardless of the type of studied samples (driven from general population or selected subgroups of population) the reported prevalence of self-medication misuse in Eastern Mediterranean countries is very high. Therefore, high prevalence of misuse seems to be a health challenge in the Middle East. However, much still remains undone in this area in Eastern Mediterranean area. Many important researches remained unexplored in different countries of Middle East.

The inappropriate use of antibiotic is risky. This may include the use of antibiotics beyond the scope of their indications to treat ailments unrelated to bacterial infections or using antibiotic with incorrect dosages for inappropriate period of time. As a result, most antibiotics are used in unnecessary cases that would mostly recover without any antibiotic. For instance, people may self-medicate with antibiotic for treatment of mild ailments as throat or teeth symptoms, nasal congestion, cough, flu, and urinary discomfort. Although patients can use many alternative OTC medications as cough, decongestants, or antihistamine products for upper respiratory tract infections, many still prefer to use of antibiotics.

Inappropriate use of antibiotics may eventually lead to antibiotic resistance.

The main sources for self-medication were previously prescribed pharmaceuticals stored in the household and those purchased in pharmacies (Al-Bakri *et al.* 2005). Prescribing of medicine based on Essential Medicine List formularies, information campaigns, and regulatory reinforcement might control or reduce SM misuse. In Chile, the prohibition of OTC sales of antibiotic and a simultaneous public education campaign had an immediate and significant impact on the acquisition of antibiotic from pharmacies (Abasaed *et al.* 2009). Similarly, sales of antibiotic without prescription in Zimbabwe decreased when the law against over-the-counter sales was strictly enforced (Avorn and Solomon 2000).

The use of leftover medications is a unique consequence of poor compliance with medications including antibiotics because it affords the patient opportunities to self-medicate with a partial supply of antibiotics. Over-prescription of antibiotics by physicians is also an important factor that increases patient self-medication. Awareness and educational programs for physicians and consumers appear promising to control the overuse of antibiotics, noncompliance, and the use of leftovers.

Methodologically, studies are not standardized, which limits the quality of studies as well as comparability. Most of the studies were cross-sectional descriptive studies often using self-administered questionnaires, face-to-face interviews, or pharmacists' perception. Many studies report data based on pharmacists' perceptions of the problem of misuse and the profile of those they considered to be affected, such as reported by Albsoul-Younes *et al.* (2010), Elhoseeny *et al.* (2013), or Sweileh *et al.* (2004). These study designs are similar to those conducted in Scotland (Paxton and Chapple 1996; Matheson *et al.* 2002). Although these studies may have high response rate, they are still subjective.

Like all literature reviews, and despite our best effort to use standard methodology for such reviews, the possibility of a selection bias cannot be excluded, even though we did search for local language papers that might have escaped other researchers. Lack of access to some of the databases in the field and to unpublished research reports was the main limitations in our attempt to shed light on OTC misuse behavior. Uninformative titles and abstracts are also a limitation. However, the main limitation in our analysis is the heterogeneous methodological nature and reporting of the studies. Even finding more studies hidden in obscure repositories would probably not have changed that conclusion. In addition, most studies were consistent and showed similar results on the widespread use of self-medication, so that again missing studies would not change these results.

Conclusion

This review relating to self-medication misuse has found a massive problem involving a range of medicines. Considerable attention should be paid to the risks of future expansion of inappropriate self-medication. Better physician education of appropriate medication use is one approach that may encourage the prudent use of antimicrobial and other medicines. In addition, policy making should be implemented in Middle East area in order to restrict sales of prescription medications without prescription.

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Authors Contribution

Malak Khalifeh had the original idea, did the literature search, and wrote the original manuscript. Nicholas Moore had the original idea, and edited/amended the manuscript. Pascale Salameh had the original idea, and edited/amended the manuscript. All authors read and approved the final manuscript as submitted.

Disclosures

The authors declare no conflicts of interest.

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