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Saudi Pharmaceutical Journal 31 (2023) 1254–1264

HOSTED BY

Contents lists available at ScienceDirect

Saudi Pharmaceutical Journal

journal homepage: www.sciencedirect.com

Original article

Suspected inappropriate use of prescription and non-prescription drugs among requesting customers: A Saudi community pharmacists' perspective

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ARTICLE INFO

Article history:
Received 12 February 2023
Accepted 9 May 2023
Available online 15 May 2023

Keywords:
Prescription drugs
OTC drugs
Non-prescription drugs
Abuse
Misuse
Community pharmacy
Saudi Arabia

ABSTRACT

Background: Inappropriate use of medications is a global health concern, and this is attributed to the increased accessibility to prescription and non-prescription (over-the-counter) drugs at community pharmacies. We investigated the inappropriate use of prescription and non-prescription drugs in community pharmacies based on the perspectives of the community pharmacists in Saudi Arabia.

Methods: This was a questionnaire-based, cross-sectional survey which employed convenient sampling (snowball technique) to recruit participants. Being a licensed practicing pharmacist in a retail chain or an independent community pharmacy was the inclusion criteria. Participants were asked to report the drugs they suspected of being inappropriately used along with the frequency, age and gender of the suspected customers. Pharmacists were also asked to mention the action taken to limit inappropriate use at their pharmacy.

Results: A total of 397 community pharmacists completed the questionnaire (86.9 % response rate). 86.4% of the pharmacists suspected some level of abuse or misuse to have occurred. After receiving the questionnaire, the pharmacists reported suspected inappropriate use as encountered during the past three months. Cumulative inappropriate use was reported 1069 times (prescription drugs – 530; non-prescription drugs – 539). The top three inappropriately used prescription-drug categories were gabapentinoids (22.5%), antipsychotics (17.5%) and topical corticosteroids (12.1%). Among non-prescription drugs, cough products (33.2%) ranked first, followed by cold and flu products (29.5%) and first-generation antihistamines (10.8%). The cross tabulations revealed that being in the age range of 26–50 years and being a male was significantly associated ($p < 0.001$) with abuse/misuse of antipsychotics, antidepressants, gabapentinoids, cough products and first-generation antihistamines. Eye products (Bimatoprost) and skin products abuse/misuse had significant association with female gender ($p < 0.001$)

Conclusion: The results of our study provide crucial information to the healthcare authorities regarding the medications that can be inappropriately used at the community pharmacies in Saudi Arabia which necessitates implementation of stringent dispensing regulations. Educational programs can be

Abbreviations: MOH, Ministry of Health; OTC, over-the-counter; SFDA, Saudi Food and Drug Authority; USFDA, United States Food and Drug Administration.

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Peer review under responsibility of King Saud University. Production and hosting by Elsevier.

Production and hosting by Elsevier

https://doi.org/10.1016/j.jsps.2023.05.009

implemented to increase the awareness among public regarding the harmful effects of inappropriate use of drugs.

1. Introduction

Abuse and misuse of prescription as well as non-prescription (over-the-counter [OTC]) drugs remains a substantive challenge for health authorities worldwide (Hernandez & Nelson, 2010; Lessenger & Feinberg, 2008). The terms, abuse and misuse are generally interchangeable when illicit drugs are discussed, however it is essential to differentiate between these terms when dispensing of prescription and OTC drugs are involved. The misuse of prescription and OTC drugs generally refers to its use for reasons other than those prescribed or indicated. Additionally, misuse also includes taking a medication even if not prescribed or using it in a higher dose than prescribed (Benotsch et al., 2014). The use of the term ‘‘abuse” generally relates to use of prescription and/or OTC drugs for iatrogenic pain and for non-medical generally psychotropic purposes, such as to experience mind-altering effects (Cooper, 2013; Hughes et al., 1999; Wazaify et al., 2017). Both of these practices are encompassed as inappropriate use of medications according to Smith et al., (2015). For the purpose of the current study, we use the term ‘‘inappropriate use” for misuse and/or abuse of drugs.

The problem of inappropriate medication use has globally affected developed and developing nations and continues to be a challenge due to increase in availability of prescription and OTC products (Fuentes Albarrán & Villa Zapata, 2008; McCabe et al., 2006). The Saudi Food and Drug Authority (SFDA) regulates the approval of drugs in Saudi Arabia and publicly provides a drug list with detailed information including the drug status (prescription, controlled or OTC) (Syed et al., 2021). There have been strict restrictions by the Ministry of Health (MOH) to contain levels of inappropriate drug consumption and related drug dependence, evident by their recent policy reforms, for example there has been a reinforcement of regulations in 2018 regarding for dispensing of antibiotics without a valid prescription at community pharmacies (Al-Tannir et al., 2020) and the shifting of controlled substances (e.g. opioids, pregabalin) from community pharmacy setting to hospital pharmacies (Alkhalaf et al., 2021). The SFDA had also reiterated the warning issued by the United States Food and Drug Administration (USFDA) in 2008 to stop the dispensing of OTC cough and cold products to children less than two years of age (SFDA, 2008). These regulations by the MOH and SFDA were enforced to protect the public as well as to control their dispensing pattern. Nonetheless, the community pharmacists’ role is of utmost importance as they are at the implementation front of these regulations. Community pharmacists have been successfully able to implement these regulations at their practice level and this is clearly seen with recent reports regarding the decrease in the sale of antibiotics (AlRukban et al., 2020).

There have been studies conducted in Saudi Arabia which explored the prevalence of inappropriate and dependent use of prescription and/or OTC medications among students and public. A study conducted among female students attending a Saudi university reported high prevalence of OTC and prescription drug misuse with tramadol being reported as the drug of choice for abuse among health and non-health college students (Dabbagh et al., 2021). A recent Saudi study reported high prevalence of sedative misuse among university students (Fadhel, 2022). A study conducted from a major city Saudi city (Jeddah) documented the prevalence of inappropriate and harmful OTC use among adults wherein they found that a high significant rate (exceeding 50%) of OTC medication use (Safdar et al., 2021). Also, inappropriate use of medications was identified by another study in Saudi Arabia, where half of the study participants claimed that they knew someone who had misused medications (Tobaiqy et al., 2019). Abuse liability of gabapentin among Saudi population was reported after enforcement of pregabalin restriction for sale through community pharmacies (Alkhalaf et al., 2021).

However, there is dearth of studies focusing on the experiences and perspectives of Saudi community pharmacists on the phenomenon of inappropriate use of prescription and OTC drugs. One Saudi study assessed their knowledge, attitude and beliefs about such drugs and the majority of community pharmacists reported to have received training to identify drug abuse during their pharmacy education and could appropriately counsel suspected customers (Mobrad et al., 2020). Recently, a study from the south-western region of Saudi Arabia evaluated the perceptions of community pharmacists regarding consumption of pregabalin and found that nearly two-thirds of their respondents suspected pregabalin to be abused (Alshahrani et al., 2021).

Hence, the current study was designed to investigate the most common prescription and OTC drugs that were suspected of inappropriate use from the community pharmacists’ perspective along with the action taken by the pharmacist in response to the suspicious requests. Also, we explored the community pharmacists’ suggestions pertaining to their role in dealing with suspicious requests. The findings are intended to contribute to the growing evidence base in Saudi Arabia.

2. Methods

2.1. Study design

A questionnaire-based cross-sectional study was designed which employed convenience sampling to elicit responses from the community pharmacists across the five geographical regions (central, east, west, north and south) in Saudi Arabia. The inclusion criteria were being a licensed pharmacist practicing in a retail chain or an independent community pharmacy in Saudi Arabia. Pharmacists who were practicing in any setting other than in a community pharmacy were excluded from the study. The study was granted approval (REC42/1/031) by the Institutional Review and Ethics Committee of the College of Pharmacy, Jazan University, Saudi Arabia. The study was conducted between January 2021 to December 2021. All study participants were notified about the purpose of the study and informed consent was taken prior to administering the questionnaire. Participation was voluntary, and anonymity and confidentiality were maintained during the study.

2.2. Data collection

Both paper-based and an online questionnaire (Qualtrics XM) were administered to community pharmacists across the five main geographical locations in Saudi Arabia (eastern, western, central, northern and southern). Snowball technique (non-probability, convenient) was employed to recruit the participants (Meraya et al., 2021). The first page of the online questionnaire included the purpose of the study along with the definitions of prescription medi-

cations, OTC medications, and forms of inappropriate drug use. The names, email and phone numbers of the study investigators were also made available to the participants, if they had any query. Before proceeding to the questionnaire, the participants were asked to provide their consent to participate in the study. The participants were also requested to record their responses only once. The questionnaire link was first distributed to ten known pharmacists who were selected based on their appropriate representation of years of experience and location of their pharmacy. Upon completion, they were requested to forward the online link to another 10 pharmacists who fitted the inclusion criteria. The second set of participants further asked to forward it to another 10 pharmacists and so on. Paper-based questionnaires were also delivered to various pharmacies in a south-west province (Jazan) of Saudi Arabia by a group of three PharmD interns (College of Pharmacy, Jazan University, Saudi Arabia). Prior to distributing the paper-based survey, the data collectors enquired if the responding pharmacists had not filled the online questionnaire to avoid duplication of responses. The pharmacists were informed that their pharmacy location would remain confidential and their responses would be used only for research purposes by the study investigators. The interns who had assisted in the paper-based data collection were provided with financial incentives at the end of data collection period and appreciation certificate as a data collector was awarded to each of three interns.

2.3. Study tool

The questionnaire was adapted from that administered by Hughes et. al (1999) in Northern Ireland and Albsoul-Younes et al (2010) in Jordan (Albsoul-Younes et al., 2010; Hughes et al., 1999). The Arabic version of the questionnaire employed in Jordan was adapted with some minor revisions to be applied in the Saudi context. After the modifications, the questionnaire was proof-read by a three-member expert committee comprising of two community pharmacists and one hospital pharmacist for face validity and content validity. Subsequently it was given to a professional expert to check the correctness and consistency of the Arabic language, and then pilot-tested among 40 known community pharmacists with varied geographical distribution. After receiving the responses, these pharmacists were contacted in regard to the completion time and requested to provide any suggestions to improve the questionnaire. The suggestions were discussed among the study authors and were incorporated where the team had consensus.

The questionnaire consisted of three broad sections. The first section required the community pharmacist to report the name of the drugs they suspected of inappropriate use (misuse and/or abuse). For each drug entry, the pharmacists were asked if the frequency of inappropriate use was increasing, decreasing or staying same and if they had encountered any cases of abuse in their pharmacy. Also, the pharmacists were asked to provide the typical age and gender for the suspected consumers for each drug.

The second section of the questionnaire employed three questions, the first of which was to enquire any specific system they had in place to limit the suspected users' access to medications. This was an open-ended question for which the responses were later grouped under five categories. The next question asked the pharmacists to indicate if they had contacted or had been contacted by other pharmacies in their area regarding this issue. In the last question, the pharmacists were asked to indicate the suggested role of the pharmacist to combat the problem of inappropriate use of prescription and OTC drugs.

The third section of the questionnaire included questions on the demographic characteristics of the pharmacists. This included: gender, age and years of experience. Participants were also asked to indicate the social class of the majority of their customers. In order to ensure anonymity of the participating pharmacists, they were only asked to mention their province and classify the area where their pharmacy is situated (urban, semi-urban or rural).

2.4. Sample size calculation

The sample size in the study was determined to be 368 and was calculated using an online tool (Raosoft®, 2004). This was based on the number of community pharmacists working in Saudi Arabia (AlRuthia et al., 2018) with estimated population of 8409, with power (1- β) of 0.80, 5% margin of error, 95% confidence level and 50% response distribution. By using the Cochran's equation ($n_0 = Z^2\ pq/e^2$) (Alnohair et al., 2021) the estimated sample size was found to be 384, which is relatively similar to the sample size calculated by the online tool, where; n_0: sample size, Z^2: corresponds to the desired confidence level, e.g., 95% (i.e., Z = 1.96), e - desired level of precision (e = 5% = 0.05), p - estimated proportion of an attribute that is present in the population (p = 0.5), and q = 1-p (i.e., q = 1 – 0.5 = 0.5). $(1.96)^2 \times 0.5 \times 0.5 / (0.5)^2 = 3.84 \times 0.25 / 0.0025 = 0.96 / 0.0025 = 384$.

2.5. Statistical analysis

The responses collected through paper-based questionnaire and online questionnaire (Qualtrics XM) were first entered in Microsoft Excel and coded. Data were then analyzed using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA, version 23). The demographic characteristics were analyzed descriptively and expressed as frequencies and percentages. Cross-tabulation was done with Pearson's chi-square and Fisher's exact test (for variables having an expected cell count below 5) were used to test significant association between groups. A priori level was set to be 0.05.

3. Results

By the end of the data (December 2021) collection period, 457 community pharmacists had received the questionnaire, out of which 397 community pharmacists participated in the study (86.9 % response rate). The mean age of participants was 29.57 ± 4.96 years of whom the majority of were male (92.4%). More than half of the community pharmacists had 0 to 5 years of experience. Nearly one third perceived the customer's social class as either low-middle and middle class (36.5% and 36.3% respectively). Less than half (45.6%) of the community pharmacists reported their pharmacy location as urban. The detailed demographic characteristics are depicted in Table 1.

Based on the brand name or generic name of the prescription and OTC drugs suspected to be used inappropriately, the drugs were categorized to 12 broad categories as listed in Table 2. Cronbach's Alpha was used to assess the internal consistency of these 12 categories of the questionnaire. All the sections pertaining to these drug categories had an alpha coefficient > 0.8 (i.e. greater than the threshold of 0.70), thereby demonstrating excellent internal consistency.

Majority of community pharmacists (86.4%) suspected some level of inappropriate use of prescription and OTC drugs occurring in their catchment area. To estimate the extent of inappropriate use of the reported drugs, the responses provided by each pharmacist were distributed as either a prescription or OTC drug. Inappropriate use was reported 1069 times in the past three months by the pharmacists among which prescription drugs were reported 530 times and OTC drugs were reported 539 times. Overall, the trend of suspicious requests was presumed to be increasing (67.8%) for

Table 1
Demographic characteristics of participating pharmacists (n = 397).

VARIABLE	OPTIONS	N	%
Education Level	Pharm.D	257	64.7
	B.Pharm	125	31.5
	Masters	15	3.8
Years of Experience	0 – 5 years	223	56.2
	6 – 10 years	109	27.5
	> 10 years	65	16.4
Gender	Male	367	92.4
	Female	30	7.6
Age Mean (±SD)	29.57 ± 4.96		
Customer's Social Class	Low	36	9.1
	Low – Middle	145	36.5
	Middle – Upper	144	36.3
	Upper	72	18.1
Location of Pharmacy	Urban	181	45.6
	Semi-Urban	156	39.3
	Rural	60	15.1
Province of Pharmacy	Central	94	23.7
	Eastern	41	10.3
	Western	80	20.2
	Northern	34	8.6
	Southern	148	37.3

Table 2
Suspicious request for prescription and OTC drugs (N = 1069).

Prescription drugs reported (n = 530)	
Drug category	**n (%)**
Gabapentinoids	119 (22.5)
Antipsychotics	93 (17.5)
Topical corticosteroids	64 (12.1)
Antidepressants	62 (11.7)
Codeine containing analgesics	58 (10.9)
NSAIDs	37 (7.0)
Eye products	36 (6.8)
Topical Retinoids	22 (4.2)
Appetite stimulants	20 (3.8)
Antibiotics	11 (2.1)
Miscellaneous	8 (1.5)
OTC drugs reported (n = 539)	
Drug category	**n (%)**
Cough products	179 (33.2)
Cold and flu products	159 (29.5)
First generation antihistamines	58 (10.8)
Analgesics	55 (10.2)
Topical medications	36 (6.7)
Nasal decongestants	23 (4.3)
Laxatives	17 (3.2)
Antacids	12 (2.2)

the mentioned products. Among the drugs that were reported for potential inappropriate use, the top category was of gabapentinoids (22.5%) for prescription drugs and cough products (33.2%) for OTC drugs. The list of all reported prescription and OTC drug categories as reported by pharmacists are summarized in Table 2 Regarding the gender involvement in inappropriate use, pharmacists were of the belief that nearly half of the suspected abusers were male (48.4%) and belonging to the age group of 26 – 50 years. The gender-wise distribution of suspicious requests for prescription and OTC drugs are illustrated in Fig. 1 and Fig. 2 respectively.

From each drug category listed out in Table 2, the most reported drug product was identified, and a list of top 20 drugs suspected of inappropriate use was prepared. The top-ranking drug product liable for inappropriate use that was identified in our study was an OTC cough syrup (diphenhydramine + dextromethorphan + ps eudoephedrine). The most reported medications are presented in Table 3.

Table 4 depicts the cross tabulation of the different classes of drugs with age as well as gender of customers with suspicious requests. The drug classes that were significantly associated with males and with the age group of 26–50 years were antipsychotics, antidepressants, gabapentinoids, cough products and first-generation antihistamines ($p < 0.001$). Eye products (Bimatoprost) were the only category significantly associated with age group of 26–50 years and females ($p < 0.001$). Cold and flu products and analgesics (including codeine and paracetamol preparations) were only associated with the age group of 26–50 years ($p < 0.001$). Skin products (which included both prescription and OTC drugs) had significant association with female gender ($p < 0.001$) and not with any age group.

The community pharmacists were also asked about the action they take in order to restrict access to customers with suspicious requests. More than one third (36.7%) responded that they would request a valid prescription where a prescription only drug was requested. The other actions are listed in Table 5. The community pharmacists were also asked if they had contacted other pharmacies in the area or have been contacted by other pharmacies to deal with suspicious requests for certain drugs. Less than one third (30%) reported that they had contacted other pharmacists in their area. Around half of the pharmacists (46.3%) responded that they had not contacted other pharmacists, nor had they been contacted by other pharmacists regarding the issue. Opinion of the pharmacists was also elicited concerning their role in dealing with suspicious requests for certain drugs. Most pharmacists (39.5%) suggested that the pharmacist should be involved in all the mentioned roles (Table 6).

4. Discussion

Community pharmacists worldwide and in Saudi Arabia continue to regularly encounter the problem of suspicious requests related to prescription and OTC drugs with abuse liability. Although, regulations make the distinction between prescription-only and OTC drugs, patients may self-medicate with either or both, which if not controlled may have disastrous consequences, from various side effects, iatrogenic tolerance, habit forming use and dependence. An earlier Saudi conducted in 2013 reported the extent of dispensing prescription-only medications (co-amoxiclav/cefaclor, captopril and fluoxetine) without a prescription at community pharmacies in Jeddah, wherein around 98% of pharmacists dispensed co-amoxiclav/cefaclor, all of the pharmacists (100%) dispensed captopril and nearly 90% dispensed fluoxetine, thereby highlighting a major fault in dispensing practices (Al-Mohamadi et al., 2013). A previous study in Jordan, have reported abuse or misuse at community pharmacies to be highest for decongestants, cough/cold products, benzodiazepines and antibiotics of both prescription and non-prescription drugs (Albsoul-Younes et al., 2010). Later, when this study was repeated after eight years, new products (ophthalmic drops and pregabalin) added to the list demonstrating a change in pattern to inappropriate use of medications (Wazaify et al., 2017). Also, other studies from Yemen (Abood & Wazaify, 2016) and Palestine (Sweileh et al., 2004) have also reported the misuse of prescription and/or OTC drugs.

The majority of the community pharmacists (86.4%) in the current study reported receiving at least one suspicious request for prescription as well as OTC drugs during the past three months. Higher number of pharmacists reported that they received suspicious requests in Jordan in 2010 (94.1%) and 2016 (100%) (Albsoul-Younes et al., 2010; Wazaify et al., 2017). Among the therapeutic categories, gabapentinoids (gabapentin and pregabalin) were ranked highest for the suspicious requests by respondents. Out of these, requests for gabapentin were considerably higher than for pregabalin which is probable due to the decision by the Saudi Food and Drug Authority in 2017 to list pregabalin as a con-

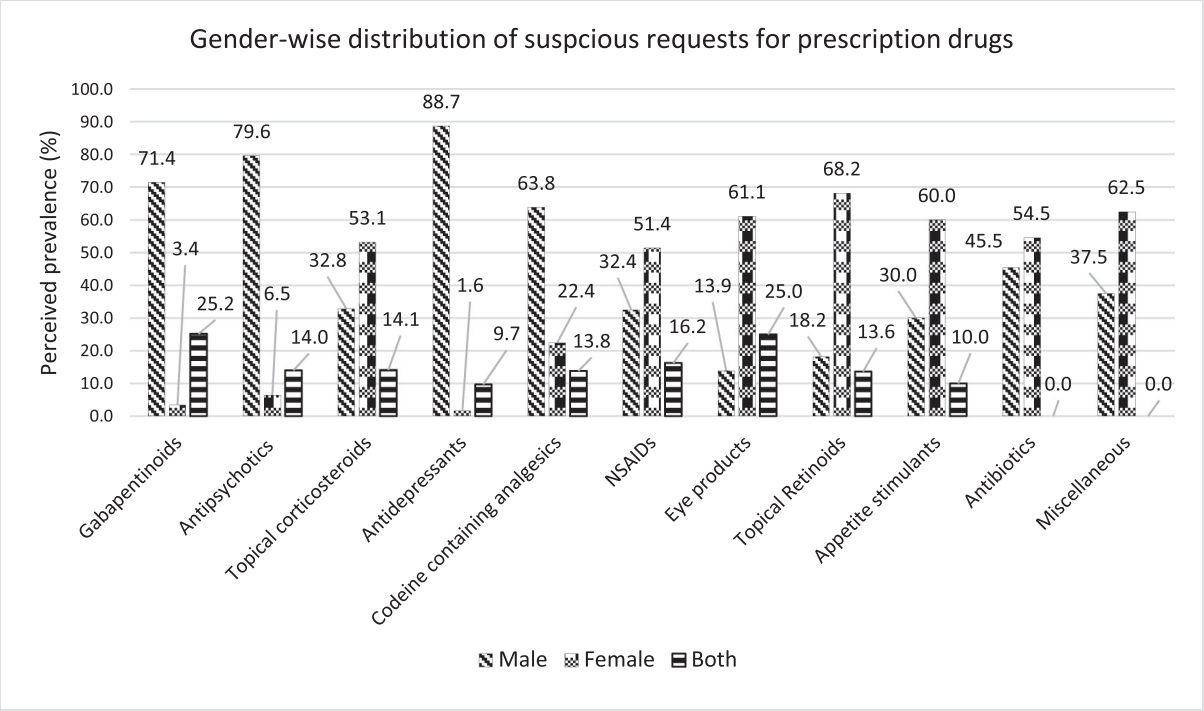

Fig. 1. Gender-wise distribution of suspicious requests for prescription drugs.

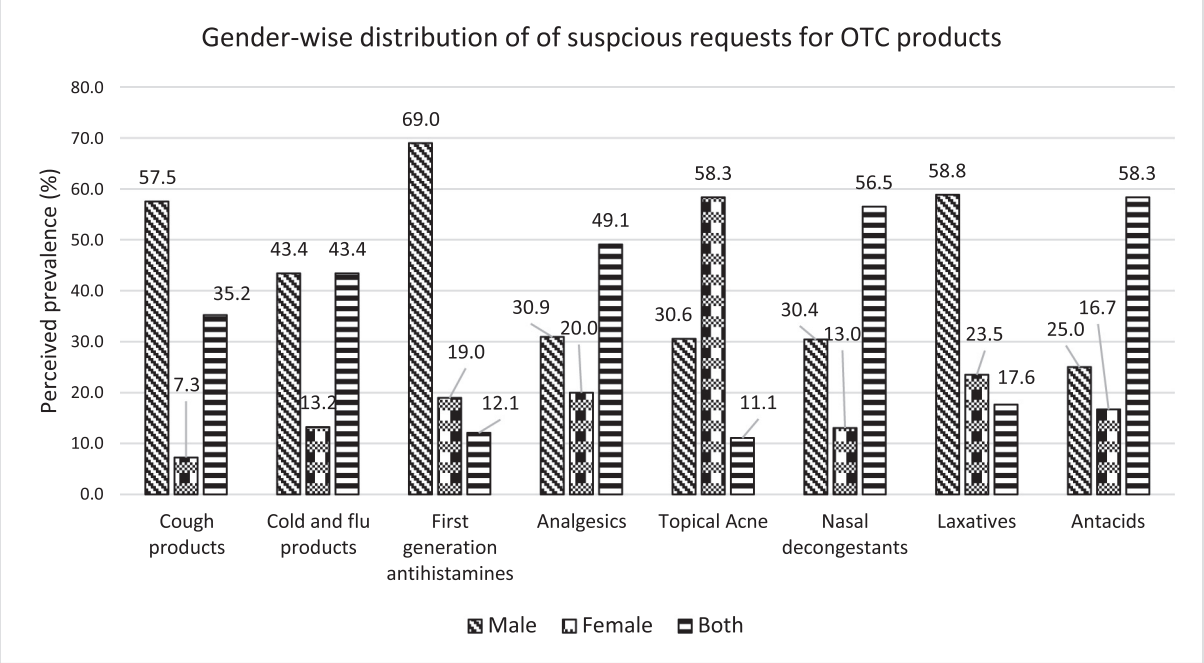

Fig. 2. Gender-wise distribution of suspicious requests for OTC products.

trolled substance which led to its withdrawal from community pharmacies, thereby restricting the availability only at hospital pharmacies (SFDA, 2015). A recent Saudi study has also highlighted displacement of use from pregabalin to gabapentin (Althunian et al., 2022). Another study reported that around 50% of respondents misusing gabapentin had previously used pregabalin suggestive of displacement (Alkhalaf et al., 2021). Similar accounts of pregabalin abuse/misuse were also reported from Jordan. (Al-Husseini et al., 2018, 2019).

Antipsychotics were the next most common drugs in suspicious requests and the most requested drug in this class was quetiapine. This finding is in agreement with other studies that explored the abuse liability of quetiapine. Recently, Roy et al (2022), analyzed case safety records from pharmacovigilance database of World Health Organization which has confirmed risks associated with quetiapine. Our findings are also supported by evidence from several studies that documented quetiapine as the most abused drug among atypical antipsychotics (Keltner & Vance, 2008; Klein et al.,

Table 3
Top 20 drugs in suspicious requests as reported by pharmacists.

S. No	Drug	Formulation	Category	Class/Use	No. of suspicious requests
1	Diphenhydramine + Dextromethorphan + Pseudoephedrine	Syrup	OTC	Cough	113
2	Gabapentin	Capsule	Prescription – Controlled drug	Gabapentinoid	99
3	Paracetamol + Diphenhydramine	Tablet	OTC	Cold and Flu	98
4	Quetiapine	Tablet	Prescription – Controlled drug	Antipsychotic	61
5	Dextromethorphan	Syrup	OTC	Cough	58
6	Paracetamol + Codeine	Capsule	Prescription	Codeine containing Analgesic	58
7	Escitalopram	Tablet	Prescription – Controlled drug	Antidepressant	54
8	Clobetasol propionate	Cream/ Ointment	Prescription	Topical corticosteroid	44
9	Chlorpheniramine	Syrup	OTC	First generation antihistamine	37
10	Paracetamol + Caffeine	Tablet	OTC	Analgesic	32
11	Paracetamol + Pseudoephedrine + Diphenhydramine	Tablet	OTC	Cold and Flu	31
12	Paracetamol + Chlorpheniramine + Pseudoephedrine	Tablet	OTC	Cold and Flu	30
13	Hydroquinone	Cream	OTC	Topical OTC formulation	25
14	Xylometazoline	Spray	OTC	Nasal decongestant	23
15	Tretinoin	Cream	Prescription	Topical retinoids	22
16	Pregabalin	Capsule	Prescription – Controlled drug	Gabapentinoid	20
17	Bimatoprost	Eye Drops	Prescription	Glaucoma	20
18	Diclofenac sodium	Tablet	Prescription	NSAID	20
19	Diphenhydramine	Syrup	OTC	First generation antihistamine	18
20	Mometasone	Cream	Prescription	Topical corticosteroid	16

2017; Pinta & Taylor, 2007). A Saudi study in 2016 also reported that around 10% of their participants had obtained quetiapine without a prescription (Alosaimi et al., 2016).

Topical corticosteroids were reported as the third most requested prescription products in our study. Although most of the topical corticosteroid preparations (excluding hydrocortisone acetate, hydrocortisone butyrate and hydrocortisone and miconazole combination) are listed as prescription drugs by the SFDA (SFDA, 2023), they can be easily purchased from community pharmacies without prescription. Indiscriminate use of topical corticosteroid preparations among the dermatology outpatients has been reported worldwide which have underscored the rampant problem of topical corticosteroid misuse (Nagesh & Akhilesh, 2016; Al-Dhalimi & Aljawahiry, 2006; Lu et al., 2009; Sendrasoa et al., 2017; Mahe et al., 2003). Also, our finding related to topical corticosteroid misuse is supported by results of a Saudi study that investigated the prevalence of topical corticosteroid use without prescription and reported that being a female was the most identifiable risk factor (Al-Aojan et al., 2021). Other study results from those conducted in the central (Alafnan et al., 2019) and western regions (Hawsawi et al., 2017) of Saudi Arabia have also demonstrated misuse of topical corticosteroids by females. These findings are also similar as those in our study where nearly half of the misusers (53.1%) were female. Also, clobetasol propionate was most misused among all topical corticosteroid preparations in our study.

Based on the suspicious requests received for prescription-only drugs, respondents in our study mentioned antidepressants to be the fourth most requested drug class. Although, antidepressants have low potential for abuse, there are concerns around potential for a psychostimulant effect, including a desire for a 'high/euphoria' (Evans & Sullivan, 2014). We found that among antidepressants, the drug that was suspected of inappropriate use was escitalopram which is supported by the results of another Saudi study where they explored the patients' reasons for obtaining psychotropic medications from community pharmacies without prescription and reported escitalopram to be the most commonly abused psychotropic drug wherein respondents stated depression, anxiety, lack of sleep, and social phobia as the reasons for self-treatment with escitalopram (Alosaimi et al., 2016).

Analgesic products containing codeine also appeared as a concern in our study and were ranked fifth in the prescription drugs category. Misuse of medications containing codeine have been recognized as a growing public health and drug control challenge (van Hout & Norman, 2016). There have been numerous studies conducted in the United Kingdom, Ireland, South Africa and Australia that have raised this growing problem due to the availability of combination OTC codeine-containing medications (Foley et al., 2016, 2017, 2018; van Hout et al., 2017; Wells et al., 2018). In our study, the most requested product in this category was a combination of paracetamol and codeine. A recent Saudi study also highlighted the concerns of physicians regarding the easy availability of codeine-containing analgesics at community pharmacies (Syed et al., 2021).

Bimatoprost was the most common in the list of prescription-only eye drops category. Although, it is a drug for treatment of glaucoma, it has been reported by pharmacists that it is being used for eye lash and eye brow hypotrichosis. Bimatoprost was approved for this indication by the United States Food and Drug Administration (FDA) for use in cancer patients who are on chemotherapy (Chanasumon et al., 2018). The easy availability of bimatoprost on online shopping websites and its off-label use of by dermatologists has led to its popularity in general population and contributed to use without medical supervision.

In addition, topical retinoids (tretinoin), appetite stimulants (pizotifen, cyproheptadine) and antibiotics were also included in suspicious requests at community pharmacies in descending order with antibiotics misuse being the lowest. In order to curtail the inappropriate antibiotic sale through the community pharmacies, the Ministry of Health (MOH) in Saudi Arabia has imposed the provisions of the Executive Regulations of Health Practice Law in 2018 prohibiting the sale of antibiotics as OTC medications at community pharmacies (MOH, 2018).

Table 4
Cross tabulations between drug categories in suspicious requests and their association with age and gender of customers.

Variable		Mentioned N (%)	*p*-value	χ^2
ANTIPSYCHOTICS				
AGE	< 25 years	20 (21.5%)	$p < 0.001$	414.32
	26 – 50 years*	52 (55.9%)		
	> 50 years	13 (14%)		
	Unspecified	8 (8.6%)		
	Total	93 (100%)		
GENDER	Male*	74 (79.6%)	$p < 0.001$	417.37
	Female	6 (6.5%)		
	Equal	13 (14%)		
	Total	93 (100%)		
ANTIDEPRESSANTS				
AGE	< 25 years	15 (24.2%)	$p < 0.001$	330.0
	26 – 50 years	39 (62.9%)		
	> 50 years	4 (6.5%)		
	Unspecified	4 (6.5%)		
	Total	62(100%)		
GENDER	Male	55 (88.7%)	$p < 0.001$	333.15
	Female	1 (1.6%)		
	Equal	6 (9.7%)		
	Total	62 (100%)		
GABAPENTINOIDS				
AGE	< 25 years	38 (31.9%)	$p < 0.001$	458.75
	26 – 50 years	64 (53.8%)		
	> 50 years	4 (3.4%)		
	Unspecified	13 (10.9%)		
		119 (100%)		
GENDER	Male	85 (71.4%)	$p < 0.001$	459.97
	Female	4 (3.4%)		
	Equal	30 (25.2%)		
	Total	119 (100%)		
ANTIBIOTICS				
AGE	< 25 years	0 (0%)	$p < 0.001$	96.61
	26 – 50 years	7 (63.6%)		
	> 50 years	4 (36.4%)		
	Unspecified	0 (0%)		
	Total	11 (100%)		
GENDER	Male	5 (45.5%)	$p < 0.001$	96.54
	Female	6 (54.5%)		
	Equal	0 (0%)		
	Total	11 (100%)		
SKIN MEDICATIONS				
AGE	< 25 years	54 (44.3%)	$p < 0.001$	463.25
	26 – 50 years	56 (45.9%)		
	> 50 years	4 (3.3%)		
	Unspecified	8 (6.6%)		
	Total	122 (100%)		
GENDER	Male	37 (30.3%)	$p < 0.001$	392.37
	Female	67 (54.9%)		
	Equal	18 (14.8%)		
	Total	122 (100%)		
EYE MEDICATIONS				
AGE	< 25 years	11 (30.6%)	$p < 0.001$	226.72
	26 – 50 years	18 (50.0%)		
	> 50 years	1 (2.8%)		
	Unspecified	6 (16.7%)		
	Total	36 (100%)		
GENDER	Male	5 (13.9%)	$p < 0.001$	224.99
	Female	22 (61.1%)		
	Equal	9 (25.0%)		
	Total			
COUGH MEDICATIONS				
AGE	< 25 years	25 (14.0%)	$p < 0.001$	393.0
	26 – 50 years	97 (54.0%)		
	> 50 years	22 (12.3%)		
	Unspecified	35 (19.6%)		
	Total	179 (100%)		
GENDER	Male	103 (57.5%)	$p < 0.001$	393.0
	Female	13 (37.3%)		
	Equal	63 (35.2%)		
	Total	179 (100%)		

Table 4 (*continued*)

Variable		Mentioned N (%)	*p*-value	χ^2
COLD & FLU MEDICATIONS				
AGE	< 25 years	6 (3.8%)	$p < 0.001$	504.97
	26 – 50 years	96 (60.4%)		
	> 50 years	17 (10.7%)		
	Unspecified	40 (25.2%)		
	Total	159 (100%)		
GENDER	Male	69 (43.4%)	$p < 0.001$	392.89
	Female	21 (13.2%)		
	Equal	69 (43.4%)		
	Total	159 (100%)		
NASAL DECONGESTANTS				
AGE	< 25 years	1 (4.3%)	$p < 0.001$	169.49
	26 – 50 years	9 (39.1%)		
	> 50 years	3 (13.0%)		
	Unspecified	10 (43.5%)		
	Total	23 (100%)		
GENDER	Male	7 (30.4%)	$p < 0.001$	168.41
	Female	3 (13.0%)		
	Equal	13 (56.5(%)		
	Total	23 (100%)		
ANTIHISTAMINES				
AGE	< 25 years	8 (13.8%)	$p < 0.001$	315.68
	26 – 50 years	30 (51.7%)		
	> 50 years	6 (10.3%)		
	Unspecified	14 (24.1%)		
	Total	58 (100%)		
GENDER	Male	30 (51.7%)	$p < 0.001$	317.07
	Female	6 (10.3%)		
	Equal	22 (37.9%)		
	Total	58 (100%)		
ANALGESICS				
AGE	< 25 years	14 (9.3%)	$p < 0.001$	397.0
	26 – 50 years	60 (40.0%)		
	> 50 years	30 (20.0%)		
	Unspecified	46 (30.7%)		
	Total	150 (100%)		
GENDER	Male	47 (31.3%)	$p < 0.001$	397.0
	Female	21 (14.0%)		
	Equal	82 (54.7%)		
	Total	150 (100%)		

Table 5
Action taken by pharmacist to prevent access following a suspicious request.

Action taken by the Pharmacist	n = 384	%
Hiding drug away from sight	92	24.0
Advice and counselling	75	19.5
Refuse to sell the drug	76	19.8
Request for a valid prescription for prescription only drugs	141	36.7

Table 6
Suggested community pharmacists' role in dealing with suspicious requests.

Suggested Role of Pharmacist	N = 397	%
Individual referred to the Physician	135	34
Individual referred to another organization (Ex. Substance Abuse Treatment Centre)	38	9.6
Pharmacists involved in the development of drug detoxification, treatment and rehabilitation programmes	67	16.9
All of the above	157	39.5

OTC abuse has been well documented as a serious public health concern worldwide (Abood & Wazaify, 2016; Barrenberg & Garbe, 2015; Conca & Worthen, 2012; Elhoseeny et al., 2013; Fingleton et al., 2016). OTC drugs suspected of inappropriate use in our study includes cough products (33.2%) and the most requested product was a cough syrup with a combination of diphenhydramine, dextromethorphan and pseudoephedrine. Studies from United States and Taiwan have reported the abuse of diphenhydramine (Chen et al., 2014; Dinndorf et al., 1998; Saran et al., 2017). In Saudi Arabia, diphenhydramine was reported to be one of the most frequently misused drug among female university students (Dabbagh et al., 2021). Among cough medications, a product containing pseudoephedrine in combination with codeine and triprolidine was reported to be the most frequently misused in Palestine (Sweileh et al., 2004). Dextromethorphan has infamously been the focus of abuse in regard to OTC medications. A systemic review encompassing 92 articles has reported dextromethorphan to be the most commonly misused OTC drug (Schifano et al., 2021). Gender distribution showed that suspected inappropriate use of cough products was greater in males (57.5%).

Cold and flu products were the next most common category and all of which contained paracetamol in combination with an antihistaminic (diphenhydramine, chlorpheniramine) and/or a sympathomimetic drug (pseudoephedrine). The suspicious request for cold and flu products was lowest in females alone (13.2%) when compared to males alone (43.4%) or no gender preference (43.4%). Anticholinergic properties and CNS effects similar to effects of alcohol or benzodiazepines is well known for first-generation antihistamines (Juniper et al., 2005). Many community pharmacists notified that patients tend to use these products more as a sleep aid and repetitive use can lead to dependence. Males (69%) predominantly requested the first-generation antihistamines

in our study. Analgesics (10.2%), topical medications (6.7%), nasal decongestants (4.3%), laxatives (3.2%) and antacids (2.2%) were also reported by pharmacists in decreasing order in the OTC group.

Another important factor to take into consideration was the effect of COVID-19 on the responses given by community pharmacists in our study. There was an increase in sale of OTC drugs in many countries during the pandemic period due to decreased access to doctors, and the "infodemic" that ensued resulted in self-medication by patients. This increase in trend of OTC use was evident in many countries (Karlsson et al., 2021; Nasir et al., 2020; Wegbom et al., 2021; Yáñez et al., 2021). In our study as well, there are two cough products (ranked first and fifth) and one cold and flu product (ranked third) in the list of top 20 drugs in suspicious requests.

The cross tabulations between age and gender with the different categories of drugs revealed that being in the age range of 26–50 years and being a male was significantly associated ($p < 0.001$) with suspicious requests for most drug categories (antipsychotics, antidepressants, gabapentinoids, cough products and first-generation antihistamines). In contrast, eye products (Bimatoprost) and skin products use had significant association with female gender ($p < 0.001$).

The action taken by the pharmacists in our study were similar to those of pharmacists from other countries (Abood & Wazaify, 2016; Albsoul-Younes et al., 2010; Hughes et al., 1999; Wazaify et al., 2017). Requesting a valid prescription for prescription-only medications and hiding the drug away from sight for OTC drugs were the most common action reported by community pharmacists if they suspected inappropriate use of OTC drugs. These actions may seem effective to the pharmacist in the encountered situation, the usefulness is limited as the patients indulge in "pharmacy hopping" to obtain the medications. Networking of pharmacists in an area can help minimize the problem as other pharmacists will be informed of the suspected abuser and/or the common drugs being requested for abuse (Albsoul-Younes et al., 2010). The findings of our study can aid the MOH and SFDA to strategize further steps to combat the problem of inappropriate use of prescription and OTC drugs.

To our knowledge, this study is the first to provide insights into community pharmacists' experiences and perspectives around dealing with suspicious requests and potential inappropriate use of certain common prescription and OTC drugs in Saudi Arabia. Another strength is that our participants were distributed across all regions of the country covering community pharmacies located in rural, semi-urban and urban settings.

The study however has limitations. As a self-reporting questionnaire was employed, it may result in recall or desirability bias and self-selection bias. Additionally, the responses were based on the perception of the community pharmacists about which drugs they suspect to be abuse or misused. Structured interviews with the pharmacists would have been helpful to better explore and understand the phenomenon of suspected inappropriate use of drugs. Nevertheless, the findings of our study do act as baseline for further studies to identify the barriers and facilitators for community pharmacists in tackling this growing problem.

5. Conclusion

The findings of this study warrant strict regulation in regard to dispensing policies. Also, specific training needs to be provided to the community pharmacists as well as pharmacy students to update their knowledge regarding inappropriate and dependent drug use and to develop skills to identify drug-seeking behavior in patients. The study highlights the role played by community pharmacists in Saudi Arabia to identify patients with inappropriate drug-seeking behavior and underscores their willingness to play an active role in combating this problem. It also identifies a broad range of prescription and OTC drugs suspected of inappropriate use by customers attending community pharmacies in Saudi Arabia. The results provide vital information to the healthcare authorities regarding the suspected drugs that are potentially being used inappropriately, and therefore aid in the formulation of strict measures at the level of community pharmacies. In addition, increased public health initiatives are imperative to educate the public regarding the dangers of using drugs without medical advice. Further research involving patients is needed to explore the underlying reasons which eventually will help the health authorities to design educational programs for public benefit.

CRediT authorship contribution statement

Ayesha Yasmeen: Conceptualization, Methodology, Validation, Writing – review & editing. **Mamoon H. Syed:** Conceptualization, Methodology, Validation, Writing – original Draft. **Saad S. Alqahtani:** Methodology, Investigation, Formal analysis. **Nabeel Kashan Syed:** Investigation, Data curation, Formal analysis. **Abdulkarim M. Meraya:** Formal analysis, Writing – review & editing. **Mayyada Wazaify:** Conceptualization, Methodology, Writing – review & editing. **Marie-Claire Van Hout:** Conceptualization, Methodology, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

The authors extend their appreciation to Deanship of Scientific Research, Jazan University, for supporting this research work through the Research Units Support Program, Support Number: RUP2-03.

Author contributions

AY, MHS, MCVH, MW conceptualized the study, designed the study questionnaire and drafted the initial version of the manuscript. AY, MHS and SSA prepared the methodology. NKS and SSA collected the data and performed the data curation. NKS, SSA, AMM did the data analysis and reviewed the drafts of the manuscript. AY and MHS prepared the final version of the manuscript. MCVH, MW & AMM critically reviewed the final version of the manuscript. All authors agreed and approved of the final version before submission.

Funding

The authors extend their appreciation to Deanship of Scientific Research, Jazan University, for supporting this research work through the Research Units Support Program, Support Number: RUP2-03.

Availability of data and materials

Relevant data can be obtained from the corresponding author upon reasonable request.

Ethics approval

The Institutional Research Review and Ethics Committee at Jazan University reviewed and approved this study and all its procedures.

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