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PRESCRIBING PATTERNS AND PHARMACOLOGICAL KNOWLEDGE OF ANALGESICS AMONG COMMUNITY PHARMACISTS IN JEDDAH, SAUDI ARABIA

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Background: *Analgesics are frequently used to manage pain, and community pharmacists play a crucial role in prescribing these medications. However, inappropriate prescribing patterns and inadequate pharmacological knowledge of analgesics among pharmacists can lead to adverse health outcomes and increase healthcare costs.* ***Aim:*** *Eevaluating the prescribing patterns and pharmacological knowledge of analgesics among community pharmacists in Saudi Arabia. The study also seeks to identify any potential areas of deficiency in the knowledge or practices of community pharmacists regarding the safe and effective use of analgesics. Ultimately, to enhance the quality of care provided to patients who require analgesic therapy, by addressing any gaps in the knowledge or practices of community pharmacists.* ***Method:*** *In November 2022, a study was conducted in Jeddah to investigate the prescribing skills and level of pharmacological knowledge of analgesics among community pharmacists. The research design used for this study was cross-sectional.* ***Results:*** *One hundred thirty fours community pharmacists responded to the survey. Most participants were male, 31 years old or above, with a Bachelor's Degree in Pharmacy. Most of the community pharmacists were aware of the correct use, side effects or complications, contraindications, safe dosage, and reaction mechanism of analgesics. The community pharmacists obtained a favorable mean knowledge score (> 50%) of analgesic drugs.* ***Conclusion:*** *Community pharmacists reported correct prescribing patterns and adequate pharmacological knowledge. However, when pharmacists have little community experience their analgesic drug knowledge tends to be weaker, but it becomes stronger after 5 years.*

Keywords: *Pharmacist; pharmacology; practice; analgesics; knowledge*

INTRODUCTION

Analgesics are essential drugs for the reliable and effective relief of most reported pain symptoms and other inflammatory diseases[1–3]. They are the most commonly consumed drugs worldwide, with a safe profile when used as directed[4]. The term 'analgesics' refers to a list of different drugs and it is the category of medications with the most significant number of indications for its use[5&6]. This study focuses on six commonly used analgesics: acetaminophen, aspirin, and four specific NSAIDs drugs – ibuprofen, diclofenac, mefenamic, and indomethacin. These are often helpful for most cases reported in community pharmacies.

Acetaminophen, the amphiphilic acid acetylsalicylic acid (ASA), is a common and easily accessible drug in Saudi Arabia and globally[7&8]. It is one of the most frequently used adjuvant analgesics. In terms of analgesia, acetaminophen has perfect analgesic efficacy for headaches, lower back pain, and toothache[9–11]. It is available in approximately 101 different dosages and concentrations in the Saudi market [12]. It is a reasonable initial choice for patients with mild to moderate pain [13,14], and can be administered as a tablet or liquid with different

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combinations, as intravenous injections, and/or in the form of rectal suppositories[15&16]. Acetaminophen has a good safety record in pregnancy with few side effects in most patients [17,18]. However, careful consideration while administering high amounts of acetaminophen in conjunction with certain therapeutical drug classes such as barbiturates, isoniazid, carbamazepine, zidovudine, warfarin, and NSAIDs. Clinically, acetaminophen is the most relevant hepatotoxic drug in the United States[19].

Aspirin, acetylsalicylic acid (ASA), is an effective analgesic for moderate to acute pain with a poor safety profile[20]. Essentially, it works by inhibiting cyclooxygenase[21]. It exerts an anti-inflammatory effect, in addition to its analgesic and antipyretic actions[22]. ASA can be given in different forms such as tablet, effervescent powder, or injectable (aspirin DL-lysine) at a low dose [23&24]. It is available as an over-the-counter (OTC) medication in community pharmacies in Saudi Arabia, as an enteric-coated tablet in 81 and 100mg doses[12]. Aspirin is cheap and affordable with a price range of 1–20 Saudi riyals (equivalent to 0.2–5 USD). Aspirin most commonly produces a relatively high incidence of gastrointestinal reactions such as nausea, vomiting, and gastrointestinal distress [25&26].

Diclofenac, mefenamic, and indomethacin are all NSAIDs that are employed for the purpose of alleviating pain [27&28]. The mechanism of action of these medications involves hindering the synthesis of prostaglandins, which are accountable for inducing pain and inflammation within the body[29]. Diclofenac is often used to treat mild to moderate pain, such as that caused by headaches, toothaches, or menstrual cramps[30]. Mefenamic acid is commonly used to relieve pain associated with menstrual cramps, and can also be used to treat pain from other sources, such as arthritis [31&32]. Indomethacin is typically used to treat acute pain caused by gout, bursitis, or tendonitis. Overall, these drugs are effective at reducing pain; however, they may also elicit adverse reactions such as stomach disturbance, nausea, and vertigo [33&34]. It is important to use these drugs only as directed by a healthcare provider and to be aware of the potential risks associated with their use.

Traditional NSAIDs are excellent analgesics and they are used as antipyretic medications with anti-inflammatory activity due to their inhibition of cyclooxygenase, which results in the inhibition of prostaglandin synthesis, producing the previously mentioned clinical actions. Data from the Saudi Food and Drug Authority (SFDA) show the availability of more than 80, 130, 8, and 10 different brands, dosages and concentrations of ibuprofen, diclofenac, mefenamic and indomethacin, respectively, in the Saudi market[12]. It is worth noting that acetaminophen and NSAIDs can be used in combination for pain alleviation.

Although extensive research has been carried out on the usage of OTC analgesics, to date no study has analyzed the prescribing pattern of OTCs or evaluated the pharmacological knowledge of community pharmacists regarding the usage of analgesics in Jeddah. In addition, to the best of the author's knowledge, there is no research on community pharmacist's knowledge of, or monitoring of, the adverse effects of OTC analgesics.

The aim of this study is to shine new light on the above-mentioned objectives through an examination of different variables related to community pharmacists in Jeddah city.

Method

A cross-sectional descriptive study was conducted among community pharmacists in Jeddah. A survey was designed after extensive research and reviewed by two neuropharmacology experts. It was then piloted on a sample of 20 community pharmacists in Jeddah fin order to test the applicability and reliability of the questionnaire. The selection of medications was obtained from the pilot study. The survey consisted of 21 questions, and it was written in English. It was distributed electronically to all the community pharmacy chain managers in Jeddah, Saudi Arabia. The inclusion criterion was being a community pharmacist working in Jeddah. The data were gathered using a google form, and the study subjects were provided with necessary information and their consent was acquired before the initiation of the study.

The survey

The survey comprised two main parts related to community pharmacists. The first part consisted of eight questions regarding the prescribing patterns of analgesics while the second part enquired about the pharmacological knowledge of analgesics. It consisted of ten questions. Other questions were related to the demographic characteristics of community pharmacists: age, gender, years of community pharmacy experience, and country of academic qualification.

Sample size and sampling procedure

The sample size was based on the total number of pharmacists working in the private sector in Jeddah – 3,228[35]. The statistical program Raosoft was used to determine the sample size at a 90% confidence interval, and a 5% margin of error; the adequate sample size was calculated to be 250.

Ethical considerations

The study adhered to ethical principles and was sanctioned by the Biomedical Research Ethics Committee at Umm Al-Qura University (Registration No. in National Committee of Bio Ethics: HAPO-02-K-012). All participants voluntarily participated, and their information was kept confidential through complete anonymization.

Statistical analysis

The data analysis was performed using IBM SPSS version 23 (IBM Corp., Armonk, N.Y., USA). Simple descriptive statistics were utilized to present the features of the study variables. Specifically, categorical and nominal variables were expressed as counts and percentages, while continuous variables were represented by mean and standard deviation. A scoring system was employed to measure the pharmacists' level of knowledge of the pharmacology of analgesics, and the various adverse effects associated with them. Each question's responses were categorized as correct or incorrect, with a value of 1 and 0 respectively. A simple additive method was used to calculate the total score. The questions involved were the following:

- Aspirin is used as an analgesic.
- The safest dose of ibuprofen is 800 milligrams (mg) every four to six hours, as needed.
- GI upset is the most common side effect of NSAIDs.
- Mefenamic is not used to manage dysmenorrhea (menstrual cramps).
- Diclofenac is contraindicated during pregnancy.
- Mefenamic acid has better antipyretic activity than paracetamol.
- The use of NSAIDs has been associated with a higher probability of experiencing cardiovascular complications such as stroke, heart attack, atrial fibrillation, and heart failure.
- The recommended daily dose of diclofenac is 100–150mg in two or three divided doses.
- NSAIDs should not be administered with diuretics.
- The main mechanism of action of acetaminophen is the inhibition of the enzyme cyclooxygenase (COX).

RESULTS AND DISCUSSION

Results

In this study, the prescribing patterns and pharmacological knowledge of analgesics of 134 community pharmacists in Jeddah, Saudi Arabia, were evaluated. The response rate was 53.6%.

The participants' sociodemographic characteristics showed that the majority of the participants were male (90.3%, n = 121), aged 31 years old and above (76.1%, n = 102), held a Bachelor's Degree in Pharmacy (74.6%, n = 100), and obtained their academic qualifications overseas (64.2%, n = 86), as shown in Table 1. All were working in Jeddah city. In addition, nearly one-third had 11–15 years of community pharmacy experience (32.1%, n = 43), followed by roughly one-quarter with 6–10 years (24.6%, n = 33) and > 15 years of experience (23.1%, n = 31).

Table 2 reveals the frequencies of the responses to each item of the attitude test regarding the prescription of analgesic medications. Most of the community pharmacists: (a) prescribed analgesic drugs to their patients (94.8%, n = 127); (b) preferred

the oral route as the administration medium (96.3%, n = 129); and (c) dispensed analgesics based on their advice (86.6%, n = 116). Furthermore, the majority of the community pharmacists reported that 40–79% of patients required analgesic drugs (70.1%, n = 94). They preferred to prescribe acetaminophen as an analgesic drug (66.4%, n = 89), read the information leaflet inside the analgesic drug package prior to prescribing them (51.5%, n = 69), and prescribed the intake duration of analgesics only when required (50.0%, n = 67). Finally, close to one-quarter frequently reported the side effects as muscle pain (20.1%, n = 27) and fever (14.2%, n = 19).

Table 1: Socio-demographic characteristics of the studied community pharmacists (N = 134).

Demographics		**Count**	**%**
Total		134	100.0
Age	21-25	3	2.2
	26-30	29	21.6
	31-36	56	41.8
	Over 36	46	34.3
Gender	Male	121	90.3
	Female	13	9.7
Pharmacy academic qualification	B.Pharm	100	74.6
	PharmD	19	14.2
	Postgraduate studies	15	11.2
Years of community pharmacy experience	0-5 years	27	20.1
	6-10 years	33	24.6
	11-15 years	43	32.1
	More than 15 years	31	23.1
Country of Academic qualification	Saudi Arabia	48	35.8
	Overseas	86	64.2
Working City	Jeddah	134	100.0

The knowledge of the pharmacology of analgesics and their various adverse effects was then assessed (see Table 3). Most of the respondents answered the knowledge items related to aspirin use correctly, such as its use as an analgesic, the most common side effects of NSAIDs, the contraindications for diclofenac, NSAIDS-triggered cardiovascular complications, the non-administration of NSAIDs along with diuretics, the safest ibuprofen intake, the antipyretic activity of mefenamic acid, and the mechanism of action of acetaminophen. On the other hand, nearly two-thirds answered incorrectly the items related to the use of mefenamic, its relationship with dysmenorrhea, and the recommended daily dose of diclofenac.

Table 4 shows the average knowledge of analgesic drugs among community pharmacists, in percentages. The results show that the community pharmacists obtained a mean knowledge score regarding analgesic drugs of > 50% (mean ± SD = 6.70 ± 1.4, N = 134, min = 3.00, max = 10.00). Approximately one-quarter of them obtained a mean analgesic drug knowledge score of 6.00 (26.9%, n = 36), 7.00 (25.4%, n = 340), or 8.00 (22.4%, n = 30).

The association between knowledge of analgesic drugs and sociodemographic characteristics was then determined, as shown in Table 5. The results show that those with 11–15 years' (mean score = 7.00 ± 1.5) and > 15 years' (mean score = 6.90 ± 1.4) community pharmacy experience had significantly better analgesic drug knowledge than those with only 0–5 years of experience (mean score = 6.11 ± 1.1). Also, a significantly higher analgesic drug knowledge score was obtained by the participants with overseas academic qualifications (mean score = 6.90 ± 1.4) compared to those with Saudi Arabian qualifications (mean score = 6.35 ± 1.4), suggesting that those who had studied overseas obtained and retained a higher level of knowledge of analgesic drugs.

Table 2: Frequency of response to each item of attitude test among community pharmacist toward prescribing analgesic medications (N = 134).

Community pharmacists' attitudes toward prescribing analgesic medications		Count	%
Total		134	100.0
Do you prescribe analgesic drugs for your patients?	Yes	127	94.8
	No	7	5.2
What percentage of patients require analgesic drugs?	80–100%	18	13.4
	60–79%	44	32.8
	40-59%	50	37.3
	Less than 40%	22	16.4
Frequency of reporting side effects?[a]	Headache	9	6.7
	Fever	19	14.2
	Muscles pain	27	20.1
	Others	84	62.7
Analgesics drugs that are preferably prescribed	Acetaminophen	89	66.4
	NSAIDs	1	0.7
	Others	44	32.8
Do you read the package insert of the analgesic drugs before prescribing them?	Yes	69	51.5
	No, not required	47	35.1
	No, don't have time	12	9.0
	No, never thought of it	6	4.5
A most common route of administration preferred by you?	Oral	129	96.3
	Parenteral	1	0.7
	Topical	4	3.0
Duration of prescribing analgesics?	Only when required	67	50.0
	1-3 days	38	28.4
	3-5 days	25	18.7
	1 week	4	3.0
How do you dispense analgesics?	Based on patients' selection	18	13.4
	Based on the pharmacist's (You) advise	116	86.6
[a]-Multiple answer question, please don't add count and percentages.			

Table 3: Knowledge towards pharmacology of analgesics and various adverse effects associated with analgesic drugs of community pharmacists (N = 134).

Knowledge of pharmacology of analgesics and various adverse effects associated with analgesic drugs n=134	True	False	I don't know	Correct n(%)
Aspirin is used as an analgesic.	110(82.1%)	24(17.9%)	0(0.0%)	110(82.1%)
The safest dose of ibuprofen is 800 milligrams (mg) every four to six hours, as needed.	19(14.2%)	112(83.6%)	3(2.2%)	112(83.6%)
GI upset is the most common side effect of NSAIDs*.	129(96.3%)	4(3.0%)	1(0.7%)	129(96.3%)
Mefenamic is not used to manage dysmenorrhea (menstrual cramps).	38(28.4%)	90(67.2%)	6(4.5%)	38(28.4%)
Diclofenac is contraindicated during pregnancy.	117(87.3%)	15(11.2%)	2(1.5%)	117(87.3%)
Mefenamic acid had better antipyretic activity than paracetamol.	29(21.6%)	95(70.9%)	10(7.5%)	95(70.9%)
NSAIDs may increase the risk of cardiovascular complications including heart attack, stroke, heart failure, and atrial fibrillation.	110(82.1%)	14(10.4%)	10(7.5%)	110(82.1%)
The recommended daily dose of diclofenac is 100-150mg in two or three divided doses.	97(72.4%)	34(25.4%)	3(2.2%)	34(25.4%)
NSAIDs should not be administered with diuretics.	83(61.9%)	22(16.4%)	29(21.6%)	83(61.9%)
The main mechanism of action of acetaminophen is the inhibition of the enzyme COX**.	56(41.8%)	70(52.2%)	8(6.0%)	70(52.2%)

* NSAIDS = Non-steroidal anti-inflammatory drugs, ** COX = cyclooxygenase.

Table 4: Percentage and average knowledge of analgesic drugs among community pharmacists (N = 134).

Variables	N	Min	Max	Mean	SD
Knowledge of Analgesic Drugs	134	3.00	10.00	6.70	1.4
		Count		%	
Total		134		100.0	
Knowledge of Analgesic Drugs	3.00	2		1.5	
	4.00	5		3.7	
	5.00	17		12.7	
	6.00	36		26.9	
	7.00	34		25.4	
	8.00	30		22.4	
	9.00	7		5.2	
	10.00	3		2.2	

Table 5: Association between knowledge of analgesic drugs and socio-demographic characteristics (N = 134).

Demographics		Total	Knowledge of Analgesic Drugs	p-value
Age	21-25	3	8.00 ± 2.0	0.358
	26-30	29	6.55 ± 1.2	
	31-36	56	6.64 ± 1.4	
	Over 36	46	6.78 ± 1.4	
Gender	Male	121	6.74 ± 1.4	0.122
	Female	13	6.31 ± 0.9	
Pharmacy academic qualification	B.Pharm	100	6.82 ± 1.4	0.224
	PharmD	19	6.42 ± 1.1	
	Postgraduate studies	15	6.27 ± 1.2	
Years of community pharmacy experience	0-5 years	27	6.11 ± 1.1^{A}	$0.042^{b,c}$
	6-10 years	33	6.58 ± 1.4^{AB}	
	11-15 years	43	7.00 ± 1.5^{B}	
	More than 15 years	31	6.94 ± 1.4^{B}	
Country of Academic qualification	Saudi Arabia	48	6.35 ± 1.4	0.029^{a}
	Overseas	86	6.90 ± 1.4	

[a]-significant using Independent *t*-test at <0.05 level.
[b]-significant using One-Way ANOVA Test at <0.05 level.
[c]-Post-Hoc Test = LSD.

Analysis using the General Linear Model showed that among all the factors, the age group factor of 21–25 years old most significantly and positively influenced the analgesic drug knowledge of the participants (B = 2.748, S.E. = 0.889, 95% CI = 0.988 – 4.507, p = 0.002), suggesting that the analgesic drug knowledge of the pharmacist tends to be stronger between the ages of 21 and 25 years. On the other hand, the factor of having 0–5 years' community pharmacy experience significantly and negatively influenced the analgesic drug knowledge of the participants the most (B = -2.038, S.E. = 0.606, 95% CI = -3.236 – -0.839, p = 0.001), followed by having 6–10 years' community pharmacy experience (B = -1.253, S.E. = 0.511, 95% CI = -2.265 – -0.241, p = 0.016). This suggests that when pharmacists have little community experience their analgesic drug knowledge tends to be weaker, but it becomes stronger after 5 years.

Table 6: Predictors of knowledge of analgesic drugs among community pharmacists.

Dependent Variable: Knowledge of Analgesic Drugs					
Parameter	**B**	**S.E.**	**95% C.I.**		**p-value**
			Lower Bound	**Upper Bound**	
Intercept	7.336	0.684	5.982	8.691	<0.001[a]
Age=21-25	2.748	0.889	0.988	4.507	0.002[a]
Age=26-30	1.358	0.514	0.340	2.376	0.009[a]
Age=31-36	0.651	0.396	-0.133	1.435	0.103
Gender=Male	-0.308	0.484	-1.267	0.651	0.527
Pharmacy academic qualification=B.Pharm	0.065	0.393	-0.713	0.844	0.868
Pharmacy academic qualification=PharmD	0.197	0.506	-0.805	1.199	0.697
Years of community pharmacy experience=0-5 years	-2.038	0.606	-3.236	-0.839	0.001[a]
Years of community pharmacy experience=6-10 years	-1.253	0.511	-2.265	-0.241	0.016[a]
Years of community pharmacy experience=11-15 years	-0.415	0.399	-1.206	0.375	0.300
Country of Academic qualification=Saudi Arabia	-0.584	0.265	-1.108	-0.060	0.029
[a]-significant using General Linear Model at <0.05 level.					

Discussion

To best of the author's knowledge, this study examined the prescribing patterns and pharmacological knowledge of analgesics among community pharmacists in Jeddah, Saudi Arabia for the first time. Analgesics include acetaminophen, aspirin, and other NSAIDs such as ibuprofen, diclofenac, mefenamic, and indomethacin; these are all useful for mild to moderate fever, low-grade inflammation and pain [36&37]. In this study, community pharmacists showed adequate knowledge about analgesics. An increasing number of OTC analgesics are available to treat a variety of conditions in the Saudi market, and this study reports that the majority of community pharmacists in Jeddah are dispensing analgesics for their clients, which corroborate the findings of previous work[38].

In this study, most of the community pharmacists were aware of the correct use, side effects or complications, contraindications, safe dosages, and reaction mechanisms of analgesics. Also, the community pharmacists displayed a favorable mean knowledge score (> 50%) regarding analgesic drugs. The length of community pharmacy experience and the country where academic qualifications were obtained had significant associations with the analgesic drug knowledge of the participants.

Community pharmacists should consider the wide variety of analgesics available with fewer side effects, and check patients' medical history, including careful questioning about details of the pain; this may help to make a diagnosis. Since their desired effects are similar, the choice of NSAID depends on the pharmacist's base on medication history and the potential adverse effects of different drugs. This study revealed that most of dispensed medicines are chosen by pharmacists. Acetaminophen was the preferred analgesic among patients in Jeddah, in agreement with previous findings in Saudi Arabia [39&40].

According to estimates listed on Statista, in 2022, the revenue from the analgesics segment of the pharmacological market amounted to almost US$168 million in Saudi Arabia. The market is expected to grow annually by 3.57% (compound annual growth rate, 2022–2027). These revenues could encourage some community pharmacists to dispense more analgesics to patients. Among the top-selling analgesics are diclofenac, aspirin, ibuprofen, and paracetamol. The category includes OTC and prescription drugs, and nonsteroidal and anti-inflammatory agents. It includes both products that are exclusively

sold in pharmacies and products that can be purchased in places other than hospitals[41].

The study demonstrates a correlation with data published by the Saudi MoH in terms of the number of community pharmacists who graduated overseas; according to the MoH, most of those who are working in the private sector are non-Saudis with international academic backgrounds[35]. Predictors of community pharmacists' knowledge of analgesic drugs include age (the most significant being 21–30 years old) and community pharmacy experience (those with 0–10 years' experience had the lowest knowledge levels).

This paper studies the prescribing patterns and pharmacological knowledge of analgesics among community pharmacists in Jeddah, Saudi Arabia for the first time.

Conclusion

The prescribing patterns and pharmacological knowledge of analgesics are not only applicable to analgesics but also to other types of medications that are commonly prescribed in the community pharmacy setting. The knowledge and skills required to prescribe medications safely and effectively are a crucial part of a community pharmacist's job. This study provides valuable insights into the prescribing patterns and pharmacological knowledge of analgesics among community pharmacists in Saudi Arabia. The findings of this study can be used by community pharmacists to improve their prescribing practices and enhance their knowledge of analgesics and other medications. Moreover, the study's results and recommendations can also be used by policy makers to develop policies and regulations related to the prescribing and dispensing of medications in community pharmacies. Additionally, pharmacy education and continuing professional development programs can utilize the findings of this study to improve the quality of education and training provided to pharmacy students and practicing pharmacists. Overall, this study contributes valuable insights and suggestions that can benefit community pharmacists, policy makers, pharmacy educators, and others involved in the pharmacy profession.

Limitations

These findings are limited due to the use of a cross-sectional design including a be difficulty in recruiting participants within the allotted time frame or budget. Also, challenges in reaching out to potential participants, convincing them to participate in the study, or ensuring that they met the inclusion criteria.

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REFERENCES

1. S. Bacchi, P. Palumbo, A. Sponta and M. F. Coppolino, "Clinical Pharmacology of Non-Steroidal Anti-Inflammatory Drugs: A Review", ***Antiinflamm Antiallergy Agents Med Chem***,11(1), 52-64 (2012).
2. N. Ohashi and T. Kohno, "Analgesic Effect of Acetaminophen: A Review of Known and Novel Mechanisms of Action", ***Front Pharmacol,*** 11, 1916 (2020).
3. D. A. Q. Milani and D. D. Davis, "Pain Management Medications", ***StatPearls,*** (2022).
4. Mordor Intelligence. Over the Counter (OTC) Analgesics Market Size & Share (2022-27). https://www.mordorintelligence.com/industry-reports/otc-analgesics-market (2022).
5. ReportLinker. Analgesics Global Market Report 2022. https://www.reportlinker.com/p06245016/Analgesics-Global-Market-Report.html?utm_source=GNW (2022).
6. N. M. Alorfi, A. M. Ashour, A.S. Algarni, *et al.,* "Assessment of the Community Pharmacists' Knowledge and Attitudes Toward Pain and Pain Management in Saudi Arabia", ***Int J Gen Med,*** 15, 8527–8537 (2022).
7. O. A. AlKhamees, K. A. AlNemer, M. W. Bin Maneea,*et al.,* "Top 10 most used drugs in the Kingdom of Saudi Arabia 2010–2015", ***Saudi Pharm J SPJ,*** 26(2),211-216 (2018).
8. I. M. Macintyre, E. J. Turtle, T. E. Farrah, *et al.,* "Regular Acetaminophen Use and

Blood Pressure in People with Hypertension: The PATH-BP Trial", ***Circulation,*** 145(6),416-423 (2022).
9. Maciej Serda, *et al.*, "Acetaminophen (paracetamol): Properties, clinical uses, and adverse effects", ***Uniw Śląski,*** 7, 1–24 (2012).
10. R. Chou, *et al.*, "Noninvasive Treatments for Low Back Pain", ***Eff Heal Care Progr - Comp Eff Rev,*** 272 (2016).
11. M. Jozwiak-Bebenista and J. Z. Nowak, "Paracetamol: mechanism of action, applications and safety concern", ***Acta Pol Pharm,*** 71(1), 11–23 (2014).
12. Saudi Food and Drug Authority. Drugs List | Saudi Food and Drug Authority. https://www.sfda.gov.sa/en/drugs-list (2022).
13. R. M. Langford, "Pain management today—what have we learned?", ***Clin Rheumatol,*** 25suppl 1, 2–8 (2006).
14. R.Twycross, V. Pace, M.Mihalyo and A. Wilcock, "Acetaminophen (Paracetamol)", ***J Pain Symptom Manage,*** 46(5), 747–755 (2013).
15. L. H. Goldstein, M. Berlin, M. Berkovitch and E. Kozer, "Effectiveness of Oral vs Rectal Acetaminophen: A Meta-analysis", ***Arch Pediatr Adolesc Med,*** 162(11), 1042–1046 (2008).
16. T.Tetsunaga, T. Tetsunaga, M. Tanaka and T. Ozaki, "Efficacy of tramadol–acetaminophen tablets in low back pain patients with depression", ***J Orthop Sci,*** 20(2), 281–286 (2015).
17. B. Hinz, O.Cheremina and K. Brune, "Acetaminophen (paracetamol) is a selective cyclooxygenase-2 inhibitor in man", ***FASEB J,*** 22(2), 383–390 (2008).
18. M. Babb, G. Koren and A. Einarson, "Treating pain during pregnancy", ***Can Fam Physician,*** 56(1), 25-27 (2010).
19. A. Ramachandran and H. Jaeschke, "Acetaminophen Hepatotoxicity", ***Semin Liver Dis,*** 39(2), 221–234 (2019).
20. E. Shepherd and R. M. Grivell, "Aspirin (single dose) for perineal pain in the early postpartum period", ***Cochrane Database Syst Rev,*** 7(7),CD012129 (2020).
21. M. Uzzaman and T. Mahmud, "Structural modification of aspirin to design a new potential cyclooxygenase (COX-2) inhibitors", ***Silico Pharmacol,*** 8(1), 1–14 (2020).
22. M. R.Montinari, S. Minelli and R. De Caterina, "The first 3500 years of aspirin history from its roots – A concise summary", ***Vascul Pharmacol,*** 113, 1–8 (2019).
23. H. Arif and S. Aggarwal, "Salicylic Acid (Aspirin)", ***StatPearls,*** (2022).
24. M. Bojić, C. A. Sedgeman, L. D. Nagy and F. P. Guengerich, "Aromatic hydroxylation of salicylic acid and aspirin by human cytochromes P450", ***Eur J Pharm Sci,*** 73, 49–56 (2015).
25. J. R. Vane and R. M. Botting, "The mechanism of action of aspirin", ***Thromb Res,*** 110(5-6), 255–258 (2003).
26. P.Pavlidis and I. Bjarnason, "Aspirin Induced Adverse Effects on the Small and Large Intestine", ***Curr Pharm Des,*** 21(35),5089-5093(2015)
27. H. G. Kress, A. Baltov , A. Basiński, *et al.*, "Acute pain: a multifaceted challenge – the role of nimesulide", ***Curr Med Res Opin***,32(1), 23–36 (2015).
28. M.Hyllested, S.Jones, J. L. Pedersen and H. Kehlet, "Comparative effect of paracetamol, NSAIDs or their combination in postoperative pain management: a qualitative review", ***BJA Br J Anaesth,*** 88(2), 199–214 (2002).
29. J. N. Cashman, "The mechanisms of action of NSAIDs in analgesia", ***Drugs,*** 52(5), 13–23 (1996).
30. S. Jenarthanan and C. Subbarao, "Comparative evaluation of the efficacy of diclofenac sodium administered using different delivery routes in the management of endodontic pain: A randomized controlled clinical trial", ***J Conserv Dent,*** 21(3), 297 (2018).
31. R. Moll, S. Derry, R. A. Moore and H. J. Mcquay, "Single dose oral mefenamic acid for acute postoperative pain in adults", ***Cochrane Database Syst Rev,*** 2017(3), CD007553 (2011).
32. G. Ozgoli, M. Goli and F. Moattar, "Comparison of Effects of Ginger, Mefenamic Acid, and Ibuprofen on Pain in Women with Primary Dysmenorrhea", ***Altern Complement Med,*** 15(2), 129–132 (2009).

33. M. D. Villar-Martínez, D. Moreno-Ajona, C. Chan and P. J. Goadsby, "Indomethacin-responsive headaches—A narrative review", ***Headache J Head Face Pain,*** 61(5), 700–714 (2021).
34. S. Nalamachu and R. Wortmann, "Role of Indomethacin in Acute Pain and Inflammation Management: A Review of the Literature", ***Postgrad Med,*** 126(4), 92–97 (2015).
35. Ministry of health. Statistical Yearbook - Statistical Yearbook. https://www.moh.gov.sa/en/Ministry/Statistics/book/Pages/default.aspx (2021).
36. G. Varrassi, E. Alon , M. Bagnasco, *et al.*, "Towards an Effective and Safe Treatment of Inflammatory Pain: A Delphi-Guided Expert Consensus", ***Adv Ther,*** 36(10), 2618- 2637 (2019).
37. M. de Martino and A. Chiarugi, "Recent Advances in Pediatric Use of Oral Paracetamol in Fever and Pain Management", ***Pain Ther***, 4(2), 149–168 (2015).
38. S. D. Babakor and M. M. Al Ghamdi, "Prevalence and determinants of over-the-counter analgesics usage among patients attending primary health care centers in Jeddah, Saudi Arabia", ***J Young Pharm,*** 10(1), 91–97 (2018).
39. F. Kamel, R. Magadmi, N. M. AbuOuf, *et al.*, "Knowledge, Attitude, and Practice of Paracetamol and Ibuprofen Administration Among Caregivers of the Pediatric Age Group in Jeddah", ***Cureus,*** 13(1), e12460 (2021).
40. N. Karami, A.F. Altebainawi , S. A. Alfarki, *et al.*, "Knowledge and attitude of analgesics use among Saudi population: A cross-sectional study", ***Int J Med Sci Public Heal,*** 7(2),1 (2018).
41. Statista. Analgesics - Saudi Arabia | Statista Market Forecast. https://www.statista.com/outlook/cmo/otc-pharmaceuticals/analgesics/saudi-arabia (2022).

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أنماط وصف الأدوية والمعرفة الدوائية للمسكنات بين صيادلة المجتمع في جدة بالمملكة العربية السعودية

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مقدمة: تُستخدم المسكنات بشكل متكرر لإدارة الألم ، ويلعب الصيادلة المجتمعيون دورًا مهمًا في وصف هذه الأدوية. ومع ذلك ، يمكن أن تؤدي أنماط الوصفات غير المناسبة والمعرفة الدوائية غير الكافية بالمسكنات بين الصيادلة إلى نتائج صحية ضارة وزيادة تكاليف الرعاية الصحية.

الأهداف: تقييم أنماط وصف الأدوية والمعرفة الدوائية للمسكنات بين صيادلة المجتمع في جدة غرب المملكة العربية السعودية. تسعى الدراسة أيضًا إلى تحديد أي مجالات محتملة لنقص في معرفة أو ممارسات صيادلة المجتمع فيما يتعلق بالاستخدام الآمن والفعال للمسكنات. في نهاية المطاف ، لتعزيز جودة الرعاية المقدمة للمرضى الذين يحتاجون إلى علاج مسكن ، من خلال معالجة أي ثغرات في معرفة أو ممارسات صيادلة المجتمع.

الطريقة: في نوفمبر ٢٠٢٢ ، أجريت هذه الدراسة لمعرفة مهارات وصف الأدوية ومستوى المعرفة الدوائية للمسكنات بين صيادلة المجتمع و كان تصميم البحث المستخدم لهذه الدراسة استقصائياً.

النتائج: استجاب ١٣٤ من صيادلة المجتمع للدراسة ، كان معظم المشاركين ذكورًا تبلغ أعمارهم ٣١ عامًا أو أكثر ، حاصلين على درجة البكالوريوس في الصيدلة. كان معظم صيادلة المجتمع على دراية بالاستخدام الصحيح ، والآثار الجانبية أو المضاعفات ، وموانع الاستعمال ، والجرعة الآمنة ، وآلية تفاعل المسكنات. حصل صيادلة المجتمع على درجة معرفة متوسطة مواتية (> ٥٠٪) من الأدوية المسكنة.

الخلاصة: أبلغ صيادلة المجتمع عن أنماط وصف صحيحة ومعرفة دوائية كافية. ومع ذلك ، عندما يكون لدى الصيادلة خبرة قليلة في المجتمع ، فإن معرفتهم بالأدوية المسكنة تميل إلى أن تكون أضعف ، لكنها تصبح أقوى بعد ٥ سنوات.