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# Physician Perspectives on Codeine Accessibility, Patterns of Use, Misuse, and Dependence in Saudi Arabia

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## Abstract

In Saudi Arabia, there are concerning rates of non-compliance with pharmaceutical regulations prohibiting the pharmacy dispensing of prescription-only medications without a physician prescription. This is the first study in the Middle East which examines physicians' perceptions regarding misuse of codeine, listed as a narcotic, controlled, and prescription-only drug. The CODEMISUSED survey was adapted to the Saudi Arabian context and pilot tested, prior to cross-sectional administration to physicians in Riyadh, Jeddah, Abha, and Jazan ( $n=105$ ). Descriptive statistics (frequencies and percentage) present physician level of agreement, neutrality, and disagreement with statements regarding codeine prescribing, patient awareness and use, online and community pharmacy availability, and dependence. The study indicates concern by physicians regarding patient intentional use of codeine to enhance mood, misuse patterns, lack of awareness around habit-forming use and iatrogenic dependence, and sourcing via illegal dispensing. It underscores the imperatives to address pharmacy compliance with pharmaceutical regulatory controls, implement enhanced pharmacovigilance, and improve awareness around safe use.

**Keywords** Codeine · Middle East · Saudi Arabia · Physicians · Pharmacy

## Background

The misuse and abuse of codeine-containing medications both prescribed and over the counter continues to represent a global public health and policy challenge (Bergin et al., 2015; Dada et al., 2015; Myers et al., 2003; Parry et al., 2015; Wells et al., 2018). Despite it being a weak opiate and used to treat mild to moderate pain in adults, misuse is broadly defined as “the use of a medicine, with or without a doctor’s prescription, clearly outside of accepted medical practice or guidelines, for recreational purposes or in the framework of self-medication, in greater dosages or for longer periods than were prescribed, in which the risks and problems associated with use outweigh the benefits” (Casati et al., 2012, p.

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230). The maximum recommended dosage of codeine is 240 mg daily (Moore et al., 2001), often in combination with paracetamol, aspirin, or ibuprofen in codeine combination preparations (Foley et al., 2015). A range of related health harms are reported as consequence of prolonged use, high-dose use, and misuse of codeine combination productions, which include acute hemorrhagic necrotizing pancreatitis, hypokalemia, nephrotoxicity, gastrointestinal hemorrhage, dependence, and depression (Barreto et al., 2011; Chetty et al., 2003; Dutch, 2008; Ng et al., 2011; Nielsen et al., 2012; Romach et al., 1999). Substance use disorders are classified as a psychiatric disorder under the DSM-V diagnostic criteria (American Psychiatric Association 2013), with several studies exploring the unique codeine pathways toward iatrogenic dependence, generally commencing with a legitimate medical reason (Parry et al., 2017; Van Hout et al., 2017a, 2017b, 2018).

There is a growing literature base in many countries on consumer access routes and trajectories to codeine misuse and dependence via community pharmacy dispensing and diversion (Carney et al., 2016, 2018; Nielsen et al., 2012; Van Hout et al., 2017b; Wells et al., 2018;). There are increased efforts to develop medical and community practice-based innovations to detect, intervene, and support those affected (Norman et al. 2014; Van Hout, 2014; Van Hout & Norman, 2016), supported by assessments of medical and pharmacy practitioner perspectives on codeine use, pathways toward misuse and dependence, the detection of patient aberrance, and support interventions (Foley et al., 2016, 2017, 2018).

With most studies on codeine aberrance originating in the UK, Ireland, South Africa, and Australia (Van Hout et al., 2014), very little is known about prescribing patterns, patient use, and misuse of this drug in the Middle East. Research on pain management and patient care (particularly those with non-cancer musculoskeletal pain), prescribing rates of opioids, and consumption trends, are scarce in the Middle East (Cleary et al., 2013; Wilby & Wilbur, 2017). We report here from the Kingdom of Saudi Arabia (hereafter Saudi Arabia), a high income Islamic country, which has experienced rapid societal change with increased drug consumption patterns (including amphetamine type stimulants, cannabis, heroin, and cocaine) in recent years (Abomughaid et al., 2018; Abualola & Rahamathulla., 2017; Alhazmi et al., 2020; Kravitz & Nichols, 2016; Saquib et al., 2020; United Nations Office on Drugs and Crime 2020). Very little is known however regarding pain management, prescribing trends, and patient misuse of opioids (tramadol is most commonly prescribed) in Saudi Arabia (Alharbi et al., 2020; Al-Rowaili et al., 2009; AlRuthia et al., 2020). There are a few pain management clinics in Saudi Arabia, which operate under strict rules for opioid prescription by medical specialists and dispensing regulations by narcotic pharmacists (Alomi, 2017). These strict regulations (in addition to local drug enforcement laws) operate alongside the law that those found engaging in prescription drug diversions can be sentenced to death (Alomi, 2017; Cleary et al., 2013). Of note is that Saudi Arabia was responsible for the most confirmed drug-related executions globally in 2018; at least 59 (Girelli, 2019).

The Ministry of Health (MoH) publishes the Formulary Drug List (MoH 2014) which is publicly available through its website. The Saudi Food and Drug Authority (SFDA) continuously updates and maintains the drugs approved for marketing in Saudi Arabia and also provides the complete list of drugs in a spreadsheet format on its website (SFDA 2021). According to the MOH Formulary Drug List and the Saudi Food and Drug Authority (SFDA), all codeine products are listed as narcotic, controlled, and prescription-only. At the time of data collection, the SFDA website yielded four products currently approved for marketing in Saudi Arabia (see Table 1), all of which were to be dispensed only on a valid prescription from a licensed medical practitioner. The available MoH Formulary Drug List

Table 1 Codeine-containing products authorized in Saudi Arabia

S. no	Product	Ingredients	Manufacturer
1	Fevadol Plus Tablet	Paracetamol 500 mg, caffeine 30 mg, codeine phosphate 8 mg	SPIMACO, Saudi Arabia
2	Solpadeine Capsule	Paracetamol 500 mg, caffeine 30 mg, codeine phosphate 8 mg	Smithkline Beecham, Spain
3	Solpadeine Soluble Tablet	Paracetamol 500 mg, caffeine 30 mg, codeine phosphate 8 mg	GlaxoSmithKline Dun- garvan Ltd, Ireland
4	Actifed Compound Linctus	Each ml contains triprolidine (30 mg), pseudoephedrine (10 mg), codeine (1.25 mg)	ASPEN, Germany

had four codeine items (paracetamol + codeine tablet, paracetamol + codeine + caffeine tablet, codeine phosphate tablet, and codeine phosphate syrup).

The Procedures and Controls for Narcotics and Psychotropic Substances published by the SFDA enlists the regulations pertaining to the acquisition, storage, and dispensing of codeine and the penalties in case of any violation. Despite the regulations, the non-compliance regarding the dispensing of prescription-only medications is a common malpractice in Saudi Arabia, resulting in both inappropriate dispensing and self-medication (Aljadhey et al., 2015; Al-Mohamadi et al., 2013; Sabry et al., 2014). It is common for individuals to access community pharmacies as first port of call prior to a medical practitioner, which has been observed to result in instances of inappropriate dispensing (Hussain et al., 2012; Sabry et al., 2014). Studies have assessed the compliance of community pharmacies with the regulations that prohibit the dispensing of prescription-only medications in the absence of a physician prescription in Saudi Arabia and have reported on concerning rates of non-compliance, including of codeine-containing medicines (Alshammari et al., 2017).

Mobrad et al. (2020) reported in 2020 that the majority of community pharmacists were trained in recognizing the signs of misuse, to provide warnings and counseling to patients. Despite this, there are increased reports of community pharmacy routes to access drugs with potential for misuse (opioids, gabapentinoids) in Saudi Arabia (Alibrahim et al., 2012; AlKhamees et al., 2018; Al-Mohamadi et al., 2013). Corporate chain community pharmacies also operate online pharmacies in Saudi Arabia and have dedicated apps for mobile phone users. These online pharmacies ask the patient to upload their prescription when they select the home delivery option. Possibly, a person sitting at home may upload a codeine prescription to more than one online pharmacy and get it delivered to his/her home from multiple sources. While residents of Saudi Arabia have access to online stores outside the country, these online stores generally restrict supply to only over the counter drugs.

There is a dearth of research in the Middle East and particularly in Saudi Arabia regarding the views and experiences of physician on the misuse of codeine-containing medicines (MENAHR, 2021). Hence, this is the first study to date which examines their perceptions regarding codeine prescribing, availability, safety, risks, patient use, misuse, and dependence in Saudi Arabia.

## Methods

### Research Design

We adapted the CODEMISUSED survey tool used in previous studies conducted by author three in Ireland, South Africa, and the UK (Foley et al., 2016, 2017, 2018). Once adapted to the Saudi context, the initial draft of the survey questions was then sent to a psychiatrist with specialism in the treatment of addictions for critical review. After incorporation of several suggestions applicable to the Saudi regulatory context, the questionnaire was sent to a three-member expert committee comprising of physicians, two from government hospitals, and an academic physician for face validation so as to ensure the purpose and relevance of the tool was clear to respondents. Consequently, the final version of the study questionnaire contained 20 closed-ended items distributed across four sections. Nine questions pertaining to demographic information were included to indicate the representativeness of the study respondents. All items in the questionnaire requested the respondent to indicate their level of agreement on a 5-point Likert scale. The first section comprised of

five questions related to codeine prescribing by physicians. The second section included six questions on the availability, safety, and risks of codeine medication available at the community pharmacies. The third section had four questions regarding the physician's perspectives regarding the use pattern of codeine medications by their patients. The fourth section had four questions which probed the opinion of the physicians related to codeine dependence. The online questionnaire was prepared using Google Forms as a survey tool. Lastly, for quality assurance, the online link was piloted with a group of five medical practitioners not partaking in the study.

## **Recruitment of Participants and Study Procedures**

The study was designed as a cross-sectional study and was conducted in the late 2020. An online and paper-based self-reporting questionnaire tool was employed to elicit responses from a national sample of physicians in Saudi Arabia. Given the sensitivity of the topic, a snowball sampling technique (non-probability sampling) was used. The web link of the questionnaire was initially sent to five physicians, one each from the cities of Riyadh, Jeddah, and Abha and two from Jazan in Saudi Arabia. These five participants were chosen for appropriate representation of age, gender, nationality, qualification, practice setting, and experience. After completion of the survey, respondents were requested to forward the online or paper-based questionnaire to another five colleagues whom they considered suitable for the study. Similarly, the second set of respondents were asked to further direct the link to further respondents and so on. It was ensured that where physicians selected to complete the paper-based survey, that they had not completed the online survey link. The person assigned for data collection through the paper-based format verbally confirmed with the physician if they had filled the questionnaire through the online survey link. Those physicians who had already completed the survey online were excluded from the paper-based survey collection.

## **Ethical Considerations**

The study was reviewed and approved by the Institutional Research Review and Ethics Committee at Jazan University (REC40/1–008), Saudi Arabia. Participants completed an informed consent form prior to the start of the questionnaire. The participants were briefed about the benefits and risk involved with their participation in the study and were assured of the confidentiality of the data they would provide. The approximate completion time (around 8 min) was indicated prior to start of the questionnaire. The respondents were also free to retract from the survey at any point.

## **Data Analysis**

At the end of the 6-month data collection period, all responses from the Google Forms were downloaded to a Microsoft Excel sheet. The responses obtained through the paper-based questionnaire were manually incorporated into the same data sheet. Prior to analysis, all data were scrutinized for any duplication of responses and/or errors. Thereafter, all data were coded and transferred to the Statistical Package for Social Sciences (SPSS) database (version 23) for statistical analysis (IBM Corporation, Armonk, NY, USA). Descriptive statistics (frequencies and percentage) were employed for data analysis. We present the

results in terms of level of agreement, disagreement, and neutral responses with each of the statements in tables; and we also present the results grouped as “agree” and “disagree” pertaining to all responses obtained under the level of agreement (for example, “strongly agree” and “agree” were included under the category of “agree”; “strongly disagree” and “disagree” were included under the category of “disagree”) in illustrative figures. The neutral responses were retained as such under the third category.

## Results

### Participant Profile

One hundred five physicians completed the survey. About half (48.6%) of respondents were of the younger age group (25–35 years), and around two-thirds (67.6%) were male. Nearly two-thirds (63.8%) of the respondents were Saudi physicians, and the remaining were expatriates. The demographic characteristics of the study sample are detailed in Table 2.

### Codeine Prescribing and Liability for Misuse

Table 3 illustrates the responses of the physicians pertaining to codeine prescribing. Nearly one-third (30.5%) were more inclined (“strongly agreed”) to prescribe codeine products if the non-opioid analgesics did not work. Only a meager percentage of respondents (2.9%) strongly agreed to the statement that patients were cognizant of the adverse effects of taking codeine in higher doses. Likewise, lesser percentage of physicians (2.9%) strongly agreed that codeine medications carry lesser risk of misuse.

When grouped together, physician experience related to codeine prescribing is depicted in Fig. 1 in terms of total percentage of agreement and disagreement. More than half (57.1%) of respondents agreed that they would prescribe codeine combinations to patients when non-opioid analgesics were ineffective. About half (49.5%) affirmed an increase in patients’ request for codeine-containing medicines. Only about one-third (36.2%) had difficulty and feelings of awkwardness when asking their patients questions related their codeine use. A similar percentage of respondents (35.2%) disagreed. Moreover, around three-fourths (78.1%) showed level of disagreement about the patients’ awareness about the adverse effects of high doses of codeine. About two-thirds (68.6%) disagreed that codeine-containing medications are less liable to be misused.

### Availability, Safety, and Risk Perceptions Regarding Codeine Products

Table 4 details the responses of physicians to the statements associated with codeine products availability at community pharmacies. Many respondents remained neutral about their concern of availability and easy access through the community pharmacies (39%), including online pharmacies (40%); overall, there was a high level of agreement related to their concern. The distribution of responses was nearly similar for “agree,” “neutral,” and “disagree” in relation to the adequacy of product information on the codeine preparations. Generally, respondents believed that availability of codeine medications at community pharmacy is central to consumer beliefs around safety. Also, respondents mostly disagreed that codeine products at community pharmacy carry lesser risk of misuse.

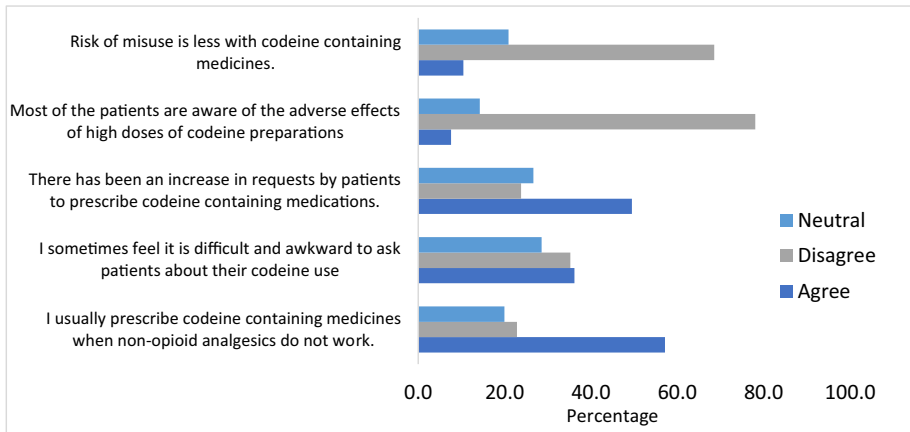
**Table 2** Demographic details  
(*N* = 105)

	n	%
Gender		
Male	71	67.6
Female	34	32.4
Age		
25–35 years	51	48.6
35–45 years	23	21.9
45–55 years	20	19.0
More than 55	11	10.5
Nationality		
Saudi	67	63.81
Non-Saudi	38	36.19
City		
Jazan	41	39.0
Jeddah	29	27.6
Riyadh	19	18.1
Abha	16	15.2
Qualification		
MBBS	59	56.2
MD	38	36.2
PhD	8	7.6
Designation		
Staff physician	26	24.8
Resident	46	43.8
Consultant	30	28.6
Practice setting		
Government hospital	58	55.2
Public health center (PHC)	25	23.8
Private hospital	19	18.1
Private clinic	3	2.9
Years of experience		
0–5 years	50	47.6
6–10 years	21	20.0
11–15 years	13	12.4
16–20 years	16	15.2
21 years and over	5	4.8
Location		
Urban	58	55.2
Semi-urban	36	34.3
Rural	11	10.5
Specialist training in substance misuse		
Yes	18	17.1
No	87	82.9



**Table 3** Level of agreement, disagreement, and neutral responses related to codeine prescribing and liability for misuse

Statement	Strongly agree <i>f</i> (%)	Agree <i>f</i> (%)	Neutral <i>f</i> (%)	Disagree <i>f</i> (%)	Strongly disagree <i>f</i> (%)
I usually prescribe codeine-containing medicines when non-opioid analgesics do not work	32 (30.5)	28 (26.7)	21 (20.0)	14 (13.3)	10 (9.5)
I sometimes feel it is difficult and awkward to ask patients about their codeine use	8 (7.6)	30 (28.6)	30 (28.6)	23 (21.9)	14 (13.3)
There has been an increase in requests by patients to prescribe codeine-containing medications	13 (12.4)	39 (37.1)	28 (26.7)	18 (17.1)	7 (6.7)
Most of the patients are aware of the adverse effects of high doses of codeine preparations	3 (2.9)	5 (4.8)	15 (14.3)	43 (41.0)	39 (37.1)
Risk of misuse is less with codeine-containing medicines	3 (2.9)	8 (7.6)	22 (21.0)	42 (40.0)	30 (28.6)



**Fig. 1** Level of agreement regarding codeine prescribing and liability for misuse

When grouped together, the perspectives of physicians about the codeine products available at community pharmacies are illustrated in Fig. 2 in terms of total percentage of agreement and disagreement. While codeine-containing medications are not licensed as over the counter products, nearly half (42.9%) were concerned about the ease of availability and accessibility of these medications at community pharmacies, while 39% had no opinion regarding same. 47.6% were concerned about the codeine products being available through online pharmacies. Fifty-nine percent were of the opinion that patients are unaware about the risk of dependence and agreed that codeine products are safe due to their availability at community pharmacies. Similarly, 59% disagreed that potential of misuse is less for the codeine products that are available at community pharmacies. For the treatment of mild to moderate pain, only one-third (33.3%) agreed that codeine products were safe and effective, as opposed to the non-opioid analgesics. Mixed responses were obtained regarding the product information provided to patients who purchase codeine products from community pharmacies.

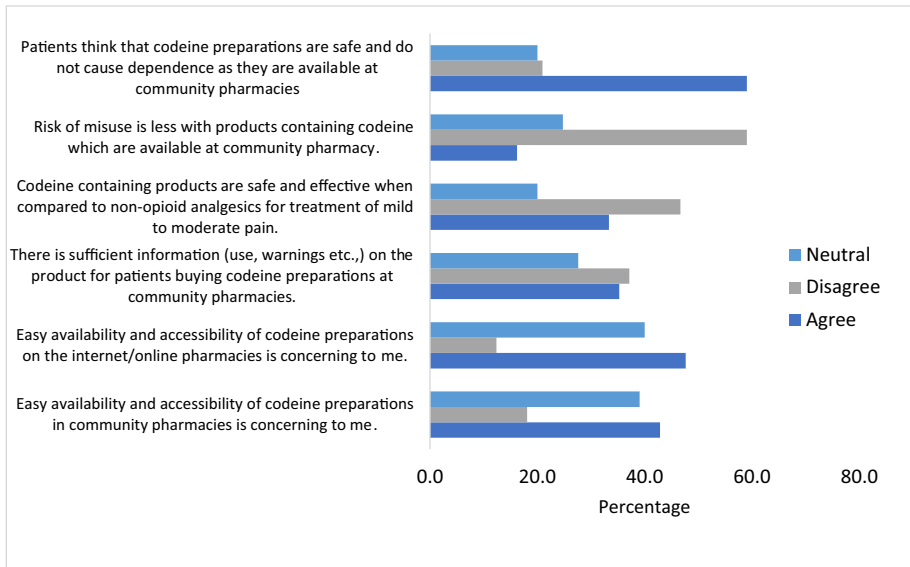
## Patient Use of Codeine

Table 5 depicts the responses for items indicating the probable reasons for codeine use by patients. There was an overall high level of agreement for all the four listed items in this category.

When grouped together, Fig. 3 illustrates the opinion of physicians regarding patient use of codeine products in terms of total percentage of agreement and disagreement. Sixty-one percent agreed with intentional misuse of codeine-containing products by patients to elevate mood, and a similar percentage (61.9%) implied that long-term codeine users may deliberately take codeine products to alleviate withdrawal headaches. The majority (75.2%) agreed that patients are usually unaware of the risks associated with long-term use of codeine medications. Nearly two-thirds (63.8%) indicated that patients who take central nervous depressants on prescription are more likely to purchase codeine products.

**Table 4** Level of agreement, disagreement, and neutral responses related to availability, safety, and risk perceptions regarding codeine products

Statement	Strongly agree <i>f</i> (%)	Agree <i>f</i> (%)	Neutral <i>f</i> (%)	Disagree <i>f</i> (%)	Strongly disagree <i>f</i> (%)
Easy availability and accessibility of codeine preparations in community pharmacies is concerning to me	16 (15.2)	29 (27.6)	41 (39.0)	12 (11.4)	7 (6.7)
Easy availability and accessibility of codeine preparations on the internet/online pharmacies is concerning to me	25 (23.8)	25 (23.8)	42 (40.0)	6 (5.7)	7 (6.7)
There is sufficient information (use, warnings etc.) on the product for patients buying codeine preparations at community pharmacies	10 (9.5)	27 (25.7)	29 (27.6)	28 (26.7)	11 (10.5)
Codeine-containing products are safe and effective when compared to non-opioid analgesics for treatment of mild to moderate pain	17 (16.2)	18 (17.1)	21 (20.0)	24 (22.9)	25 (23.8)
Risk of misuse is less with products containing codeine which are available at community pharmacy	4 (3.8)	13 (12.4)	26 (24.8)	38 (36.2)	24 (22.9)
Patients think that codeine preparations are safe and do not cause dependence as they are available at community pharmacies	36 (34.3)	26 (24.8)	21 (20.0)	14 (13.3)	8 (7.6)



**Fig. 2** Level of agreement related to availability, safety, and risk perceptions regarding codeine products

## Codeine Dependence

Table 6 shows physicians' views on codeine dependence. Surprisingly, only one respondent from the study sample strongly agreed to be adept at identifying a patient with codeine dependence. Only a small minority of the participants disagreed (disagree/strongly disagree) that risk of dependence is greater for men as opposed to women. Only four respondents strongly agreed that patients are at a lesser risk of dependence if they take the codeine medication only as prescribed by a medical practitioner.

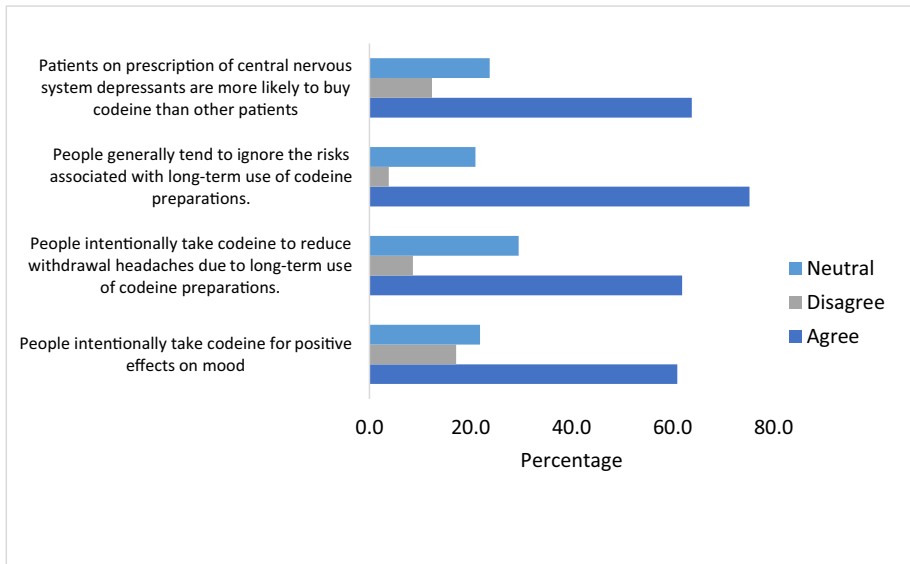
When grouped together, the physicians' responses about the items examining codeine dependence are shown in Fig. 4 regarding total percentage of agreement and disagreement. Only 25.7% were confident in identifying codeine dependence in patients. The majority (73.3%) were of the view that patients taking codeine medications on prescription do not realize that risk of codeine dependence. There was a lack of consensus among respondent with regard to the risk of dependence when a codeine product is used only as prescribed. When asked about higher risk of codeine dependence in males as compared to females, 39% of respondents agreed, while around half (54.3%) remained neutral in their opinion. Half (50.5%) agreed that services are available that would screen and support the patients with codeine dependence.

## Discussion

To the authors' knowledge, this is the first study of its kind in the Middle East and presents a unique illustration of physician perspectives on the prescribing of codeine, patient consumption patterns, and levels of awareness of risks and related harms of long-term/high-dose use and dependence in Saudi Arabia. Limitations of the study center on its small-scale cross-sectional nature. It is possible that those physicians with

**Table 5** Level of agreement, disagreement, and neutral responses related to patient use of codeine

Statement	Strongly agree <i>f</i> (%)	Agree <i>f</i> (%)	Neutral <i>f</i> (%)	Disagree <i>f</i> (%)	Strongly disagree <i>f</i> (%)
People intentionally take codeine for positive effects on mood	29 (27.6)	35 (33.3)	23 (21.9)	13 (12.4)	5 (4.8)
People intentionally take codeine to reduce withdrawal headaches due to long-term use of codeine preparations	21 (20.0)	44 (41.9)	31 (29.5)	7 (6.7)	2 (1.9)
People generally tend to ignore the risks associated with long-term use of codeine preparations	40 (38.1)	39 (37.1)	22 (21.0)	3 (2.9)	1 (1.0)
Patients on prescription of central nervous system depressants are more likely to buy codeine than other patients	29 (27.6)	38 (36.2)	25 (23.8)	10 (9.5)	3 (2.9)



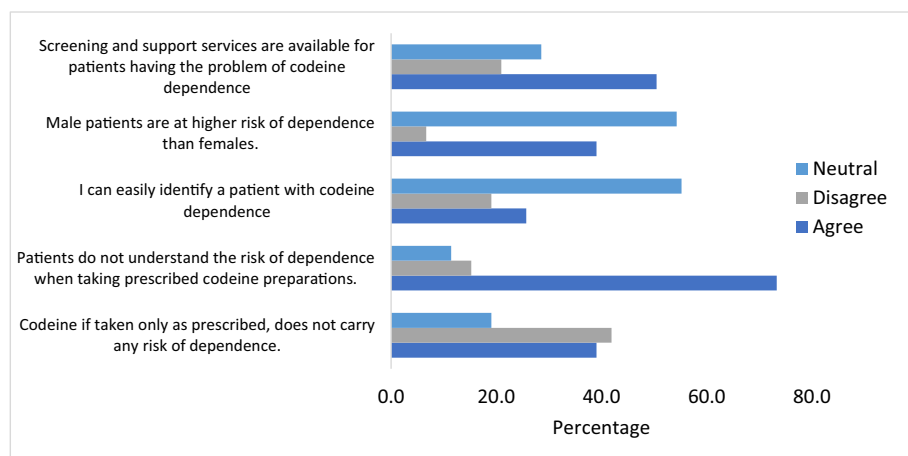
**Fig. 3** Level of agreement on patient use of codeine

an interest in addictions or experience of codeine misuse in their practices were more likely to complete the survey. Equally it is likely that misuse and dependence may have different meanings to specific respondents. The study while small-scale is however indicative of medical professional and pharmacy practitioner concerns raised in other parts of the world where codeine is available in community pharmacies (Carney et al., 2016, 2018; Foley et al., 2016, 2017, 2018; Nielsen et al., 2012; Van Hout et al., 2017b; Wells et al., 2018). Countries elsewhere across Europe, Australia, Africa, and the USA have shifted to stronger regulatory controls on over the counter codeine or to only dispense with medical prescription (Tobin et al., 2013). Given that codeine is classed a narcotic, controlled and prescription-only drug in Saudi Arabia, and yet continues to be dispensed illegally via community pharmacy is a grave cause for concern; and indicative of a need for tightening of regulatory mechanisms and pharmacy sanctions to prevent such diversion. Tackling the malpractice of non-compliance regarding the dispensing of prescription-only medications is imperative, especially the case regarding habit-forming medications such as those containing codeine and anti-biotics (Alibrahim et al., 2012; Aljadhey et al., 2015; AlKhamees et al., 2018; Al-Mohamadi et al., 2013; Sabry et al., 2014).

Of note was the strong concern by physicians, largely Saudi nationals, around the routine prescription of codeine to patients with pain, where non-opioid analgesics were ineffective, but with an observable increase in patient requests for codeine-containing medications. There was strong agreement regarding low awareness of patients around risks and harms associated with high dose, long term use and dependence; and as reported elsewhere, concern around the use of codeine for its mood altering properties, and in order to alleviate medication overuse headaches (Katsarava & Jensen, 2007; Nielsen & Van Hout, 2015; Van Hout et al., 2017a, 2017b, 2018). As here, studies have highlighted patient lack of understanding around drug terminology, medicines compliance and adherence to recommended regimes, and awareness of side effects (Hurwitz et al., 2014; Salter, 2013).

**Table 6** Level of agreement, disagreement, and neutral responses related to codeine dependence

Statement	Strongly agree <i>f</i> (%)	Agree <i>f</i> (%)	Neutral <i>f</i> (%)	Disagree <i>f</i> (%)	Strongly disagree <i>f</i> (%)
Codeine if taken only as prescribed does not carry any risk of dependence	4 (3.8)	37 (35.2)	20 (19.0)	26 (24.8)	18 (17.1)
Patients do not understand the risk of dependence when taking prescribed codeine preparations	35 (33.3)	42 (40.0)	12 (11.4)	10 (9.5)	6 (5.7)
I can easily identify a patient with codeine dependence	1 (1.0)	26 (24.8)	58 (55.2)	14 (13.3)	6 (5.7)
Male patients are at higher risk of dependence than females	18 (17.1)	23 (21.9)	57 (54.3)	3 (2.9)	4 (3.8)
Screening and support services are available for patients having the problem of codeine dependence	27 (25.7)	26 (24.8)	30 (28.6)	14 (13.3)	8 (7.6)



**Fig. 4** Level of agreement on codeine dependence

A minority of these physicians reported confidence in identifying codeine dependence in patients. All medical students in Saudi Arabia have to successfully complete 1-year internship training in order to graduate from medical school. Specialized fields such as psychiatry are however usually offered as elective rotations. Therefore, all students may not get the desired training and experience to observe and identify drug misuse and dependence. This is in contrast to a study by Mobrad et al. (2020), which indicated that the majority of community pharmacists are trained in recognizing misuse, providing warnings, and counseling patients. Further adding to the complexity is that findings in our study indicate that patient sourcing of codeine is driven by circumnavigation of online pharmacies and illegal dispensing practices.

Despite both religious and legal prohibitions against possession and consumption of alcohol and narcotics, in response to the rise in substance use among its youth, including problem drug use, the government of Saudi Arabia has ramped up its community substance awareness raising and has shifted its drug policy from zero tolerance toward harm minimisation (Abualola & Rahamathulla, 2017; Bamofleh et al., 2017; Bassiony, 2013; MENAHRA, 2021; Siddiqui & Salim, 2016; Sweileh et al., 2014). To date however, Saudi Arabia does not implement harm reduction programs such as opioid agonist treatment, needle and syringe exchange, or naloxone for people who use drugs in the community or in prisons (MENAHRA 2021). We recommend that the Saudi authorities consider to include opiate- and opioid-based pharmaceutical medicines in their prevention, pharmacovigilance, and harm minimization strategies. There is growing national level recognition of the complexities of addressing drug dependence and related comorbidities (Al Harbi, 2017; Ibrahim et al., 2018; Katselou et al., 2016; Saquib et al., 2020). While opioid use is most prevalent in drug treatment patient populations (Alshomrani et al., 2017), we recommend that addiction treatment systems in Saudi Arabia now diversify to recognize and support individuals with codeine dependence and work hand in hand with pain management clinics.

Lastly, the study highlights the need for Saudi authorities to implement and develop medical and community pharmacy practice-based innovations to raise patient awareness, detect aberrance, intervene, and support those affected (Bergin et al., 2015; Norman et al.,



2016; Van Hout & Norman, 2016; Van Hout, 2014). Further medical education is warranted both at university level, during internships, and during continuing professional development to raise awareness around patient safe use of codeine; the risk factors for misuse and dependence; how best to support pain patients with iatrogenic dependence; and how best to intervene at dispensing point of care. Future research directions could expand to focus on other drugs of misuse available via community pharmacies, for example, the gabapentinoid group.

## Conclusion

This is the first study to date in Saudi Arabia which examines the perceptions of physicians regarding codeine use, misuse, and dependence in Saudi Arabia. It indicates the imperatives of the Saudi government to address Saudi pharmacy compliance with pharmaceutical regulatory controls and implement enhanced pharmacovigilance at prescriber and dispensing levels and a need to improve patient awareness around safe use of codeine-containing medications.

## Declarations

**Conflict of Interest** The authors declare no competing interests.

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