Assessment of Pharmacist's Awareness toward Rational Dispensing of Codeine-Containing Drugs in Dhamar City, Yemen

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Abstract

Objectives*: The aim of this study was to investigate the level of awareness the pharmacists of Dhamar City in relation to dispensing codeine-containing drugs. As well as studying the relationship between the scientific degree and the wrong administration of codeine.* ***Methods****: The study used a descriptive and scientific approaches of quantitative research, in which a questionnaire was distributed to a sample of 143 pharmacists working in the pharmacies of Dhamar City during the academic year 2021 – 2022. The data were collected and analyzed using the SPSS22 software.* ***Findings****: Results show that Codeine is not safe at all for babies under 1 year old based on the participants' responses (95.8%). Most of the participants (55.9%) chose addiction and habituation. The majority of the participants (95.8%) replied that codeine is not safe for pregnant women.* ***Conclusion****: The researchers conclude that the pharmacists in Dhamar City are aware of the risks of dispensing codeine to people, especially for children, pregnant women and those who suffer from cardiac disorders. Despite the difficulties they face when dispensing codeine to people due to their addiction to it, the pharmacists do their best to overcome the problem of administrating codeine and the subsequent consequences.*

1.1. Introduction

Codeine or 3- methylmorphine is a methylated morphine derivative occurring naturally with morphine in the poppy seed. It is a short acting, weak to mid-range opiate and commonly used to manage mild to moderate pain in adults as well as for its antitussive and anti-diarrheal properties (Tremlett et al., 2010). Recommended daily oral dose for adults is between 30 and 60 mg every 4 hours and to a maximum of 240 mg (Derry et al., 2013). Evidence does not support its use for acute cough suppression in children or adults. In Europe, it is not recommended as a cough medicine in those under 12 years of age. It is generally taken by mouth. It typically starts working after half an hour, with maximum effect at two hours. Its effects last for about four to six hours. Codeine exhibits abuse potential similar to other opioid medications (Paul , et al., 2012).Conversion to morphine by endogenous enzymes causes altered perceptions and emotional responses to pain (Madadi et al., 2013). Administration of codeine incurs common opioid-typical side effects, which include sedation, euphoria and constipation. Patient responses to codeine and risk of intoxication vary due to genetic variations in metabolism (Zhou, 2009).

Contemporary research highlights global concerns around misuse of prescribed and over the counter codeine as the most commonly consumed opiate (Van Hout et al., 2014). Misuse of non-prescription codeine containing medicines is increasing, particularly where available in over the counter combination products (McAvoy et al., 2011). In this study, the researchers intended to investigate the pharmacists' awareness of dispensing codeine in the city of Dhamar.

1.2.Significance of the Study:

There are risks arising from the random dispensing of codeine and the lack of awareness among pharmacists about these risks. In our country, there are many people who use codeine-containing drugs without knowing the risks that indiscriminate use may cause, especially in children under 12 years of age, pregnant and breastfeeding women, and people with heart disease. Therefore, it is a must to convey to the pharmacists the risks that may result from the random dispensing of drugs that contain codeine and provide awareness to pharmacists not to dispense medication containing codeine until they make sure of the condition and quality of the person who will use it. In addition, it must be ensured that the drug will not cause problems for the person who will use it.

1.2. Objectives of the Study:

1.2.1. General Objective: The main objective was to assess the level of awareness of administrating codeine by pharmacists in Dhamar City.

1.2.2. Specific Objectives:

a- Identifying the awareness of pharmacists about the indication of codeine.

b- Identifying the percentage of pharmacists who know the pros and cons of codeine.

c- Identifying the percentage of those who administer codeine wrongly.

e- Studying the relationship between the scientific degree and the wrong administration of codeine.

1.3. Justification of the Study:

- Lack of awareness among pharmacists of the dangers of codeine.
- Identifying the reasons behind this lack of awareness.
- Lack of community awareness of the codeine uses and misuses.

2. Methods & Materials

2.1. Study Area:

This study has been conducted in Dhamar governorate, which is located 100 kilometers to the south of the capital, Sana'a. There are over 100 pharmacies in Dhamar City. The researchers distributed the questionnaires to almost all pharmacists in Dhamar to collect the necessary data to investigate the research problem.

2.2. Study Design and Population

This study relied on the scientific approach. The data were collected based on a descriptive and quantitative approach. The instrument for data collection was a questionnaire designed to assess the level of awareness among pharmacist in Dhamar City. Most questions were one of two types :direct questions and multible-choice questions. In its first part, the questionnaire included questions on socio-demographic data (age, gender, qualification and experience). The second part dealt with codeine-containing drugs. The third part included short questions as well as long ones.

2.3. Data Analysis

The data of this study were collected during the second semester of the Academic Year (2021 - 2022). The data were analyzed using the (SPSS)version 22, the functions used in this study were frequency, percentage and Cronbach. A detailed description of the analysis results is presented in the following chapter.

2.4. Ethical Approval

The researchers developed a questionnaire in the form of multiple-choice questions as well as open ones. The questionnaire was designed to investigate the level of awareness among pharmacists in Dhamar City. To ensure the questionnaire's validity, it was presented to the supervisor together with two other referee doctors in order to assure that the content of the questionnaire is consistent with the study objectives. They suggested making few changes to some words. During the distribution of the questionnaires, the pharmacists were assured that their personal information would not be mentioned in the questionnaires in order to ensure that their data were preserved. To ensure the study's reliability, we got the value of Cronbach Alpha after analyzing the data. The normal range of Cronbach's coefficient alpha value between (–1.0) and (+ 1.0), and the higher values reflect a higher degree of internal consistency. The value of Cronbach Alpha in our study was 0.684, which shows that the instrument is very reliable.

3.1. Results

The aim of this study was to investigate the degree of awareness among pharmacists in Dhamar City. We distributed a questionnaire of three parts to a sample of 143 pharmacists in Dhamar City. The returned copies of the questionnaire were collected from the participants, and then analyzed, using the SPSS program. The outcomes of the analysis are presented and discussed in this chapter.

3.2.**Analysis of the first Section: Table1:** socio-demographic data of participating pharmacist's**:**

socio-demographic		Frequency	Valid Percent
The participants' gender	Male	128	89.5
	Female	15	10.5
The participants' age	18 - 25	58	40.6
	26 - 33	66	46.2
	Above 33	19	13.3
The participants' qualification	B.Sc.	45	31.5
	Diploma	91	63.6
	Experience	7	4.9

The participants' experience	**1 - 3 years**	**62**	**43.4**
	4 - 6 years	**37**	**25.9**
	More than 6 years	**44**	**30.8**

The population of this study was limited to pharmacists of Dhamar City. The sample of the study has been chosen randomly from Dhamar pharmacies. Random choice gives every one of the participants the chance to be chosen. The sample size of the study is was 143 male and female pharmacists. Most of the participants were male (89.5%).

In addition, most participants' ages range between 26 and 33 years (46.2%) of age, also between 18 and 25 years (40.6%) old.

Regarding qualification, most of the participants (63.6%) have a diploma in pharmaceutics, (31.5%) hold a B.SC. and only 4.9 % have no qualification.

Regarding experience, most of the participants (43.4 %) have worked for only 1 – 3 years, 25.9 % have worked for 4 – 6 years and 30.8 % have an experience of more than 6 years..

3.3. **Analysis of the Second Section: Can these drugs be administered without a medical prescription?**

Table 2: Codeine-containing Drugs

Drug	Strongly Agree		Agree		I do not know		Disagree		Strongly Disagree	
	F	%	F	%	F	%	F	%	F	%
TUSSIFIN	23	16.1	95	66.4	1	0.7	19	13.3	5	3.5
Codeine Phosphate	8	5.6	41	28.7	18	12.6	66	46.2	10	7.0
Co-Codamol	11	7.7	79	55.2	22	15.4	26	18.2	5	3.5
Codeine Linctus (cap)	6	4.2	45	31.5	26	18.2	60	42.0	6	4.2
Codal Extra	13	9.1	86	60.1	9	6.3	32	22.4	3	2.1
Codamol plus (500 mg)	14	9.8	79	55.2	10	7.0	36	25.2	4	2.8
Fevadol plus (Tab)	15	10.5	87	60.8	9	6.3	31	21.7	1	0.7
Soplagin (Tab)	17	11.9	90	62.9	15	10.5	19	13.3	2	1.4
Syramin + Codeine (syrup)	12	8.4	41	28.7	29	20.3	55	38.5	6	4.2
Solpadine Effervescent (Tab)	22	15.4	93	65.0	1	0.7	23	16.1	4	2.8
Actifed Compound Linctus (syrup)	16	11.2	67	46.9	18	12.6	36	25.2	6	4.2
Rfamol Plus Effervescent (Tab)	21	14.7	89	62.2	4	2.8	23	16.1	6	4.2

In this section, we listed 12 codeine-containing drugs and asked the participants about the possibility of giving them to patients without a medical prescription. The first of these drugs is TUSSIFIN. Most of the participants (66.4%) replied with agreement. This shows that the pharmacists are aware of administering TUSSIFIN to patients. It is one of the drugs that cannot be administered without a prescription.

The second drug is Codeine Phosphate, which is met by the disagreement of (46.2%) of the participants. This contradicts with the first drug and shows that the pharmacists are not aware enough of administering Codeine Phosphate to patients.

For Co-Codamol, 55.2% of the participants agreed that it cannot be dispensed without a medical prescription. This, again, shows the awareness the pharmacists have when administering this drug to their patients.

Then, we asked the pharmacists about Codeine Linctus (cap). A relatively number of the participants replied with disagreement. This

again shows that the pharmacists are not aware of administering Codeine Linctus to patients.

Codal Extra was another drug, about which we asked the participants. Most of the participants agreed that it cannot be administered without a prescription. This result indicates that the participants have a relatively great awareness of dispensing Codal Extra to the patients.

In relation to Codamol Plus (500 mg), the higher number of the participants agreed that it cannot be dispensed without a prescription. The result shows that the pharmacists are aware of dispensing this drug to patients.

The same applies to Fevadol Plus (Tab). 60.8% of the participants agreed that it cannot be administered without a medical prescription. Since they answered it correctly, it shows the extent of awareness the pharmacists have in regard to administering it without a medial prescription.

For the eighth item, most of the participants (62.9) agree that Solpagin (Tab) can be dispensed without a medical prescription. This shows that the pharmacists have awareness regarding the administration of codeine-containing drugs.

In respect to Syramin + Codeine (syrup), most of the participants (38.5%) disagree that it can be administered without a medical prescription. This indicates that the pharmacists do not have enough awareness of administering codeine-containing drugs.

The sample of study are aware of administering Solpadine Effective (Tab) as 65% of them agreed that it can be administered without a medical prescription.

For Actifed Compound Linctus (syrup), the pharmacists are also aware of administering it. 46.9% of the participants agreed that it cannot be administered without a medical prescription.

The following drug is Rfamol Plus Effervescent (Tab), which was met by 62.2% of agreement. This indicates that the pharmacists are aware of dispensing it to patients.

3.4. **Analysis of the Third Section:**

when asking about the codeine one of the drugs dispensed by a prescription, most of the participants (84.6%) confirm that codeine can be administered without a medical prescription. This answer indicates that the participants have awareness of dispensing codeine.

Having asked the participants if codeine-containing drugs affect the mental state of its users or not, 53.8 % of the participants agree that codeine makes people in an unstable mental condition.

Result shows that the academic degree is one of the most important factors that form the pharmacists' awareness of dispensing codeine to patients with an average of 81.8%. the following table and figure show the participants' responses to this question.

The fourth result regarding the absence of awareness among people in Dhamar City and the risks of codeine addiction, the majority of the participants (91.6%) agree that the lack of awareness makes people more vulnerable to addiction and other risks due to the use of codeine.

Table 3: some results obtained:

Questions	YES		NO		TOTAL	
	F	%	F	%	F	%
Is codeine one of the drugs dispensed by a prescription?	121	84.6	22	15.4	143	100.0
Does codeine make people in an unstable mental state?	77	53.8	66	46.2	143	100.0
Is the scientific degree important for a pharmacist to dispense medicines, especially narcotic ones?	117	81.8	26	18.2	143	100.0

As a pharmacist in Dhamar, do you think that the community's lack of awareness makes it more vulnerable to addiction and other risks?	131	91.6	12	8.4	143	100.0

In the third item of this section, we asked about the possibilities that may result as a result of administering codeine without a medical prescription. Most of the participants' responses (35%) go for unlikely side effects. That's true and shows awareness among the pharmacists.

Table 4: In your opinion, what possibilities could happen as a result of administering codeine without a medical prescription?

	Frequency	Valid Percent
Serious side effects	43	30.1
Mild side effects	40	28.0
Unlikely side effects	50	35.0
Others	10	7.0
Total	143	100.0

For the fourth item, we mentioned three medicines that may interact with codeine. These medicines are Benzodiazepine, Phenytoin and Clarithromycin. The true answer for this question is all the above, which was chosen by 49% of the participants. This indicates that the pharmacists are aware of the interaction of codeine with other medicines.

Table 5: Which of the following constitutes significant drug interaction with codeine?

	Frequency	Valid Percent
Benzodiazepine	39	27.3
Phenytoin	21	14.7
Clarithromycine	13	9.1
All of the above	70	49.0
Total	143	100.0

In the seventh item of this section, the researchers asked the participants about the number of people who come to their pharmacies to buy codeine. Most of the answers were 1 – 10 every month. This indicates that people in Dhamar do not buy codeine very often.

Table 6: How many people come to your pharmacy to ask for codeine every month?

	Frequency	Valid Percent
None	41	28.7
1 - 10	59	41.3
11 - 20	19	13.3
More than 20	24	16.8
Total	143	100.0

Then, we asked the pharmacists about the number of people who come to their pharmacies to buy codeine to use it incorrectly. 46.9% of them replied that no one comes to their pharmacies to buy codeine and use it incorrectly.

Table 7: How many people come to your pharmacy to ask for codeine to be used incorrectly?

	Frequency	Valid Percent
None	67	46.9
1 – 5	44	30.8
6 - 10	19	13.3
More than 10	13	9.1
Total	143	100.0

Most of the pharmacists (54.5%) state that they receive about 1 – 10 codeine-containing prescriptions every month. The responses are shown in the following table and figure.

Table 8: How many codeine-containing prescriptions do you dispense every month?

	Frequency	Valid Percent
None	33	23.1
1 - 10	78	54.5
11 - 20	21	14.7
More than 20	11	7.7
Total	143	100.0

The age group that is most likely to buy codeine is 15 – 30 years old. This indicates that young people buy codeine more than other age groups.

Table 9: What age group is most likely to buy codeine?

	Frequency	Valid Percent
15 - 30 years	84	58.7
31 - 45 years	44	30.8
46 - 60 years	13	9.1
61 and more	2	1.4
Total	143	100.0

In the last item of the multiple-choice questions, we asked the participants about the factors they take into account when dispensing codeine drugs. The majority of the participants (89.5%) care most for the type and safety of the drug.

Table 10: What do you take into account when dispensing codeine drugs?

	Frequency	Valid Percent
The type and safety of the drug	128	89.5
The price of the drug	12	8.4
The trade name	3	2.1
Total	143	100.0

The last four questions of the questionnaire were open questions. The responses to these questions show awareness to some extent among the pharmacists. The first of these questions was "What major risks have you faced as a result of dispensing Codeine-Containing drugs?" Most of the problems the pharmacists face are the insistence of the

clients to give them the drug. It is difficult for the pharmacists to convince them that the drug is not available. In addition, some people use the drug incorrectly or without a medical prescription. This leads to problems with the clients. The second was "What codeine-containing drugs are most dispensed without a medical prescription?" In their responses, the participants mentioned Tussifin + Codeine (syrup), Solpadine (effervescent), Tussivan, Actifed (syrup) and Codamol Plus. The third question was "What codeine-containing drugs are most requested without a medical prescription?" The participants replied with Solpadine (effervescent), Tussifin + Codeine (syrup), Tussivan, Solpafizz, Solpagine (tablets) and Fevadol.

Finally, the last question dealt with the most prominent complaints presented by patients as a result of using codeine-containing drugs. The pharmacists reported the following as the most complaints they hear from their clients due to the use of codeine-containing drugs: hypotension, addiction and habituation, disorders of the digestive system (e.g. nausea, vomiting) and constipation), sweating and polyuria, suffocation as a result of the interaction with other drugs, headaches due to discontinuation of the drug, memory impairment, fatigue and dizziness, lack of focus, dry mouth, insomnia and tachycardia.

4. Discussion of the Results

The main objective of this study was to evaluate the pharmacists' awareness of dispensing codeine-containing drugs. According to the outcomes of the analysis of the data presented in chapter 4, most of the participants have good awareness of administrating codeine-drugs, such as TUSSIFIN, Co-Codamol, Codeine Linctus (cap), Codal Extra (cap), Codamol Plus (500 mg), Fevadol Plus (tab), Solpagin (tab), Solpadine Effervescent (tab), Actifed Compound Linctus (syrup) and Rfamol Plus Effervescent (tab). They are not aware of dispensing Codeine Phosphate and Syramin + Codeine (syrup).

In addition, codeine is dispensed with a medical prescription is misused as over the counter which without prescription, This is in concordance with **Foley M, Carney T, *et al*,.(2018)** as their study was about medical professionals' perspectives on medicines containing codeine in South Africa.

It causes some medical interactions with other medications may be is Fatal**.** This is in concordance with **Madadi P, Hildebrandt D, *et al*,.(2010)**. Their study was about Fatal hydrocodone overdose in a child: pharmacogenetics and drug interactions.

It is not safe for pregnancy women. This is in concordance with **Henry A, *et al*,.(2002)** as their study was about patterns of medication use during and prior to pregnancy.

It is not safe for breastfeeding women. This is in concordance with **Madadi P, Moretti M *et al*.,(2013)** because their study was about Guidelines for maternal codeine use during breastfeeding.

It is not safe for children under 12 years. This is in concordance with the study of **chua KP *et al*.,(2021)** whose study was about opioid prescribing to US children and young adults in 2019.

Like other opiates, codeine is an addictive drug. This is in concordance with **C D H Parry,*et al*.,(2017)** whose study was about Codeine is my helper': Misuse of and dependence on codeine-containing medicines in South Africa.

Young people are the most likely to buy codeine-containing drugs. Many complaints are recorded by the participants as a result of selling the drug. One of the most

significant complains is the addiction and insistence of the patients to get the drug.

Both bachelor and diploma pharmacists show a degree of awareness, yet the diploma pharmacists of the sample of the study. This outcome was reached after we had studied twenty separate copies of the diploma pharmacists and the same number from the bachelor pharmacists. Out of 40, the diploma pharmacists recorded 24 true answers and 17 false answers for the bachelor pharmacists. After calculating the number of the true and false answers, it was found that 47% of the participants' answers were true and 26% were false. This indicates that the pharmacists have considerable awareness of dispensing codeine-containing drugs.

5. Conclusion

By the end of this research, we conclude that pharmacists in Dhamar City have a mild degree of awareness. The pharmacists who obtained the diploma degree are more aware than those who obtained the bachelor one. This awareness needs to be enhanced in order to avoid the risks of dispensing codeine wrongly and using it incorrectly, which may lead to the misuse of codeine and becoming addicted to it.

6. Recommendations

Based on the findings of the research, we recommend the following:

1. Medicine colleges and institutes should pay more attention when teaching things related to codeine. They should provide sufficient knowledge for their students regarding the risks of using too much codeine.
2. The pharmacists should read extensively about codeine and its risks. They should avoid quarrel with their clients who comes to ask for codeine.
3. The Ministry of Health should organize the process of administrating codeine to patients. They should also carry out campaigns and workshops to increase the level of awareness among the community regarding the dangers of codeine addiction.
4. Future researchers should study codeine from other angles.

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