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Original Research

Predictors of Recommending Non-Pharmacological Therapy for Cough during Pregnancy by the Community Pharmacists in the United Arab Emirates (UAE): A Simulated-Patient Approach.

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Abstract

Background: Cough is common during pregnancy. Community Pharmacists (CPs) can provide high-quality cough assessment and management services during pregnancy, including nonpharmacological and pharmacotherapies. In pregnant women, non-pharmacological approaches may be preferred as a first line of treatment for cough to minimize the potential side effects associated with pharmacological therapies. **Objective:** This study aimed to determine if CP characteristics (age, gender, job title, and experience) can predict clinical competencies as related to patient assessment, and act as predictors of recommending a non-pharmacological therapy for cough as first-line therapy for pregnant women. A secondary aim of this study was to further evaluate CP counselling and communication skills by measuring the levels of patient satisfaction following interactions. **Methods:** A cross-sectional, simulated patient (SP) study was conducted among 200 community pharmacies selected randomly in Dubai, Sharjah, and Ajman emirates (UAE). A cough scenario was developed, and two fourth-year pharmacy students role-played an SP visiting community pharmacies and requesting symptom relief from a cough. A formal assessment tool was used and consisted of 29 questions to assess the comprehensiveness of CPs' cough assessment, management, counselling, and communication skills. A descriptive and bivariate analysis of the data was undertaken.**Results:** Two hundred pharmacies were visited, and 88.5% of CPs asked about the description of cough symptoms. Around a third of the CPs (32.5%) did not ask follow-up questions to determine if the SP had any other symptoms, such as sinusitis, a cold, or gastric reflux. 68.0% of the CPs did not successfully ascertain that the SP was pregnant. Most CPs (97%) forgot to ask about patients' allergies to medicine, and (43.5%) did not ask if the SP had sought any medication for the cough. More than half of the CPs (62%) had not addressed the non-pharmacological treatment. Just over two-fifths (44.5%) of the CPs prescribed the SP with Prospan® cough syrup, and 3.5% of CPs recommended antibiotics for a cough. 82% of CPs did not use any source of information other than their general knowledge and expertise. Most (80%) of the SPs were either very highly satisfied or highly satisfied with cough counselling provided by the CPs. In addition, we found that age(AOR=1.489, 95% CI: 1.095-2.026, P-value= 0.01), gender(AOR=0.344, 95% CI:0.244-0.486, P-value ≤0.001), job title (AOR= 1.914; 95% CI: 1.353-2.708, P-value< 0.001), and educational levels of CPs (AOR= 0.696; 95% CI: 0.513-0.946, P-value=0.020), is predictors of non-pharmacological therapies to SPs by the CPs in the UAE. **Conclusion:** This study is the first in the UAE to determine the predictors of prescribing non-pharmacological treatment to pregnant women with cough by CPs, which has practical implications for CP training and education programs. Enhancing CPs' knowledge of non-pharmacological approaches to managing cough will improve maternal health.

Keywords: community pharmacist, cough, pregnancy, simulated patient

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INTRODUCTION

Cough is an interdisciplinary symptom, one of the most common symptoms that brings patients to ambulatory, primary health care centres and outpatient clinics worldwide.[1,2,3] Cough can be classified based on the duration of symptoms as acute (< 3 weeks), sub-acute (3–8 weeks), and chronic (> eight weeks).[4] The acute cough usually lasts less than three weeks.[4] It is considered one of the most common symptoms that bring patients to community pharmacies for a consultation or over-the-counter (OTC) cough treatment.[5] Furthermore, cough can be classified as mild, moderate, or severe; it is the severe form of cough that is of particular concern because it can cause vomiting and even fractures in the ribs.[6] Therefore, cough symptoms' onset, type, and duration are crucial to assessing the severity of cough.[7]

Cough can be caused by a simple viral upper respiratory tract infection such as a common cold or flu or a more serious underlying disease of the upper or lower respiratory tract.[1,2,4] Community pharmacists should refer patients with a cough that has lasted more than three weeks to their doctor. This could indicate a more serious underlying medical disease-causing chronic coughs, such as smoking-related cough, bronchiectasis, bronchitis, or even congestive heart failure.[1,5] In addition, community pharmacists should refer the patient to a doctor or seek urgent medical attention if shortness of breath, chest pain, wheezing, or excessive sputum production are noted.[5,7]

Cough is common during pregnancy.[8–10] One reason for this is the hormonal and physiologic changes during pregnancy, which can modulate immune responses to various allergens, viruses, and bacteria, reducing the women's immune system function. As a result, pregnant women are more likely to be susceptible to a wide variety of allergies, viral illnesses, and bacterial infections.[11] Cough can be severe during pregnancy causing episodes of hot flashes, night sweats, exhaustion, hemoptysis, sleeping difficulties, and weight loss, which might raise the risk of adverse perinatal outcomes.[8] Therefore, while treating pregnant women with cough, it is essential to consider the mother's changing physiology, her increased vulnerability to disease, the needs of the developing fetus, and any potential adverse pharmacological consequences.[9,12–14]

In most cases of acute cough, pharmacotherapy is unnecessary.[15,16] Acute cough is usually self-limiting and caused by a viral upper respiratory tract infection such as a common cold or flu.[15,17] It typically resolves on its own within a few weeks without the need for medication. [18] However, if the cough becomes severe or persists for more than a few weeks, it is advisable to consult a healthcare professional for further evaluation and potential treatment options.[19]

In pregnant women, for acute cough, the primary/most important intervention is non-pharmacological therapy as these approaches are less likely to produce unwanted side effects. Non-pharmacological therapy for acute cough includes staying hydrated, using a humidifier to moisten the air, and avoiding irritants such as smoke or strong odours. It also involves psycho-educational counselling, cough suppression techniques, and breathing techniques, as well as others.[20-23] For example, a systematic review that searched 16,546 articles found that only non-pharmacological cough therapies significantly improved cough-specific health-related quality of life, cough frequency, and voice outcomes compared to control interventions.[24]

Community pharmacies provide an opportunity to address the demand for high-quality cough assessment and management services during pregnancy, including pharmacotherapies delivered with a nonpharmacological approach. However, no published study has investigated whether pharmacists in the UAE are clinically competent in managing acute cough or acute cough during pregnancy. Further, no study has identified the key factors and predictors associated with the competency of CPs to recommend non-pharmacological therapy for pregnant women with cough. The UAE Professional Pharmacy Graduates Competency Framework, Domain 2 specifically states that clinical competencies for pharmacy graduates include patient-centred care, whereby the graduate needs to be competent in collecting subjective and objective data during patient assessment and recommending the most effective and safest medication. In the present scenario, this includes data regarding pregnancy status, cough duration and accompanying symptoms.[25]

Previous studies have investigated the clinical competencies of community pharmacists to manage other symptoms, such as headache and gastroesophageal reflux.[26–28] Those studies reported suboptimal competencies of pharmacists.[26–29] Therefore, to support optimizing pharmacy-delivered cough assessment and management services among pregnant women in the UAE, this study aimed to determine if CP characteristics (age, gender, job title, and experience) can predict clinical competencies as related to patient assessment, and act as predictors of recommending a non-pharmacological therapy for cough as first-line therapies for pregnant women. The study also aimed to evaluate CP counselling and communication skills by measuring the levels of patient satisfaction following interactions. By examining the practices of CPs in the Emirates towards non-pharmacological therapies for pregnant women, we hope to gain insights into the factors that influence their prescribing behavior. Furthermore, we will explore potential gaps in knowledge or training that may hinder CPs from confidently recommending non-pharmacological interventions to pregnant women. Understanding these factors will enable the

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development of strategies that integrate non-pharmacological treatments into care, ultimately improving the management of cough during pregnancy in the Emirates.

METHOD OF COUGH

Study design

This cross-sectional observational study used a simulated patient (SP) approach. The SP approach is recognized as a valid and reliable method for assessing community pharmacists' behaviors in their practice settings. [26–28,30,31] An SP, also called pseudo customer or mystery shopper [33], is a person trained to visit a pharmacy and play out a scenario designed by researchers to evaluate the pharmacist's behavior and actions.[32, 30] The SP methodology was used to avoid the social desirability bias inherent in other methods, such as surveys or interviews, and to lessen the potential for false positive replies (when participants know they are being assessed).[34]

Sample size and sampling technique

The sample size was calculated at a 90% confidence level, a 5% margin of error, sample proportion at 0.5 for a population of pharmacies N = 1543 to give 232 pharmacies. We used the cluster sampling technique, where the community pharmacy population subgroups were used as the sampling unit. The sampling frame from which the community pharmacies were selected was the registered pharmacies in the three clusters/ emirates (Dubai [n=775], Sharjah [n=574]), and Ajman [n= 194]) as obtained from the UAE Ministry of Health and Prevention. The 'Yellow Pages' were used to obtain community pharmacies' contact details and locations. To ensure the robustness of the sampling strategy and a more effective representation of each cluster (emirate), we included 100 pharmacies from each Emirate, creating a sampling frame of 300 pharmacies. A Microsoft Excel spreadsheet was created to list pharmacies, from which random allocation was performed.[35] The pharmacies were then arranged in ascending order of their randomly assigned number, creating a list of 300 pharmacies in a random order. The researchers visited the manager of pharmacies in each emirate as per the random order to obtain consent to participate in the study until a minimum of two hundred pharmacies that met the inclusion/exclusion criteria were recruited. To be included, the pharmacists had to speak English. On the other hand, we excluded pharmacy assistants, pharmacy technicians, and pharmacy students because they were not responsible for counselling pregnant women with coughs. The researchers explained to the manager of pharmacies in each emirate the study's goals and that an SP with a cough case scenario would be visiting their pharmacies within a specific time frame (six weeks). The head managers who agreed for their pharmacists to participate were detailed about the SP scenario to be used in the study and were assured that all collected data would remain strictly confidential, as advocated by Cohen et al. [36] Verbal approval of the head managers was considered as an agreement to participate in the study, and then their written consent documented it. They were also informed about their right to refuse participation or withdraw from the study at any point without prejudice. Acceptance was received from 200 pharmacies (83 community pharmacies in Dubai, 62 in Sharjah, and 55 in Ajman Emirates, respectively).

Simulated patient (SP) scenarios

The scenario described a 24-year-old pregnant lady in her 2nd trimester who would like the community pharmacist to recommend treatment for her recent cough. Her cough began two days ago, with a blocked nose and a sore throat. The patient did not demonstrate any pain or shortness of breath. Although the cough was dry and irritating, she was not taking any medication from any physician. Instead, she took Jos-Pan® (dried ivy leaf extract), which was ineffective. She had already taken regular saline nasal spray to treat her blocked nose, and for the sore throat, she had taken natural honey lozenges. It is noteworthy that the patient was allergic to aspirin. This scenario was developed after reviewing the literature on relevant simulated patient approaches among community pharmacies.[26–28]

The role of community pharmacists (CPs) in treating cough during pregnancy

Considering that cough is usually associated with common colds, is not a life-threatening condition, and there are certain risks associated with using medication to treat these symptoms during pregnancy, the pharmacist should recommend nonpharmacological treatments.[5,9,10] Therefore, the CP should advise the SP to have hot drinks and increase fluid intake, which can benefit the respiratory system and alleviate cough symptoms. It is recommended that the SP should increase their fluid intake by up to two liters a day to maintain hydration of the lungs. Next, if pharmacological treatment is necessary, the CP must provide information to the patient as related to personal and fetal risk and potential interactions and recommend doctor consultations when these are needed. Concomitantly, the CP must provide advice related to medication that may require dosage adjustments to minimize fetus exposure.

Assessment of the CP's clinical competency to manage cough during pregnancy

In line with the scope of this study, we only assessed clinical competencies as defined by the UAE framework for Domain 2, point 2.1, related to patient-centred care, history taking and therapeutic recommendations, including the use of technology to maximize treatment efficiency, cost and safety.[25] This includes CP competencies for inquiring about the patient's previous medical history, including the presence of a pregnancy and current used strategies to manage symptoms, symptom duration, additional symptoms, other present therapies, allergies, and competencies for recommending the most effective and safest line of therapy.

For this assessment, we adapted a framework from a previously validated tool.[26,32] The questionnaire was in English and comprised questions that were divided into five categories: demographic data, CP's clinical competencies (taking the past medical history), management, referral, communicative skills, and provided information used during the counselling process.

Accordingly, the assessment tool ended up with 29 questions (Appendix).

The first section of the assessment was sociodemographic characteristics of the community pharmacist comprising age, gender, nationality (Arab versus non-Arab), job title (pharmacist versus in charge pharmacist), work experience (years), working time (hours), average client waiting time (minutes) and, the educational qualification of the CP.

The second section was the clinical competencies of CP (taking the past medical history) and comprised nine questions.[26] These questions clarify if the CP asked the SP about the description of cough (productive versus non-productive symptom), age of the patient, duration of symptoms, time of symptom, frequency of the symptom, patient's previous history, family history of eczema, hay fever or asthma and smoking habit, asking about other conditions that might be associated with the cough such as sinusitis, sore throat, gastro esophageal reflux and pregnancy precipitating factors (e.g., dust) and if there was any SP's management of cough and SP's allergy to medicine). Each item assessed whether the CP performed a criterion action (yes= 1) or not (zero).

The third section collects data on the management competency of the CP which consists of seven questions (prescribe medicine, advice about the dose, frequency, duration of treatment, and potential adverse effect, advice about the use of a non-pharmacological approach and if the pharmacist refers to the SP to the doctor). The CP's performance on each criterion action was either 1 (yes) or 0 (no) for each item. The checklist also assessed whether the CP prescribed the incorrect medicine to the SP and whether the information provided had the potential to cause harm to the SP.

The fourth section was the source of medical information to verify if the CP utilized another source of information than his/her knowledge, e.g. computer/database, books, package insert and others. Furthermore, this section enquires if any written information was offered to the SP (brochures and stickers; computer printout; remark on the package, or specified any other approach, if ever). Data was coded as an ordinal variable: Patient information/brochures = 1, Individual information (computer printout) = 2; Label sticker/remark on the package provided by the pharmacist = 3

The sixth section was satisfaction levels of the SP with the CPs, which involved the overall satisfaction rate by the SP, the eye contact of the CP during the counselling and, the attention paid by the CP which were coded as an ordinal variable: Very highly satisfied = 1, highly satisfied= 2; satisfied = 3; Less satisfied =4and Not satisfied=5.

Simulated patient (SP) training

Two fourth-year pharmacy students from Ajman University, Ajman-UAE, were recruited to play the role of the SP. SPs were females in their twenties and spoke both Arabic and English languages. SPs were familiarized with the above scenario and provided with six training sessions, each lasting around 45 min. The training sessions consisted of meeting SPs in six days to explain the scope of the study and their role, clarify the use of the assessment framework, and explain the importance of accurate feedback to ensure consistency in the delivery of scenarios. Furthermore, SP watched video recordings of scenarios including a mock pharmacist and SP and were given feedback on their performance.

Pilot study

A convenience sample of 12 pharmacies was selected to run the two phases of the pilot study. For phase one, six pharmacies were visited once by one of the SPs to test the content, and the feasibility of the scenario and provide feedback to improve the scenario. Based on the data collected from phase one pilot study, the scenario was developed and tested in phase two with an additional number of six pharmacies. Pharmacies visited in phase one were not visited in phase two study. The results of the pilot study were reviewed by the researchers to ensure consistency in the data collection process by the SP and to ensure that the scenarios were aligned with the objectives of the study.

Procedure and documentation after the visit

Over a period of six weeks, SP visited the pharmacies on weekdays and weekends. There was coordination between the two SPs so that each pharmacy visited once. During visits, one pharmacist in each selected pharmacy was evaluated. In pharmacies where more than one pharmacist was in the pharmacy, the in-charged pharmacist was selected. Immediately following each encounter, the questionnaire (assessment form) was completed by the SP to avoid recollection bias of the SP. The completion of the assessment form was done in a convenient location outside the community pharmacy. If there were other customers in the pharmacy at the time of the SPs' visit, the SP would wait until all customers left before speaking to the pharmacist.

Statistical analysis

All data gathered were entered into Microsoft Excel 2016 for Windows (Microsoft Corp, Redmond, WA, USA) and analysed using IBM SPSS Statistics 26.0 (SPSS Inc., Chicago, IL, USA). As advised by Fisher and Marshall, descriptive statistics were calculated for all variables [36]. Continuous variables were described as mean values and standard deviations, and categorical variables as frequencies and percentages. The questionnaire's internal consistency was assessed using Cronbach's alpha.[37,38] A chi-square test for association was conducted to determine if there is an association between the demographic characteristics of the CPs and the ability to advise for non-pharmacological therapy. Furthermore, the binary logistic regression was used to identify predictors associated with the likelihood of CPs recommending non-pharmacological treatment to SPs. A p-value of <0.05 was considered statistically and clinically significant.

RESULTS

The following sections present the results divided into two main sections: demographic characteristics and clinical competency

of of CPs.

Demographic characteristics

Among the 200 respondents, almost three-quarters were males (150, 75%), non-Arab (147, 74%) and under the age of 31 years (158, 79%) with a mean age of (27.5 ±4.4). Furthermore, over half of the respondents were in charge of pharmacists (118,59%), and just over three-quarters of them had more than ten years of experience (153,765%). In addition, most of the respondents (192, 96%) worked between 8 and 10 hours daily, with an average client waiting time between 6 to 10 minutes for the majority of them (186, 93.0%). The demographic results are summarised in Table 1.

CLINICAL COMPETENCY OF CPs

A. Assessment of competencies

Approximately more than three-quarters of the respondents (177, 88.5%) asked the SP to describe the cough symptoms and whether it was productive (chesty or loose) or unproductive (dry). In addition, 58% of them (116) questioned how long the symptoms would last. Just under a tenth (7.5%) asked when the coughing started. Furthermore, around a third of the respondents (62, 32.5%) did not ask follow-up questions to determine if the simulated patient had any other symptoms, such as sinusitis, a cold, hay fever, a sore throat, or gastric reflux, in addition to the cough. While investigating the simulated patient's medical history, two-thirds of the respondents (130, 65%) did not ask the SP if she was pregnant. Furthermore, most respondents (194, 97%) forgot to ask about patients' allergies to medicine and around two-fifths (43.5%) did not ask if the SP had sought any medication for the cough, as illustrated in Table 2.

Table 1. Demographic distribution characteristics of the participants (*N* = 200)

Characteristic	Frequency (%)
Age (years)	
22–30	158 (79)
31–40	42 (21)
Gender	50 (25)
Female	150 (75)
Male	
Nationality	
Arab	53 (26.5)
Non-Arab	147 (73.5)
Job title	
community pharmacist	82 (41)
In-charge community pharmacist	118(59)
Working hours/week	
1–8	8(4)
> 8	192(96)
Work experience (years)	
<1	8 (4)
1–5	39(19.5)
>5	153(76.5)
	14 (7)
Average client waiting time (minutes)	186(93)
1–5	
6–10	
Educational Qualification	158(79)
Bachelor of Pharmacy	42(21)
Doctor of Pharmacy (Pharm D)	

B. Management of the cough's symptoms by the CPs

More than half of the respondents were competent to recommend a cough medication and specified the dose and the frequency of taking medicine to the simulated- patient without being asked to do so (125, 62.5%;115, 57.5%, respectively). Notably,179 of the respondents (98.5%) did not discuss the potential adverse effect of the medicine with the SP. The non-pharmacological approach to cough treatment, such as taking lozenges, honey or drinking hot water, has been discussed with the simulated patient by one-third of the respondents (76, 38%). Finally, the referral competencies of the respondents were noticed by 37 of them (75%), who did not offer any medicine but asked the SPs to see a doctor (Table. 3). Considering the high number of pharmacists that refrained from offering medication of any kind and directed the patient to a doctor, it can be argued that community pharmacists may feel that they lack the professional competencies for prescribing therapies for pregnant women.

C. Pharmacological and non-pharmacological treatment offered by the CPs to the SPs

The most prescribed medicine for cough by the respondents was cough syrup, such as Prospan® Melrosum®; and Sinecod®. Nevertheless, other medicines were also prescribed for the simulated patient. For example, analgesics (Pandol®), antibiotics (amoxicillin), throat lozenges (Strepsils®), antihistamines (Clartin® and Zyretic®), vitamin C and Non-steroidal anti-inflammatory (Ibuprofen). On the other hand, ginger and lemon hot drinks, honey, and inhaling Viks® ointment were highly recommended as a non-pharmacological option for coping with cough (Table 4) (Figure 1).

D. Source of medical information

Most respondents did not use any source of information during the counselling process; instead, they depended on their knowledge (164, 82.0%). The type of information used during the counselling process was package insert (26, 13%), utilising the internet (7, 3.5%), and calling the doctor (1, 1.0 %). Furthermore, attaching a sticker/remark on the medicine package was the most popular approach to reminding the simulated patient when to use the medicine (165, 82.5%). Nevertheless, most respondents (197, 99.0%) offered written information only after being asked by the SP (Table 5). This may further indicate that in terms of patient counselling,

Table 2. The distribution of the skills (past medical history) variables of the respondents (n =200)

Assessment of Past Medical History	**Frequency (%)**
Questioning for the symptoms	
Yes	177 (88.5)
No	23 (11.5)
Questioning for the age of the patient	
Yes	114 (57.5)
No	86(43.0)
Questioning for the duration of the symptoms.	
Yes	
No	116 (58)
	84(42)
Questioning for the timing of the symptoms.	
Yes	15 (7.5)
No	185 (92.5)
Questioning the frequency of the symptoms	
Yes	84(42.0)
No	116(58.0)
Questioning about the previous medical history of the patient	
Yes	
No	15(7.5)
	85(92.5)
Questioning about Other conditions, e.g. sinusitis, a cold, hay fever, a sore throat, and gastroesophageal reflux.	
Yes	
No	
Co-existence of pregnancy	135(67.5)
Yes	65(32.5)
No	
Questioning for Action taken by the patient.	70(35)
Yes	130 (65)
No	
	112(56)
Questioning for allergies to medicine.	87(43.5)
Yes	
No	
	6(3)
	194(97)

Table 3. The distribution of variables of the CPs' skills (offering treatment) (N=200)

Management Variables	Frequency (%)
Prescribing the medicine	
Yes	125(62.5)
No	75(37.5)
Given the dose of a prescribed medicine	
Yes	115 (57.5)
No	85(42.5)
Providing the frequency of the treatment	115(57.5)
Yes	85.0(42.5)
No	
Providing the duration of the treatment	
Yes	112(56)
No	88(44)
Given the potential side effects	
Yes	3(1.5)
No	197(98.5)
Suggesting non-pharmacological treatment	
Yes	76(38)
No	124(62)

Table 4. The distribution of variables of the CPs' skills (offering treatment) (N=200)

Management Variables	Frequency (%)
Prescribing the medicine	
Yes	125(62.5)
No	75(37.5)
Given the dose of a prescribed medicine	
Yes	115 (57.5)
No	85(42.5)
Providing the frequency of the treatment	115(57.5)
Yes	85.0(42.5)
No	
Providing the duration of the treatment	
Yes	112(56)
No	88(44)
Given the potential side effects	
Yes	3(1.5)
No	197(98.5)
Suggesting non-pharmacological treatment	
Yes	76(38)
No	124(62)

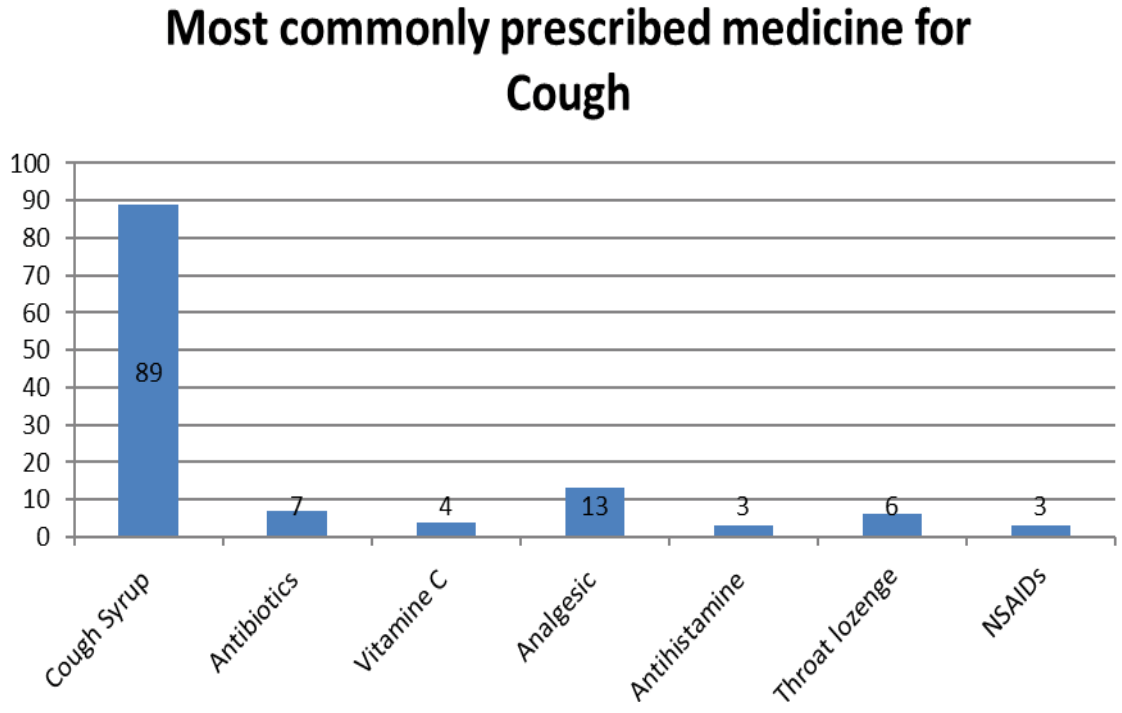

Figure 1. The most commonly prescribed medicine

Table 5. Sources of medical information used by the CP (N=200)

Information variables	Frequency (%)
Has the community pharmacist utilized other sources of information during the counseling process?	
Yes	34(17)
No	164(82)
Has the community pharmacist offered any written information to the simulated customer?	
Yes	3(1)
No	197(99)
Community pharmacists utilized the package inserts (patient information/brochures)	
Yes	26(13)
No	74(87)
Community pharmacists utilize the Internet.	
Yes	7(3.5)
No	193(196.5)
Individual customer information (computer printout)	
Yes	7(3.5)
No	193(96.5)
Other ways used to respond to the provision of information (call the doctor)	
Yes	1(1)
No	199(99)

Table 6. Satisfaction of the SP with the CPs (N=200)

Variables	Frequency (%)
Overall satisfaction rate by the simulated patient	
Very highly satisfied	94(47)
Highly satisfied	66(33)
Satisfied	19(9.5)
Less satisfied	10(5)
Not satisfied	11(5.5)
Eye contact of the CP	
Very highly satisfied	184(92)
Highly satisfied	11(5.5)
Satisfied	4(2)
Less satisfied	1(0)
Attention paid by the CP	
Very highly satisfied	172(86)
Highly satisfied	21(0.5)
Satisfied	7(3.5)

community pharmacists may benefit from additional training and continuous professional development.

E. Satisfaction levels of the simulated patient with the CPs

The simulated patient was highly satisfied or even very highly satisfied with the clinical competencies' services of almost half of the respondents, as cited at 94 (47.0%); and 66 (33.0%), respectively. Likewise, they were also very highly satisfied with the communication skills of the respondents by maintaining eye contact with most of them (184, 92.0%). Furthermore, simulated patients were also highly satisfied or even very highly satisfied with the attention paid by most respondents (172, 86.0%, and 21, 10.5 %, respectively) as shown in Table 6.

F. Bivariate analysis of factors associated with enhancing CPs' ability to recommend non-pharmacological therapies

We observed an association between the Age group of CPs and the ability to recommend non-pharmacological therapies [$\chi2(1) = 3.761$, P-value = 0.052]. Furthermore, the work experience of CPs and the job title of the CPs (In charge versus uncharged CPs) were also found to be related to suggesting non-pharmacological therapies by the CPs [**$\chi2(2) = 10.914$, P-value = 0.004** and; $\chi2(1) = 14.337a$, P-value = 0.000 respectively] as shown in Table 7.

Table 7. Bivariate analysis of factors associated with the ability to advise for non-pharmacological therapy (N =200)

Variable	Yes (n/%)	No (n/%)	P-value	df	χ2
Age group					
22–30 years	103 (82.4)	53 (70.7)	0.052*	1	3.761
31-40	22 (17.6)	22(29.3)			
Job Title					
In charge pharmacist	64 (51.2)	107 (41)	0.000*	1	14.337
Pharmacist	61(48.8)	154 (59)			
Work experience					
<1 year	5 (4.0)	3(4)	0.004*	2	10.914
1–5 years	34(27.2)	6 (8)			
>5 years	86(68.8)	66(88)			

*Statistically significant P-value was calculated using the chi-square test.

Table 8. Multivariate analysis of factors associated with the skills to advise for non-pharmacological therapy (N =200)

Variables	Response	AOR	95% CI		P-value
Age (ref-20-30years)	Age group 31-40	1.489	1.095	2.026	0.01
Gender (ref-female)	Male	0.344	0.244	0.486	< 0.001
Job title	In-charge community pharmacist	1.914	1.353	2.708	< 0.001
(ref - community pharmacist)					
Educational Qualification	Bachelor of Pharmacy	0.696	0.513	0.946	0.02
(ref- Pharm D)					

*Statistically significant P-value was calculated using

H. Multivariate analysis of factors associated with enhancing CPs' ability to recommend non-pharmacological therapies

Compared to CPs aged 20 to 30 years, those between the ages of 31 and 40 had higher odds of prescribing non-pharmacological therapy than younger participants at the age of 20 to 30 years (AOR=1.489, 95% CI: 1.095-2.026, P-value= 0.01. In practice, these results indicate that experience can be a strong contributor to prescribing the correct medication for pregnant women struggling with cough symptoms.

Furthermore, male pharmacists had 34% lower odds of prescribing non-pharmacological therapy than females (AOR=0.344, 95% CI:0.244-0.486, P-value ≤0.001). This may be indicative of a more cautious pharmacy practice behaviour from women pharmacists when compared to men. Additionally, in-charge CPs had higher odds of prescribing non-pharmacological therapy than community pharmacists, with an AOR of 1.914 (95% CI: 1.353-2.708, P-value < 0.001). This indicates that pharmacists with leadership responsibilities may similarly adopt a more cautious behaviour in prescribing for pregnant women.

In addition, CPs with an educational qualification of Bachelor of Pharmacy had a lower likelihood of prescribing non-pharmacological therapy than CPs with PharmD with an AOR of 0.696 (95% CI: 0.513-0.946, P-value = 0.020), as displayed in Table 8. As academic attainment seems to lower the odds of pharmacological prescriptions for pregnant women, it can be argued that higher pharmacological education may be beneficial to limiting the unnecessary medicalisation of pregnant women.

DISCUSSION

Our research pioneers the identification of factors influencing CPs' decisions to recommend non-pharmacological treatments for cough in pregnant women, emphasizing the crucial role of such variables in shaping patient care. These predictors are age, gender, job titles, and the educational qualifications of the CPs. These findings highlight the importance of considering the demographics and qualifications of CPs when devising strategies to promote non-pharmacological interventions in this population.

Our study assessed CPs' clinical competence in managing cough among pregnant women, pinpointing gaps in CPs' knowledge that necessitate further training. It was clear that the assessment of past medical history by CPs was suboptimal in this study. Although most of the CPs (88.5%) were questioned about the type of cough [productive (chesty or loose) or un-productive (dry)], when it came to the co-existence of pregnancy, two-thirds (68.0%) of the CPs did not successfully ascertain that the SP was pregnant. While no data is available in the literature for comparison, a potential reason for this observation might be the cultural sensitivities surrounding pregnancy inquiries in Islamic Arabic nations like the UAE. In many Muslim cultures, women's specific clothing, do not allow for a visual assessment of pregnancy. For the community pharmacist, it thus becomes increasingly relevant to ask patients whether or not they are pregnant, as the presence of pregnancy could be easily missed. This is the first study in pharmacy practice to make this observation; however, this also points to a stringent need for updating training guidelines in community pharmacies in regards to prescriptions for pregnant women. However, ascertaining pregnancy is crucial because pregnant women should avoid taking any medicines that are not necessary until after the first 12 weeks when the fetus has already completed its most critical stages of development.[40] Therefore, we suggest developing effective strategies in community pharmacies to improve the open conversation between patients and CPs by designating private counselling areas and employing measures to overcome privacy constraints, such as lowering voices and ensuring the availability of an adequate number of female CPs.

Only fifty percent of the CPs questioned the SPs about whether they had already used any cough medication. Furthermore, only 3% of the CPs checked for SPs' allergies to medicines before giving a cough treatment, and only 1.5% of CPs addressed possible side effects. Similarly to previous research, these findings indicate that the assessment competencies of the CPs are suboptimal.[26–28] Determining patients' current medication is essential for preventing potential drug interaction with the prescribed medication.[15] This is particularly critical for pregnant women as the hormonal and physiological changes in their bodies might influence the enzyme responsible for drug metabolism. [41,42] Therefore, clinical training of CPs in assessing cough during pregnancy is clearly needed.

In assessing the management of cough during pregnancy, we noted that over a third of the CPs (38%) considered non-pharmacological treatments. This indicates a positive trend towards considering alternative treatment approaches for

pregnant individuals because non-pharmacological therapies and lifestyle advice should be the first-line approach for managing cough during pregnancy.[5,9,10,15] However, as observed in this study, women pharmacists tended to adopt a more cautious prescription and advice behavior for managing cough in pregnant women by first offering non-pharmacological therapies. This gender difference is worthy of further investigation by future studies. Other investigations into medical practice also indicate that patients experience better outcomes under the care of women doctors, albeit this also seems to be linked with experience.[50]

Our research is the first in the UAE to evaluate clinical competence by focusing on CPs' non-pharmacological approaches. However, our results differ significantly from a comparative study which indicated that pharmacists in Serbia and Norway are not adequately familiar with non-pharmacological treatments for common pregnancy-related issues.[43] One possible explanation for this finding is that pharmacists have become increasingly aware of the potential risks associated with pharmacological treatment use during pregnancy. This heightened awareness might stem from routinely updating their expertise through continuing education programs, adherence to professional guidelines, or exposure to research promoting non-pharmacological therapies. Additionally, pharmacists may recognize that expecting mothers often prefer non-pharmacological options due to concerns over potential harm pharmaceutical treatments might pose to their unborn child. Hence, promoting treatments without pharmaceuticals aligns with patient-centered care and shared decision-making. These approaches necessitate patients' active involvement in choosing treatments, considering their expressed preferences and specific conditions.

Our findings reveal that 44.5% of CPs recommended Prospan® cough syrup, a concerning choice given its classification as pregnancy category C. This medicine is not recommended during pregnancy because the teratogenic effect of the Prospan® cough syrup cannot be safely excluded. This finding raises concerns about the management competency of CPs in the UAE and highlights a substantial gap in pharmacy practice that requires training. Thus, we recommend providing community pharmacies with practical guidelines on the management of cough.

Although in the UAE, antibiotics cannot be sold without a prescription from a doctor, we found that a minority of CPs (3.5%) recommended antibiotics for cough. This finding agrees with other studies in the UAE, highlighting that antibiotics can sometimes be purchased from community pharmacies without needing a doctor's prescription.[43,44] Instead, an appropriate referral to a doctor ought to have been made for this therapy to be prescribed. Moreover, since CPs breached the legislation about medications that can only be sold via prescription, there is a need for workshops and other training programs to improve community pharmacists' knowledge and appropriate antibiotic-prescribing behavior. Furthermore, community pharmacies should receive standardized guidelines on antibiotic use and reinforce the current policy on antibiotic sales.

With regards to the assessment of the source of medical information used by the CPs, we found that most CPs (82%) did not use any source of information other than their general knowledge and expertise. This result significantly differs from our previous work among CPs in the UAE, where only 17.5% of the CPs relied on their basic knowledge to counsel headaches during pregnancy.[26] It might be that CPs considered cough as a common ailment, which does not require as much attention as a headache. This indicates that some CPs might hold false beliefs of self-confidence in their competency for managing cough which negatively influences the quality of patient care. There is thus an obvious need for modernizing pharmacy curricula and continuing education for pharmacists in the UAE.

On the assessment of the satisfaction level, cough counseling provided by the CPs received a high number of positive evaluations, with most of those evaluations (80%) being either very highly satisfied or highly satisfied. These findings contrast significantly with our previous study about counseling for headaches for pregnant women, where only 46% of the SPs reported being very highly satisfied or highly satisfied with the service they received.[26] Although in both scenarios, an obvious coexisting condition was pregnancy, the CPs seemed to provide better counselling for cough symptoms in contrast with headache symptoms. CPS may apply their knowledge and skills regarding headaches differently than they would about cough while treating pregnant women. A pertinent predictor of recommending non-pharmacological therapy was age: CPs aged 31 to 40 were more inclined towards such suggestions than their younger counterparts (20 to 30 years). Our findings align with a study that demonstrated how work experience influences pharmacists' decisions to recommend dietary supplements to patients.[46]

One possible explanation could be that senior pharmacists may have more experience and exposure to non-pharmacological treatments, leading to deeper understanding and confidence in suggesting them. Additionally, older pharmacists may have been trained in a different era, where non-pharmacological therapies were emphasized more. Younger pharmacists can greatly benefit from the mentorship and expertise of their older counterparts in non-pharmacological therapies. Incorporating this valuable knowledge into the curriculum of pharmacy schools can better prepare aspiring pharmacists to address the holistic needs of their patients. Promoting intergenerational collaboration among pharmacists fosters knowledge-sharing and elevates patient care quality. Ultimately, prioritizing the value of non-pharmacological therapies throughout a pharmacist's career can lead to improved patient outcomes and a more comprehensive approach to healthcare.

Male CPs had lower odds of prescribing non-pharmacological therapy than females. Our finding is consistent with other studies that indicated Female CPS recommended and dispensed complementary medicines more than male pharmacists.[47-48] While interpreting this finding, it's crucial to consider potential influencing factors like gender-related differences in training, personal beliefs, or patient interactions. Further research would

be helpful to delve deeper into the underlying reasons for this disparity and identify ways to address it through qualitative research or by analyzing larger datasets. We found that in-charge CPs, who hold higher authority and responsibility, are more likely to suggest non-pharmacological therapies. The disparity might stem from the distinct curricula and training intensity of these programs. Additionally, leadership roles offer opportunities for continuing education, enhancing their ability to incorporate these therapies into patient care.

This study also reveals that CPs with a Bachelor of Pharmacy degree tend to prescribe non-pharmacological therapies less than those with a Doctor of Pharmacy (PharmD) degree. While no direct study parallels our findings, research in Qatar, Uganda, and Canada found no notable correlation between pharmacists' educational level and their proficiency in maternal-fetal medicine."[49]. This may be due to the curriculum and training provided in these programs, which typically require more education. PharmD programs emphasize patient-centred roles, like medication therapy management and non-pharmacological interventions, equipping pharmacists to confidently recommend these therapies.

Limitations and future directions

Our study excluded hospital pharmacists, who may have more experience and knowledge in assessing cough during pregnancy. This exclusion may limit the generalizability of the findings to other healthcare settings. Hence, future studies should consider including hospital pharmacists to obtain a more comprehensive understanding of cough diagnosis during pregnancy. In addition, the current study did not investigate whether female pharmacists provide better care than male pharmacists. Given that the SP was a woman, it is possible that gender dynamics influenced the interactions. Certain female pharmacists might have felt a shared understanding or familiarity, leading to specific types of questions. Conversely, some male pharmacists might have approached the situation differently, potentially affecting the depth of their inquiries. However, it's essential to consider individual differences and avoid overgeneralizing based on gender alone. Future studies could thus explore the potential impact of gender on the quality-of-care pharmacists provide.

CONCLUSION

This is the first study in the UAE to identify predictors behind CPs prescribing non-pharmacological treatments to pregnant women experiencing cough. In addition, it assesses the clinical competencies of CPs in managing, assessing, and counselling pregnant women with cough. Our study has significant practical implications for CP training and education programs. Enhancing CPs' understanding of non-pharmacological approaches to cough management will bolster their role in maternal health improvement. Future research could explore CPs' clinical competencies in addressing other health concerns in pregnancy, such as nausea and vomiting.

AUTHORS' CONTRIBUTIONS

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