Original Research

The rise of telepharmacy services during the COVID-19 pandemic: A comprehensive assessment of services in the United Arab Emirates

Feras Jirjees [iD], Mohanad Odeh [iD], Lynn Aloum [iD], Zelal Kharaba [iD], Karem H Alzoubi [iD], Hala J. Al-Obaidi [iD]

Abstract

Objective: The study aimed to explore changes in community pharmacies' processes in response to the pandemic in the United Arab Emirates (UAE) and factors affecting the adoption of these changes. **Method:** A cross-sectional study was conducted using a self-administered questionnaire that was distributed to licensed community pharmacists in the UAE. The survey used to collect information on the type of telepharmacy services and related topics such as constraints and supports. The evaluation of services was done for three periods: before, during and after lockdown. **Results:** The number of completed surveys was 391. The majority of the participants were under 35 years old (79.5%), female (65.0%), with a bachelor's degree (82.6%), and working in a pharmacy group (70.6%). Pharmacies provided the services by phone (95.6%) and/or messaging applications (80.0%) such as WhatsApp and Messenger. The community pharmacies provided a variety of services using telepharmacy tools such as managing of mild diseases, dispensing and delivering prescribed and OTC medications, general health information, and services for patients with chronic disease. The main factors that had significant effects on several telepharmacy services were pharmacies' type (group/chain vs. individual) and the number of pharmacists in the pharmacy (p < 0.05). Lack of time, training and financial support were the main barriers associated with telepharmacy services among individual pharmacies. **Conclusion:** Telepharmacy supported the work of community pharmacies during the COVID-19 pandemic by facilitating the provision of pharmaceutical services. Although the occurrence of several financial and technical problems, it appeared less frequently in pharmacy chains with a large number of pharmacists.

Keywords: Telepharmacy; Community pharmacy; UAE; COVID-19

INTRODUCTION

The ongoing global pandemic of coronavirus disease (COVID-19) was recognized in December 2019 and spread rapidly across the world within months. The World Health Organization (WHO) declared a public health emergency of international concern at the end of January 2020 and a pandemic in March 2020.[1] This situation put tremendous pressure on health systems around the world and forced them to adapt by adjusting health facility procedures to help contain the spread of the virus while still operating.[2]

Feras JIRJEES*. Department of Pharmacy Practice and Pharmacotherapeutics, College of Pharmacy, University of Sharjah, 27272, Sharjah, United Arab Emirates. fjirjees@sharjah.ac.ae

Mohanad ODEH. Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmaceutical Sciences, The Hashemite University, P.O. Box 330127, Zarqa 13133, Jordan. modeh01@qub.ac.uk

Lynn ALOUM. Kingston University, London, UK. lynn-aloum94@hotmail.com

Zelal KHARABA. College of Pharmacy, Al-Ain University, UAE, Faculty of Medical Sciences, Newcastle University, UK. zelal.kharaba@aau.ac.ae

Karem H ALZOUBI. College of Pharmacy, University of Sharjah, UAE. kelzubi@sharjah.ac.ae

Hala J. Al-OBAIDI*. College of Pharmacy and Health Sciences, Ajman University, UAE. h.alobaidi@ajman.ac.ae

The pharmacy sector was particularly affected due to an increased demand for pharmaceutical products and services, along with a pre-existing shortage of health personnel. During the COVID-19 pandemic, community pharmacists have proven themselves to be the most accessible healthcare practitioners, as they have played various roles supporting and alleviating the burden on the healthcare system.[3,4] Their work has diverted the flow of patients away from hospitals by providing medicines, evaluating patients for replenishing chronic medications, conducting consultations on minor illnesses, clarifying misconceptions about COVID-19 treatments, and contributing to COVID-19 screening.[5] This deviation benefited many patients, including those with chronic diseases who have not been able to access healthcare facilities for their routine care and medication management. Most importantly, they elevated a load of non-COVID related illnesses on already strained healthcare systems.[6]

The use of telephone to provide patient care in community pharmacies has been around for a long time. However, applying internet teleservices such as smartphone applications, messaging software and online purchasing has only appeared into spot in the last years. The use of these tools is varied between countries. Many factors affect the adoption of these services in community pharmacies since not all pharmacies offer these services and many people are still not familiar with them.[7,8] However, the impact of the pandemic has revealed an increased interest in delivering telepharmacy services and increased their usage. Pharmacies rapidly shifted their practices to provide patient medication counselling, drug

therapy monitoring, COVID-19 clarification and screening and medication home delivery, all of which have enhanced patients' life and made it easier to reach pharmacists during the COVID-19 period.

Community pharmacy and telepharmacy services in the UAE

The UAE is a federation of seven states (emirates) and classified as a high-income developing economy with a population of around 9.3 million marked in 2020.[9] Community pharmacies in the UAE are either small independent pharmacies or franchised chain pharmacies located on streets or in shopping malls. The number of community pharmacies in the UAE was 2801 in 2020.[10] The pharmaceutical law dictates that a community pharmacy must hold a license under the direction of a licensed pharmacist.[11] Although the pharmaceutical law prohibits the sale of all prescription medicines without prescriptions, in practice, strict enforcement of the law in the UAE only applies to controlled and semi-controlled drugs.[12] A wide range of prescription-only medications, including antibiotics, antidiabetics, and antihypertensive drugs, are usually purchased over the counter (OTC) from community pharmacies. Dispensing is mostly done by licensed pharmacists and pharmacy technicians, while most administrative and organizational duties are the responsibility of licensed pharmacists. Most community pharmacies in the UAE do not keep patient medication records.[12]

The UAE has an efficient telecommunication network essential to offer remote healthcare services. It has the fastest fixed broadband speed and connectivity in the Middle East region and is ranked 25th in the world. In addition, the number of active internet users was reported to be 99% of the total population in 2020.[13] The developed infrastructure, telecommunications and internet network in the UAE have enabled the shift to remote working and learning during the COVID-19 pandemic.

The country's regulations related to telehealth and healthcare delivery services were issued in 2019.[14] According to standards for telehealth services in the UAE, telepharmacy is defined as the delivery of pharmaceutical care through telehealth technology and includes prescribing and dispensing of medications, medical products, herbal, food supplements, cosmetic products, formulary compliance, patient counselling, medication therapy management, automated packaging and labelling systems. Pharmacies in the UAE can provide telepharmacy services after gaining approval from the designated health authority.[15] Currently, most pharmacies in the UAE offer online services. Several pharmaceutical services were provided via telepharmacy in the UAE before the COVID-19 pandemic.

COVID-19 in the UAE

The first confirmed case in the UAE was announced at the end of January 2020. It was the first country in the Middle East to report a confirmed case.[16] The number of cases increased thereafter considerably. Because of the national disinfection programme, a partial curfew was imposed for several weeks. In addition, a complete lockdown in some areas was mandated for several weeks in some areas in April 2020 to contain the COVID-19 pandemic.[17]

In March 2020, the UAE implemented distance learning and working in all UAE states as a precautionary measure to protect people from the COVID-19 infection. Some sectors opened during that period with restrictions such as supermarkets, restaurants (delivery only), hospitals and community pharmacies. In addition, there was a closure of shopping malls and public areas, general restriction on numbers of people in some places and travel restriction. For healthcare sectors, many healthcare providers adapted by providing telehealth services. Likewise, many governmental hospitals activated medications home delivery services. Due to the recommendations from the WHO and global and national health authorities to avoid unnecessary contact with others, most people preferred to stay at home during the first months of the pandemic. Therefore, most works were carried out from home, including those in the health domain. The curfew was eased, and movement restrictions were gradually lifted at the end of June 2020, followed by established safety instructions to avoid COVID-19 infection.[17]

Aim of the study

The study aimed to explore the change of procedures in community pharmacies in response to the COVID-19 pandemic while measuring the quality, frequency, and barriers in providing telepharmacy services in the UAE.

METHOD

Study design and tools

A cross-sectional study was done by using a self-administered questionnaire distributed to pharmacists working in community pharmacies in the UAE. The general principles of good survey design were utilized when preparing the survey. The survey is in English and contains 20 close-ended and open-ended comprehensive questions, completable within an average of 10 minutes. The design of the questions was to gather pharmacists' demographic data. The second part of the questions aimed to collect information on the type of telepharmacy services offered in the community pharmacy and related topics such as constraints and supports. Finally, pharmacies were asked about the challenges faced while providing these services. The questionnaires were distributed from the 1st to the 31st of October 2020.

Survey development

The questionnaire was developed by the authors after an extensive review of literature.[7,8] Then, the online survey was designed by the researchers on Google Forms. The survey was tested by three academics and five community pharmacists during a week pilot study to ensure comprehension, clarity, and readability. Refinements were made as needed, confirming all questions were uniformly understood, with no ambiguities present before its implementation.

Periods of study

The evaluation of telepharmacy services in this study was

divided into three periods, with an average of three months for each period. The first period, named "before the lockdown", was from December 2019 to the end of February 2020. No government safety restrictions were announced during this period, and people's movement was normal. The second period, named "during the lockdown", was from March to the end of May 2020, when most safety restrictions instructions were implemented. Finally, the third period, named "after the lockdown", was from June to the end of August 2020, when safety restrictions were eased and restrictions on people's movement were gradually lifted.

Eligibility criteria

All licensed pharmacists working in community pharmacies in the UAE that provided any form of telepharmacy services during the lockdown period of the COVID-19 pandemic (March until July 2020) were eligible.

Ethical approval

The study acquired ethical approval from the Research Ethics Committee (REC-20-10-07-01-S) at the University of Sharjah, UAE.

Sample size

The target sample size was estimated based on the Raosoft® software sample size calculator. The calculation was done for the minimal sample size needed for an unlimited population size. Based on a confidence interval of 95%, a standard deviation of 0.5 and a margin of error of 5%, the required sample size is 381 participants.

Data collection

The research team visited each pharmacy and contacted eligible pharmacists in different chains/groups and/or individual community pharmacies in the UAE. Participants were first briefed about the objectives of the study and then administered a questionnaire to each consenting pharmacist who met the eligibility criteria. Furthermore, the participants were informed of the anonymity and confidentiality of the applied policy.

Data analysis

Data collected were analyzed using the IBM SPSS Statistics (version 25.0). Categorical and ordinal variables were shown as frequencies (n) and percentages (%). The chi-square test was applied to determine a statistically significant association between the variables when the test has P-value less than 0.05. The chi-square degrees of freedom (df) were done according to the following formula: df = (r-1) (c-1) where r is the number of categories within the demographic variable and c is the number of options related to the participant–question categories.

RESULTS

Demographic data

The total number of surveys was 423. There were 391 (92.34%) complete surveys and 32 incomplete surveys, either due to missing information or participants refusing to participate.

The majority of the participants (79.54%) were under 35 years old. Nearly two-thirds of the participants (64.96%) were female. Most of the participants (82.61%) hold a bachelor's in pharmacy, and 45.78% have 2 to 5 years of experience. Table 1 shows the demographic data of the participants.

Table 1. Demographic data of the participants (n=391)		
Variables		**No. (%)**
Age (years)	21 – 25	53 (13.55)
	26 – 30	133 (34.01)
	31 – 35	125 (31.97)
	36 – 40	39 (9.97)
	41 – 45	29 (7.42)
	46 – 50	6 (1.53)
	Above 50	6 (1.53)
Gender	Female	254 (64.96)
	Male	137 (35.04)
Education level	Bachelor	323 (82.61)
	Master	49 (12.53)
	Pharm D	19 (4.86)
Experience period (years)	Less than 1 year	31 (7.93)
	2 - 5 years	179 (45.78)
	6 – 10 years	108 (27.62)
	11 – 15 years	59 (15.09)
	More than 15 years	14 (3.58)
Position	Pharmacist-in-charge	315 (80.56)
	Manager of the pharmacy	63 (16.11)
	Owner of the pharmacy	13 (3.32)
No. of licensed staff per shift in the pharmacy	Less than 3	268 (68.54)
	3 or more	123 (31.4)
Type of pharmacy	Individual pharmacy	115 (29.41)
	Group/Chain Pharmacy	276 (70.59)

Characteristics of pharmacies and telepharmacy services

Most of the pharmacies included in the study were group/chain pharmacies (70.59%). In addition, 68.5% of the participants had reported one or two licensed staff per shift (every 8 hours) in the pharmacy (Table 1). More than half of the pharmacies (57.80%) in this study were offering online sales services before and when the lockdown period began. Additionally, most pharmacies (almost 90%) provided home delivery services. Nearly all telepharmacy services were provided via phone and/or phone messaging applications such as WhatsApp, Messenger, and Instagram. The pharmacists were the principal staff responsible for administering these types of services. Table 2 shows the characteristics of telepharmacy services provided in the community pharmacies and their correlation with staff number and pharmacy type.

Considering the pharmacist's age as a dichotomy's variable, where the pharmacist's age is equal to or less than 35 years old (n=311) and more than 35 years old (n=80), it was observed that age was associated with home delivery services. A higher percentage of younger pharmacists (81%) compared with older pharmacists (19%) had home delivery services (P=0.036). Age was also associated with offering online services, where also younger pharmacists had online services more than older pharmacists (83.2% vs 16.8%, P=0.036). Other demographic variables as gender, level of education, years of experience

Table 2. Characteristics of telepharmacy services offered in the community pharmacies (n=391)			Association with number of staff			Association with pharmacy type		
		No. (%) < 3	≥ 3	P	Group/Chain	Individual	P	
Online sales services	No	165 (42.20)	114	51	0.84	113	52	0.44
	Yes	226 (57.80)	154	72		163	63	
Offering home delivery service	No	39 (9.97)	33	6	0.023	27	12	0.85
	Yes	352 (90.03)	235	117		249	103	
Main tools or applications used to offer Tele-pharmacy services	Phone	374	258	116	0.38	263	111	0.59
	Email	193	124	69	0.71	124	69	0.007
	Website (Online shopping	198	134	64	0.71	155	43	0.001
	Social Media (e.g. Facebook, Instagram)	204	135	69	0.5	135	69	0.12
	Messaging applications	313	230	82	<0.001	213	100	0.027
Fonts in Bold indicate statistically significant values, i.e., P < 0.05								

were not associated with home delivery services or online services.

Offering home delivery service was also associated with the number of staff, 95.1% (n=117) of pharmacies with three or more employees had home delivery, compared with 87.7% (n=235) of the pharmacies with less than three employees (P=0.023). On the other hand, a statistically significant association was noticed for the use of messaging applications, which were used by 67.5% (n=83) of pharmacies with staff 3 or more, compared with 85.8% (n=230) for smaller pharmacies (P<0.001).

Results showed that Individual pharmacies used e-mail services less than group/chain pharmacies (P=0.007). Furthermore, group/chain pharmacies used website, online shopping and Messaging applications more than individual pharmacies (P=0.001 and P=0.027).

Types of telepharmacy services offered at the community pharmacies

Community pharmacies provided a variety of services during the three study periods. Figure 1 shows the types of services with administration percentage during the three periods.

The use of telepharmacy tools witnessed a reduction in practice during the second and third periods. Table 3 shows changes in services offered during the three periods according to the type of pharmacy (Group/chain pharmacies and Individual pharmacies). Statistically significant associations were found between some services based on the type of pharmacy and the lockdown period. For managing mild diseases, there was an obvious reduction in individual pharmacies compared with group pharmacies during and after lockdown periods. For dispensing OTC medications, selling cosmetics and other health products and providing services for patients with chronic diseases, the reduction in individual pharmacies was significant compared to group pharmacies. Moreover, all services declined after the lockdown period, with further declines in

most services provided by the community pharmacies that participated in the study.

Barriers pharmacists faced during the lockdown period

Table 4 indicates the obstacles related to the number of staff, the type of pharmacy, technical support issues, staff training and work hours during the lockdown period.

Lack of available time was perceived as a statistically significant barrier associated with implementing telepharmacy services among small pharmacies (< 3 licensed pharmacist), with a lower association in large pharmacies (≥ 3 licensed pharmacist) (66.5% vs 52.7%, P=0.001). A similar trend was also noticed concerning training and lack of financial support (Table 4).

The challenges faced were statistically and significantly associated with the type of pharmacies (i.e., Individual vs Group/Chain), as seen in Table 4. For example, 38% of workers in group/chain pharmacies evaluates that there were no plans for implementing telepharmacy services, while almost double the percentage (68.8%) within individual pharmacies confirmed this barrier (P<0.001).

Pharmacy managements' support during the lockdown period

Table 5 describes the support pharmacies received from the management during the lockdown period related to telepharmacy services and its association with staff number and pharmacy type. The support from the management offered during the lockdown period related to telepharmacy services was neither strongly associated with the number of staff nor type of pharmacy, except in the few following cases: Policy to offer telepharmacy services was more available in larger pharmacies (n ≥ 3) compared with small pharmacies (n < 3): 76.7% vs 59.5%, P=0.003. However, an incentive for workers operating the telepharmacy services was reported more in individual pharmacies compared with chain pharmacies (50.0% vs 31.8%, P=0.004). Increased working hours also showed a similar trend (55.3% vs 38.0%, P=0.008).

Table 3. Changes in services provided by community pharmacies using telepharmacy tools during the three periods according to the type of pharmacy: Group/chain pharmacy (n=276) and individual pharmacy (n=115)					
		Number of pharmacies services			**Statistics**
Services	**Type of Pharmacy**	**Before the lockdown period**	**During the lockdown period**	**After the lockdown period**	*P* value
Managing of mild diseases	Group	136	140	113	**0.019**
	Individual	81	45	51	
Dispensing and delivering prescribed medications	Group	146	152	124	0.054
	Individual	80	52	46	
Dispensing and delivering OTC medications	Group	182	181	156	**0.029**
	Individual	95	57	58	
Advising about medications	Group	180	164	145	0.29
	Individual	91	62	59	
General health information	Group	186	159	151	0.084
	Individual	95	56	53	
Providing herbals and supplements	Group	169	153	140	0.097
	Individual	94	59	54	
Selling cosmetic and other health products	Group	175	149	131	**0.049**
	Individual	97	54	48	
Services for patients with chronic diseases	Group	135	128	119	**0.026**
	Individual	71	42	35	
Fonts in Bold indicate statistically significant values, i.e., *P* < 0.05					
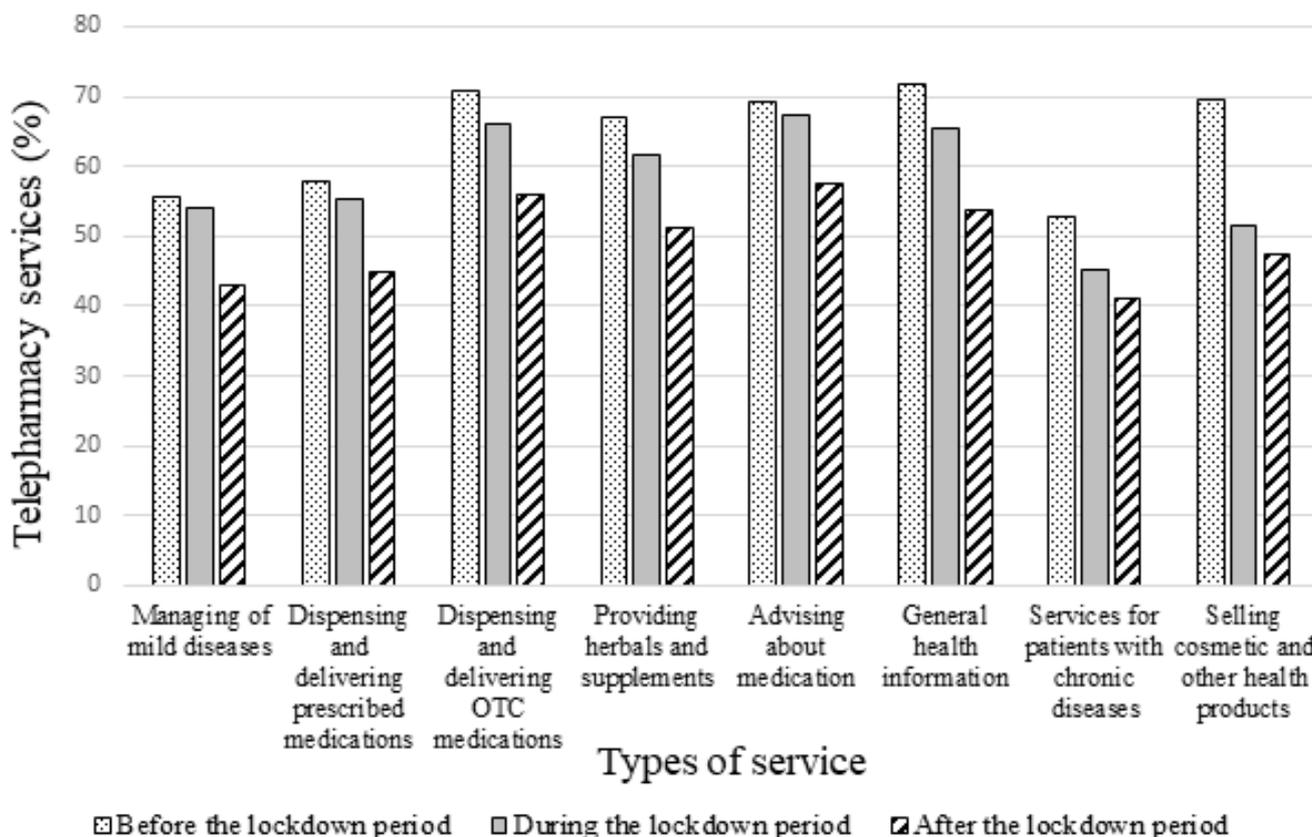
Figure 1. The services offered by community pharmacies (n=391) using telepharmacy tools: before, during and after the lockdown periods.

Table 4. Barriers faced the participants during the lockdown periods, and association with number of staff and types of pharmacy											
Main barriers in implementing telepharmacy	**Association with number of staff**						**Association with pharmacy type**				
	Subgroup, N staff	Barrier	Not barrier	Not sure	Total	*P*	Subgroup, Type	Barrier	Not barrier	Not sure	Total	*P*
		n (%)						n (%)				
No plan and/or instruction (e.g. no instructions given)		120	100	31	251	0.83		120	100	31	251	**<0.001**
	< 3	87 (47.5)	72 (39.3)	24 (13.1)	183 (100)		Group/Chain	65 (38.0)	78 (45.6)	28 (16.4)	171 (100)	
	≥ 3	33 (48.5)	28 (41.2)	7 (10.3)	68 (100)		Individual	55 (68.8)	22 (27.5)	3 (3.8)	80 (100)	
Lack of financial support (e.g. no budget for tools and applications)		133	83	24	240	**0.036**		133	83	24	240	**0.002**
	< 3	102 (58.6)	52 (29.9)	20 (11.5)	174 (100)		Group/Chain	79 (47.9)	67 (40.6)	19 (11.5)	165 (100)	
	≥ 3	31 (47.0)	31 (47.0)	4 (6.0)	66 (100)		Individual	54 (72.0)	16 (21.3)	5 (6.7)	75 (100)	
Lack of expert staff using telepharmacy (phone/apps/website) services		109	92	30	230	0.53		109	92	30	230	**<0.001**
	< 3	79 (45.9)	69 (40.1)	24 (14.0)	172 (100)		Group/Chain	49 (32.7)	74 (49.3)	27 (18.0)	150 (100)	
	≥ 3	30 (51.7)	23 (39.7)	5 (8.6)	58 (100)		Individual	60 (75.0)	18 (22.5)	2 (2.5)	80 (100)	
Low number of staff		195	69	8	271	1		195	69	8	271	**0.014**
	< 3	142 (72.1)	50 (25.4)	5 (2.5)	197 (100)		Group/Chain	130 (69.9)	54 (29.0)	2 (1.1)	186 (100)	
	≥ 3	53 (71.6)	19 (25.7)	2 (2.7)	74 (100)		Individual	65 (76.5)	15 (17.6)	5 (5.9)	85 (100)	
Insufficient technical support e.g. (support for tools and applications)		161	63	26	249	0.46		161	63	26	249	**0.002**
	< 3	109 (63.0)	44 (25.4)	20 (11.6)	173 (100)		Group/Chain	99 (57.9)	49 (28.7)	23 (13.5)	171 (100)	
	≥ 3	52 (68.4)	19 (25.0)	5 (6.6)	76 (100)		Individual	62 (79.5)	14 (17.9)	2 (2.6)	78 (100)	
Insufficient Training		115	96	21	231	**0.039**		115	96	21	231	**0.006**
	< 3	90 (54.5)	60 (36.4)	15 (9.1)	165 (100)		Group/Chain	67 (43.2)	70 (45.2)	18 (11.6)	155 (100)	
	≥ 3	25 (37.9)	36 (54.5)	5 (7.6)	66 (100)		Individual	48 (63.2)	26 (34.2)	2 (2.6)	76 (100)	
Lack of time due to high workload (e.g. serving large number of customers everyday)		174	77	31	282	**0.001**		174	77	30	281	0.15
	< 3	125 (66.5)	52 (27.7)	11 (5.9)	188 (100)		Group/Chain	116 (58.9)	56 (28.4)	25 (12.7)	197 (100)	
	≥ 3	49 (52.7)	25 (26.9)	19 (20.4)	93 (100)		Individual	58 (69.0)	21 (25.0)	5 (6.0)	84 (100)	
Fonts in Bold indicate statistically significant values, i.e., P < 0.05												

The impact of lockdown period on the number of patients/customers per day

Table 6 shows the impact of lockdown and post-lockdown periods on services provided in community pharmacies compared with services provided pre-lockdown period. Pharmacies with less than 50 patients/customers per day have slight or no change in both number of visits during the lockdown and post-lockdown periods. The same was shown for services provided using telepharmacy tools during these two periods.

Hence, a change in the number of customers for both face-to-face and telepharmacy services was not associated with the lockdown period for small pharmacies, as seen in Table 6.

Meanwhile, pharmacies with several patients/customers between 50 to 100 per day witnessed a decreased number of patients/customers during and post-lockdown periods. However, there was an increase in demand by around 36% of services via telepharmacy tools, specifically during the lockdown period. This increase in telepharmacy services for

Table 5. Support from the management offered during the lockdown period related to telepharmacy services and the association with number of staff and pharmacy type

Support Items from the management	Subgroup, N staff	Association with number of staff			P	Subgroup, Type	Association with pharmacy type			P
		No	Yes	Total			No	Yes	Total	
		n (%)					n (%)			
Training on using telecommunication technologies to provide telepharmacy services		123	191	314	0.17		123	191	314	0.41
	< 3	89 (41.8)	124 (58.2)	213 (100)		Group/ Chain	91 (40.6)	133 (59.4)	224 (100)	
	≥ 3	34 (33.7)	67 (66.3)	101 (100)		Individual	32 (35.6)	58 (64.4)	90 (100)	
Available policy on telepharmacy services (e.g. written materials or guidelines)		105	198	303	**0.003**		105	198	303	0.70
	< 3	81 (40.5)	119 (59.5)	200 (100)		Group/ Chain	77 (35.3)	141 (64.7)	218 (100)	
	≥ 3	24 (23.3)	79 (76.7)	103 (100)		Individual	28 (32.9)	57 (67.1)	85 (100)	
Regular assessment of the offered telepharmacy service		122	173	295	0.59		122	173	295	0.41
	< 3	82 (42.5)	111 (57.5)	193 (100)		Group/ Chain	90 (42.9)	120 (57.1)	210 (100)	
	≥ 3	40 (39.2)	62 (60.8)	102 (100)		Individual	32 (36.7)	53 (62.4)	85 (100)	
Incentive for workers operating the telepharmacy services		175	103	278	0.69		175	103	278	**0.004**
	< 3	123 (63.7)	70 (36.3)	193 (100)		Group/ Chain	135 (68.2)	63 (31.8)	198 (100)	
	≥ 3	52 (61.2)	33 (38.8)	85 (100)		Individual	40 (50)	40 (50)	80 (100)	
Extra staff (e.g. recruit more staff)		182	113	295	0.81		182	113	295	0.45
	< 3	132 (65.0)	71 (35.0)	203 (100)		Group/ Chain	130 (63.1)	76 (36.9)	206 (100)	
	≥ 3	50 (54.3)	42 (45.7)	92 (100)		Individual	52 (58.4)	37 (41.6)	89 (100)	
Bought or developed tools and/or applications that help in telepharmacy services		111	170	281	0.69		111	170	281	0.59
	< 3	77 (40.3)	114 (59.7)	191 (100)		Group/ Chain	75 (38.5)	120 (61.5)	195 (100)	
	≥ 3	34 (37.8)	56 (62.2)	90 (100)		Individual	36 (41.9)	50 (58.1)	86 (100)	
Advertisement using telepharmacy services (e.g. using social media)		85	216	301	0.24		85	216	301	0.84
	< 3	63 (30.3)	145 (69.7)	208 (100)		Group/ Chain	60 (27.9)	155 (72.1)	215 (100)	
	≥ 3	22 (23.7)	71 (76.3)	93 (100)		Individual	25 (29.1)	61 (70.9)	86 (100)	
Increased working hours		149	115	264	0.15		149	115	264	**0.008**
	< 3	107 (59.4)	73 (40.6)	180 (100)		Group/ Chain	111 (62.0)	68 (38.0)	179 (100)	
	≥ 3	42 (50.0)	42 (50.0)	84 (100)		Individual	38 (44.7)	47 (55.3)	85 (100)	

Fonts in Bold indicate statistically significant values, i.e., $P < 0.05$

medium-sized pharmacies was statistically significant and associated with the lockdown period (Fisher Exact P=0.002).

Lastly, for pharmacies with many patients/customers above 100 per day, there was a reduction in the number of patients/customers per day who visited the pharmacies during the lockdown period, followed by a rise in the number of patients/customers post-lockdown period. Additionally, elevated demand for services via telepharmacy tools was demonstrated in both periods compared with the pre-lockdown period. The differences in face-to-face services demand was statistically significant (P=0.001), while differences in telepharmacy services were not statistically significant.

Table 6. Impact of lockdown period on number of patients/customers per day (n=277)						
Number of patients/ customers per day	**< 50 (n=45)**		**50 – 100 (n=95)**		**> 100 (n=137)**	
	During lockdown period (%)	After lockdown period (%)	During lockdown period (%)	After lockdown period (%)	During lockdown period (%)	After lockdown period (%)
Face-to-Face services						
Increased	0	2 (4.44%)	10 (10.52%)	19 (20.00%)	43 (31.39%)	58 (42.34%)
No change	43 (95.56%)	43 (95.56%)	45 (47.37%)	50 (52.63%)	45 (32.85%)	57 (41.61%)
Decreased	2 (4.44%)	0	40 (42.11%)	26 (27.37%)	49 (35.77%)	22 (16.06%)
	Fisher Exact P=0.24		P=0.09		**P=0.001**	
Telepharmacy services						
Increased	0	0	34 (35.79%)	14 (14.74%)	68 (49.63%)	73 (53.28%)
No change	45 (100%)	45 (100%)	58 (61.05%)	75 (78.95%)	60 (43.80%)	56 (40.88%)
Decreased	0	0	3 (3.16%)	6 (6.32%)	9 (6.57%)	8 (5.84%)
	Fisher Exact P=1		Fisher Exact **P=0.002**		P=0.86	

DISCUSSION

The study assessed telepharmacy services among community pharmacies (n=391) provided in three periods: before, during and after the lockdown in the UAE. The main factors significantly affecting these services were the type of pharmacies (group/chain vs individual) and the number of pharmacists in the pharmacy. Furthermore, the main barriers faced by the participants were lack of time, training, and financial support.

Telepharmacy is a method in which a pharmacist uses telecommunication technology to oversee aspects of pharmacy operations or provide patient care services.[18] Pharmacies, similar to most healthcare practices, found rescue in technological provided services, particularly when the COVID-19 pandemic started in the early months of 2020, rendering telepharmacy a highly demanded tool by both pharmacists and patients. The use of telepharmacy is becoming more and more popular to maintain, and perhaps even improve, standard care processes.[19]

Although telepharmacy had been introduced in the UAE before the COVID-19 pandemic, a surge of extra demand and application was seen during and after the lockdown period. Telepharmacy was seen as an opportunity to reduce direct contact with patients and continue providing the common pharmacy services patients require from the comfort of their homes. Despite the promising solutions of telepharmacy, it is sometimes challenging to put into practice as many limitations hinder the greater diffusion of telepharmacy. To begin with, the startup of providing services via telepharmacy may take considerable time, staff, effort, and money.[20] Pharmacies with limited resources cannot easily apply telepharmacy services (technological infrastructure, technical support, financial issues, reimbursement, training of workers, etc.).[21] The disadvantage was especially shown in individual pharmacies when compared to chain/group pharmacies. Another setback in some countries is that their health authorities lack the interest to support the integration of this technology. Resulting in limited supportive regulations, which could be due to the novelty and unfamiliarity of these services with specific laws yet to be developed.[22]

Group/chain community pharmacies had better performance providing services using technology than individual pharmacies. They had an advantage when it came to having a telepharmacy foundation. The higher number of licensed pharmacists, bigger budget and well-developed technologies allowed group/chain pharmacies to overcome most of the initial challenges associated with telepharmacy, facilitating the adoption of the practice compared to individual pharmacies. In addition, their plans to develop their services such as implementing home delivery services were earlier and reported more than in the individual pharmacies where there is a limited resource and number of pharmacy workers during the periods of the study. Furthermore, younger licensed pharmacists working in group pharmacies (< 35 years old) were more than in individual pharmacies. This may be related to the job nature in Pharmacy chains/groups.[23] Other factors such as the closure of some shopping centers affected group pharmacies more, as this type of pharmacy predominates in these places, which led to the presence more pharmacists in providing services using telepharmacy tools, while not proving face-to-face services. In addition, people tended to avoid crowded places at the beginning of the pandemic and regulations were set to limit the number of people in shopping centers for health safety reasons.

The need to access pharmaceutical services by telepharmacy were high during the lockdown period. Nonetheless, the use of telepharmacy tools has seen a decline in some practices during the lockdown period and beyond. Services depending on the type of pharmacy and the closing period were significantly affected, such as managing mild illnesses, distributing non-prescription medicines, selling cosmetics and other health products and providing services to patients with chronic diseases. The reduced need for these types of services was due to the change in the populations' needs during these periods, the impact of the pandemic on life in general and future uncertainty among the population. Nonetheless, it is noteworthy that some barriers were patient-related, including but not limited to their inability to use technology, illiteracy and absence of assistance from others.[24]

Although the usage of technology to provide pharmacy services is not relatively new, its use has drastically increased due to

the inaccessibility of face-to-face pharmacy services, especially during the lockdown period of the COVID-19 pandemic. This was noted in the current study and it related to areas with restricted movement where some group/chain pharmacies operate, such as shopping malls and public areas. Individual pharmacies, on the other hand, operate more in residual areas. It was seen as a viable solution for the challenges faced by the management of community pharmacies and a way to increase the number of provided services, giving economic relief during a time of discord.[25] In addition, it allowed effective patient counselling and easy access to healthcare services in remote locations that had previously been deprived of it.[26]

The rising popularity of telepharmacy in the UAE and facilitated adoption has been made possible due to the essential foundation elements, which are but not limited to: the developed internet infrastructure services in the UAE, policy related to the application and practice of telepharmacy issued by health authorities,[9,13] availability and familiarity of social media sites and messaging applications that made it simple for pharmacies to easily create accounts and connect with their patients, and a large number of mobile phone users and easy access to the internet in the UAE.[13] Although the pandemic forced pharmacy managements to initiate alterations with a short-term plan, the modified system rendered benefits that prove to remain.[27]

Telepharmacy will likely continue to expand and develop, increasing patients' access to pharmacy services.[28] Hence, it is crucial to formulate a well-developed telepharmacy system that is clear and beneficial to the community. Further conduction of research is essential to study the present opportunities and challenges of telepharmacy in the UAE. During the COVID-19 pandemic and especially the lockdown period, telepharmacy benefits were able to shine bright. This paradigm allowed patients to communicate with pharmacies, whether for acute or chronic conditions, lessening the sudden burden on hospitals and reducing patients' risk of infection. The shift to online purchases additionally allowed pharmacies to keep running during a time of economic difficulties. On the other hand, it is important to note that although many issues were solved using telepharmacy, it is not without consequences. Some studies have found telepharmacy to have medication errors similar or higher than traditional pharmacies.[28,29]

Finally, several issues must be addressed in the community pharmacy sector in the UAE to provide tele-technology services more efficiently and effectively. These recommendations include developing an electronic prescription system with patient medication records in the community pharmacy, developing a network among all healthcare providers in the country, and making pharmacists more accessible to patients' health data.

Strengths and weaknesses

This study provides meaningful insights regarding the use of telepharmacy services in community pharmacies in a developing country. To the best of our knowledge, majority of studies that assessed telepharmacy services were for clinical services in hospital, hospital discharge patients and rural pharmacies. On the other hand, the cross-sectional design of the study is not without limitations since causality cannot be established. Additionally, questionnaire related issues such as difficulty in distributing the surveys and level of participants' understanding of the questions. In addition to the obstacles accompanied by the pandemic. Moreover, participants might not feel comfortable providing answers that presents themselves in an unfavorable manner, which creates a source of bias as they are evaluating services provided by them. Finally, since the survey was conducted after a short period of time out of the three study periods, there is an expectation of bias due to confusion or forgetting of some information while filling the questionnaire.

CONCLUSION

Most of the community pharmacies were offering online sales prior to the lockdown and a majority of them had home delivery service. Almost all participants confirmed that the staff responsible for the online services were the licensed pharmacists themselves. Moreover, providing pharmaceutical services by telepharmacy services was more common in group/chain pharmacies than individual pharmacies.

Regarding barriers that the pharmacists faced, it was perceived that small individual pharmacies struggled more than group/chain pharmacies when it came to time, training and financial support. Although group/chain pharmacies had a larger availability of set policies regarding telepharmacy, individual pharmacies reported more working hours and incentive for their employees.

Telepharmacy can be used as a tool to reduce the burden on the healthcare system and enhance pharmaceutical services provided by the community pharmacies.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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AUTHOR'S CONTRIBUTIONS

KEY FINDINGS

A demand for pharmacy services using telepharmacy tools was observed during the lockdown period related to COVID-19

pandemic.

Using telepharmacy to provide pharmaceutical services in community pharmacies has been beneficial during the COVID-19 pandemic, including the lockdown period.

The lack of time, training, workers, and financial support were the main obstacles in providing pharmaceuticals services via telepharmacy. Yet, these barriers were reported less in pharmacy group/chain.

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