

# The Practice of home healthcare services by Pharmacists in Saudi Arabia

Yousef Ahmed Alomi\*, 

BSc. Pharm, MSc. Clin Pharm, BCPS, BCNSP, DiBA, CDE, Critical Care Clinical Pharmacists, TPN Clinical Pharmacist, Freelancer Business Planner, Content Editor, and Data Analyst, Riyadh, SAUDI ARABIA.

**Maha Hussein Almadany**, Bsc. Pharm, Health Care Quality Management Professional Diploma (HCQM), Pharmacy Quality department, King Salman bin Abdulaziz Medical City, Al Medina Al Monwarah, SAUDI ARABIA.

**Areej Abdullah Al Jasser**, Bc. Pharm, MSc. Clin Pharm, Director, Total Quality Management, King Fahd Specialist Hospital, Buraydah, SAUDI ARABIA.

**Fawaz Abdullah Alrakaf**, MD, Family Medicine, Director, Public Health Department, Heath Affairs Directorate, Ministry of Health, Tabuk, SAUDI ARABIA.

**Fatima Abdulqader Alshamrani**, BSc. Pharm, Inventory management services, Alyamamah hospital, SAUDI ARABIA.

**Hussa Mubarak Muwainea**, Bsc. Pharm, MSc. Pharm, Prince Sultan Military Medical City, Riyadh, SAUDI ARABIA.

**Osama Ali Alzahrani**, Pharm D, College of Pharmacy, Taif University, Tail, SAUDI ARABIA.

## Correspondence:

**Dr. Yousef Ahmed Alomi**, Bsc. Pharm, msc. Clin pharm, bcps, bcNSP, DiBA, CDE Critical Care Clinical Pharmacists, TPN Clinical Pharmacist, Freelancer Business Planner, Content Editor and Data Analyst, P.O.BOX 100, Riyadh 11392, Riyadh, SAUDI ARABIA.

**Phone no:** +966 504417712

**E-mail:** yalomi@gmail.com

Received: 23-02-2022;

Accepted: 26-05-2022;

Copyright: © the author(s), publisher and licensee International Journal of Pharmacology and Clinical Sciences. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License

Access this article online	
	<a href="http://www.ijpcs.net">www.ijpcs.net</a>
	DOI: 10.5530/ijpcs.2022.11.17

## ABSTRACT

**Objectives:** To illustrate the practice of home healthcare services by pharmacists in Saudi Arabia. **Methods:** It analyzes a cross-sectional survey that discussed practice at home health care services in Saudi Arabia. The study comprised respondents' demographic information about pharmacists and home healthcare pharmacy services implementation and resources used for home healthcare pharmacy services. The 5-point Likert response scale system was used with closed-ended questions. The survey was validated through the revision of expert reviewers and pilot testing. Besides, various tests of reliability, McDonald's  $\omega$ , Cronbach alpha, Gutmann's  $\lambda_2$ , and Gutmann's  $\lambda_6$ , were done with the study. Furthermore, the data analysis of the practice home healthcare services by pharmacists in Saudi Arabia is done through the survey monkey system. Besides, the statistical package of social sciences (SPSS), Jeffery's Amazing Statistics Program (JASP), and Microsoft Excel sheet version 16. **Results:** A total number of 393 pharmacists responded to the questionnaire. Of them, more than three-quarters responded from the Central region (303 (77.10%)), with statistically significant differences between the provinces ( $p=0.000$ ). Males responded less than females (195 (49.74%)) versus 197 (50.26%)), with statistically non-significant differences between them ( $p=0.920$ ). Most of the responders were in the age group of 24-35 years (267 (67.94%)) and 36-45 years (121 (30.79%)), with statistically significant differences between all age groups ( $p=0.000$ ). The average number of home healthcare prescriptions was (17.46) daily per responder, with a total number (6,861) per day. The highest range number of prescriptions was (26-30) ((33.93%) daily. Those prescriptions were dispensed to home healthcare (8.34) patients daily per each responder, with the highest range number of patients being (16-18) ((25.95%) daily per each responder. The average score of the practice of pharmacists about the home healthcare Pharmacy implementations was (4.45). The element "The medication error system is included in home healthcare pharmacy services" obtained the highest score (4.60). The pharmacists believe that "The research on home healthcare pharmacy services" (4.57) and "The cost analysis of home healthcare pharmacy services. The most used resources of the home healthcare pharmacy services in practice were Health Practitioners 265 (67.60%) and Drug Bulletin 246 (62.76%). They were followed by Internet 241 (61.48%), Scientific literature 212 (54.08%). **Conclusion:** The home care pharmacy practice by pharmacists is appropriate. Each pharmacist provides home care activities based on each type of healthcare organization. The vision, mission, and home care pharmacy strategy should be identified, and the home care pharmacist role must be unified at all healthcare institutions. Besides, further research about home care pharmacy practice is highly suggested in Saudi Arabia.

**Keywords:** Practice, home, healthcare services, Pharmacists, Saudi Arabia.

## INTRODUCTION

Health care services consist of multiple types: critical, acute, ambulatory, long-term, and home health care. All previous types of care provide Healthcare services directly to the patient through the hospital and primary care centers.<sup>[1]</sup> One type was home healthcare offers the service at the patient's home.<sup>[1,2]</sup> Daily, teams visit patients who demand home care, such as elderly patients with chronic conditions or handicapped patients. Each team visits the patients at their homes to provide the services.<sup>[2,3]</sup> The team consists of physicians, nurses, and an ambulance driver. The team might provide the following services: physical assessment, wound care, vaccinations, laboratory tests, medication therapy, intravenous infusion, respiratory therapy, and nutritional support services.<sup>[2,3]</sup> In the early morning, the

pharmacist prepares and regularly dispenses the medication in bags with appropriate labels to home healthcare nurses. The nurse provides the medications to the patient during the visit. Sometimes the physician writes the prescription, and the caregiver receives the medication from the hospital pharmacy. Few studies worldwide illustrate the pharmacist practice of home care locally or in the Gulf and Arabic countries.<sup>[2,4-15]</sup> The current cross-sectional study, aims to investigate home healthcare practice by the pharmacist in Saudi Arabia.

## METHODS

The study analyzed a cross-sectional survey that discussed the Pharmacist practice of pharmacy home healthcare services in Saudi Arabia. It self-reported an electronic survey of the pharmacist,

including pharmacists from internship to consultant, pharmacist specialties, and Saudi Arabia. All non-pharmacist or students, non-completed, non-qualified surveys will be excluded from the study. The survey consisted of respondents' demographic information about pharmacists and home healthcare pharmacy services implementation and resources used for home healthcare pharmacy services.<sup>[2,4-15]</sup> The 5-point Likert response scale system was used with closed-ended questions. According to the previous literature with an unlimited population size, the sample was calculated as a cross-sectional study, with a confidence level of 95% with a z score of 1.96 and a margin of error of 5%, a population percentage of 50%, and drop-out rate 10%. As a result, the sample size will equal 380-420 with a power of study of 80%.<sup>[16-18]</sup> The response rate required for the calculated sample size was at least 60-70% and above.<sup>[18,19]</sup> The survey was distributed through social media of Whatsapp applications and telegram groups of pharmacists. The reminder message had been sent every 1-2 weeks. The survey was validated through the revision of expert reviewers and pilot testing. Besides, various tests of the reliability of McDonald's  $\omega$ , Cronbach alpha, Gutmann's  $\lambda_2$ , and Gutmann's  $\lambda_6$  were done with the study. The data analysis of the practice of home healthcare services by pharmacists was done through the survey monkey system. Besides, the statistical package of social sciences (SPSS), Jeffery's Amazing Statistics Program (JASP), and Microsoft Excel sheet version 16. It included a description and frequency analysis, good of fitness analysis, and correlation analysis. Besides, inferential analysis of factors affecting home healthcare pharmacy services implementation with linear regression. The STROBE (Strengthening the reporting of observational studies in epidemiology statement: guidelines for reporting observational studies) guided the reporting of the current study.<sup>[20,21]</sup>

## RESULTS

A total number of 393 pharmacists responded to the questionnaire. Of them, more than three-quarters responded from the Central region (303 (77.10%)), with statistically significant differences between the provinces ( $p=0.000$ ). Most of the responders were from Pharmaceutical Companies (69 (17.56%)), University Hospitals (56 (14.25%)), Community Pharmacy (54 (13.74%)), and Private Hospital (53 (13.49%)), with statistically significant difference between working sites ( $p=0.000$ ). Males responded less than females (195 (49.74%) versus 197 (50.26%)), with statistically non-significant differences between them ( $p=0.920$ ). Most

of the responders were in the age group of 24-35 years (267 (67.94%)) and 36-45 years (121 (30.79%)), with statistically significant differences between all age groups ( $p=0.000$ ). Most responders held Pharm D (334 (84.99%)). Most of the pharmacists were staff pharmacists (367 (94.34%)), with statistically significant differences between all levels ( $p=0.000$ ). Most pharmacists had a work experience of 4-6 years (185 (47.07%)), 1-3 years (72 (18.32%)), and 7-9 years (71 (18.07%)), with a statistically significant difference between years of experience ( $p=0.000$ ). Most pharmacists had worked at Drug Information (239 ((60.81%)), inpatient pharmacy (78 ((53.94%)), and Inventory control (147 ((37.40%)). There was a medium negative correlation between age (years) and gender based on Kendall's tau\_b (0.397) and Spearman's rho (0.400) correlation coefficients, with a statistically significant difference between the two factors ( $p<0.000$ ) (Tables 1 and 2).

The average number of home healthcare prescriptions per responder per day was (17.46), with an estimated total of (6,861) per day, with the highest range of prescriptions (26-30) and 133 (33.93%) orders per day. Those prescriptions were dispensed to home healthcare (8.34) patients daily per responder, with an estimated total number of home care patients (2,766) daily. The highest number of home care patient range for (16-18) was 102 (25.95%) patients per responder per day (Table 3). The average score of the practice of pharmacists about the home healthcare Pharmacy implementations was (4.45). The element "The medication error system is included in home healthcare pharmacy services" obtained the highest score (4.60). The pharmacists believe that "The research on home healthcare pharmacy services" (4.57) and "The cost analysis of home healthcare pharmacy services. In contrast, the lowest score was obtained for the element "The annual plan for home healthcare pharmacy services" (4.29). The score for the element "The pharmaceutical care department provides home healthcare pharmacy activities" was (4.33), for the element "The vision of home healthcare pharmacy services" was (4.34), and the element "Mission of home Healthcare pharmacy services" with a statistically significant difference between the responses ( $p<0.000$ ). All aspects of the practice of pharmacists about home healthcare Pharmacy implementations were statistically significant between responses ( $p<0.000$ ) (Table 4). The most used resources of the home healthcare pharmacy services in practice were Health Practitioners 265 (67.60%) and Drug Bulletin 246 (62.76%). They were followed by the Internet 241 (61.48%) and Scientific literature 212 (54.08%) (Table 5). The score for

single-test reliability analysis of McDonald's  $\omega$  was 0.985, Cronbach's  $\alpha$  was 0.985, Gutmann's  $\lambda_2$ , 0.985, Gutmann's  $\lambda_6$  was 0.993, and Greater Lower Bound was 0.997 with statistically significant ( $p<0.05$ ).

## Factors affecting the home healthcare pharmacy services implementation

Factors affecting the perception were analyzed. We adjusted the significant values using the independent samples Kruskal-Wallis test and the Bonferroni correction for multiple tests. Location, worksite, age (years), gender, experiences, position held, number of homecare prescriptions, and number of homecare patients are all factors in implementing home healthcare pharmacy services. Five locations affected the *Home healthcare pharmacy services implementation*. There are statistically significant differences between all regions ( $p=0.000$ ), with the highest score (4.6612) in the central area. Eleven worksites affected the *Home healthcare pharmacy services implementation*. The Ministry of Health hospital had the lowest scores (3.6092) in implementing Home Healthcare Pharmacy Services, with a statistically significant difference between working sites ( $p = 0.000$ ) with significance across all sites. There are non-statically significant differences between males and females that affect *Home healthcare pharmacy services implementation* ( $p=0.875$ ). The age of the responders did not affect the *Home healthcare pharmacy services implementation* with a non-statistically significant difference between all age groups ( $p=0.061$ ). Five levels of work experience affected the *Home healthcare pharmacy services implementation*. The lowest score (2.0500) was obtained for those with work experience of less than one year, with a statistically significant difference between all levels ( $p=0.000$ ). Four levels of the position affected the *Home healthcare pharmacy services implementation*, with the highest score (4.5238) obtained for the pharmacy staff with a statistically significant difference between all levels ( $p=0.000$ ). The number of home care prescriptions affected *Home healthcare pharmacy services implementation*. The pharmacist did not know the number of prescriptions, or they can not specify, obtained the lowest scores (2.5495) with a statistically significant difference ( $p=0.000$ ). The number of home care patients affected the *Home healthcare pharmacy services implementation*. The number of 4-6 patients daily obtained the lowest scores (2.8292) with a statistically significant difference ( $p=0.000$ ).

The relationship between implementing the home healthcare pharmacy services and factors

Nationality	Response Count	Response Percent	p-value (X2)	
Central area	303	77.10%	0.000	
North area	27	6.87%		
South area	32	8.14%		
East area	18	4.58%		
West area	13	3.31%		
Answered question	393			
Skipped question	0			
Site of work	Response Count	Response Percent	p-value (X2)	
Ministry of Health Primary Hospital	32	8.14%	0.000	
Military hospital	36	9.16%		
National Guard Hospital	2	0.51%		
Security Force Hospital	3	0.76%		
University Hospital	56	14.25%		
Ministry of Health Primary Care Center	44	11.20%		
Private Hospital	53	13.49%		
Private Ambulatory Care Clinic	20	5.09%		
Private Primary Healthcare Center	24	6.11%		
Community Pharmacy	54	13.74%		
Pharmaceutical Company	69	17.56%		
Answered question	393			
Skipped question	0			
Gender	Response Count	Response Percent		
Male	195	49.74%		0.920
Female	197	50.26%		
Answered question	392			
Skipped question	1			
Age	Response Count	Response Percent		
24–35	267	67.94%	0.000	
36–45	121	30.79%		
46–55	4	1.02%		
> 55	1	0.25%		
Answered question	393			
Skipped question	0			

Pharmacist Qualifications	Response Count	Response Percent	p-value (X2)
Diploma in Pharmacy	3	0.76%	
Bachelor's in pharmacy	21	5.34%	
Master	41	10.43%	
Doctor of Pharmacy (Pharm D)	334	84.99%	
Doctor of Philosophy (Ph.D.)	3	0.76%	
Postgraduate Year One (PGY1)	30	7.63%	
Postgraduate Year Two (PGY2)	40	10.18%	
Postgraduate Year Three (PGY3)	31	7.89%	
Fellowship	1	0.25%	
Answered question	393		
Skipped question	0		
Position Held	Response Count	Response Percent	
Director of Pharmacy	5	1.29%	0.000
Assistant Director of Pharmacy	4	1.03%	
Supervisor	13	3.34%	
Pharmacy staff	367	94.34%	
Answered question	389		
Skipped question	4		
Years of experience in the pharmacy career	Response Count	Response Percent	
< 1	9	2.29%	0.000
1-3	72	18.32%	
4-6	185	47.07%	
7-9	71	18.07%	
> 9	56	14.25%	
Answered question	393		
Skipped question	0		
The practice area	Response Count	Response Percent	
Inpatient Pharmacy	212	53.94%	
Outpatient Pharmacy	67	17.05%	
Satellite Pharmacy	2	0.51%	
Narcotics and Controlled	98	24.94%	
Extemporaneous Preparation	118	30.03%	
Clinical Pharmacy	99	25.19%	
Inventory Control	147	37.40%	
Drug Information	239	60.81%	
IV admixture	67	17.05%	
Community pharmacy	48	12.21%	
Pharmaceutical companies	163	41.48%	
Health education	1	0.25%	
Answered question	393		
Skipped question	0		

**Table 3: Total number of prescription medications dispensed/filled for home healthcare patients daily.**

	Responses		p-value (X2)
1-5	25	6.38%	0.000
6-10	32	8.16%	
11-15	69	17.60%	
16-20	46	11.73%	
21-25	47	11.99%	
26-30	133	33.93%	
I do not know, and I can not specify	10	2.55%	
Nothing	30	7.65%	
<b>Answered</b>	<b>392</b>		
<b>Skipped</b>	<b>1</b>		

The total number of home healthcare patients would need medications daily

	Responses		p-value (X2)
1-3	28	7.12%	0.000
4-6	12	3.05%	
7-9	54	13.74%	
10-12	42	10.69%	
13-15	38	9.67%	
16-18	102	25.95%	
19-21	86	21.88%	
Nothing	31	7.89%	
<b>Answered</b>	<b>393</b>		
<b>Skipped</b>	<b>0</b>		

such as location, worksite, age (years), and gender. Besides, the years of experience, position held, number of homecare prescriptions, and number of homecare patients. The multiple regression analysis considered perception as the dependent variable and factors affecting it as an explanatory variable. There was a medium relationship ( $R=0.644$  with  $p=0.000$ ) between the home healthcare pharmacy services implementation and its factors. Three out of eight were non-significant differences ( $p>0.05$ ). However, multiple regression analysis confirmed that one factor (i.e., locations, number of homecare prescriptions) explained 38.3% and 45.0% of the negative relationship to the variation in perception, with a statistically significant difference ( $p=0.000$ ) and ( $p=0.000$ ), respectively. Therefore, the bootstrap model was also confirmed. Furthermore, the relationship was verified by the non-existence of multicollinearity with the location factor with a variance inflation factor (VIF) of 1.249 and 2.832, respectively less than three or five as a sufficient number of VIF (22).<sup>[23,24]</sup> Besides, three-factor (work site, position held, and the number of home care patients) explained 29.0%, 19.0%, and 50.7% of the positive relationship to the variation in perception, with a statistically significant difference ( $p=0.000$ ) ( $p=0.000$ ) and

( $p=0.000$ ) respectively. Therefore, the bootstrap model was also confirmed. Furthermore, the relationship was verified by the non-existence of multicollinearity with the three factors (gender, experiences, position held) with a variance inflation factor (VIF) of 1.073, 1.123, and 2.796 respectively less than three or five as a sufficient number of VIF (Table 6).<sup>[22-24]</sup>

## DISCUSSION

Home health care is an essential service for most healthcare organizations.<sup>[2,4,10]</sup> It provides services to geriatric populations or handicapped patients. The home care system can help those types of patients according to their situation and might reduce the cost of health care services and indirect costs for overall societies.<sup>[10]</sup> The pharmacist can perform various activities for home healthcare patients with medication counseling, prevent drug-related illnesses, and improve patient clinical outcomes by implementing the pharmaceutical care service to home care.<sup>[4,9,12,25]</sup> The practice level of home care pharmacy is highly demanded to improve pharmacy performance and increase patient satisfaction with the services. The current cross-sectional study with different pharmacist locations, working sites, ages,

experiences, and positions; can give practice pictures from different angles, similar to the previous study.<sup>[4]</sup> The survey was distributed to a calculated number sample which was better than the previous study.<sup>[4]</sup> The current research assumes the first report estimated the number of prescriptions for the number of home care patients, which was not reported before.<sup>[4,10]</sup> The study's findings showed the average home care pharmacy practice is appropriate. The significant practice elements were medication errors, possibly answered by pharmacists working in the hospitals because they are very concerned about medication safety-related issues as required by national and international quality standards,<sup>[2]</sup> which was similar to the previous study.<sup>[4]</sup>

The cost analysis of home care pharmacy that's expected the answers from the pharmacist who works at community pharmacies and private health care organizations. The cost analysis is required to show the benefits of the home care pharmacy services and calculate revenue. Besides, it might need health insurance comparison and coverage.<sup>[26]</sup> The other system practiced home care pharmacy was research. That is the most common response from respondents who work for pharmaceutical companies. That might be needed for visibility studies in-home care pharmacy-related investments.<sup>[27]</sup> However, the lowest practice elements were the vision, mission, scope of the services, and annual plan of the home care pharmacy. That's expected because the home care pharmacy is not well developed at most hospitals and healthcare facilities.

On the other hand, some elements of home care pharmacy services got good scores, such as home care pharmacy competencies, total quality at the home care pharmacy services, ADR reporting system, and education and training system of home care pharmacy. However, all those elements might be overestimated because they are commonly not found in practice, it might found, and the author might not be aware of them, or the healthcare provider did not publish those services in the home care pharmacy. Besides, it might cause respondents to misunderstand the survey because the term home care pharmacy is new to them.

Various factors might affect the home care pharmacy implementation. First, the location might affect the home care pharmacy's job implementation in the central region. That's expected because most home health care offers are from the governmental and private sectors in the central area. Second, the working site might affect the home care pharmacy implementation, with the lowest being at MOH hospital because the role of

Table 4: Home healthcare Pharmacy implementations.

No	Items	No activity had been implemented	It was formally discussed and considered, but it was not implemented	It is partially implemented in hospitals for some or all areas, patients, drugs, staff	It is fully implemented in the hospital for some areas, patients, drugs, and staff	It is fully implemented throughout the hospital for all patients, drugs, and staff	Total	Weighted Average	p-value (X2)					
1	The vision of home healthcare pharmacy services	2.08%	8	2.60%	10	13.02%	50	24.22%	93	58.07%	223	384	4.34	0.000
2	The mission of home Healthcare pharmacy services	2.29%	9	4.58%	18	11.70%	46	19.34%	76	62.09%	244	393	4.34	0.000
3	The strategic plan of home healthcare pharmacy services	2.80%	11	3.82%	15	9.92%	39	21.12%	83	62.34%	245	393	4.36	0.000
4	The annual plan for home healthcare pharmacy services	2.80%	11	2.54%	10	13.49%	53	24.94%	98	56.23%	221	393	4.29	0.000
5	The policy and procedure of home healthcare pharmacy services	3.31%	13	3.56%	14	5.09%	20	22.14%	87	65.90%	259	393	4.44	0.000
6	The home healthcare pharmacy services competency	3.64%	14	2.86%	11	4.94%	19	24.68%	95	63.90%	246	385	4.42	0.000
7	The home healthcare pharmacy services associated with the pharmacy total quality management	3.32%	13	1.79%	7	7.14%	28	26.79%	105	60.97%	239	392	4.40	0.000
8	The pharmaceutical care department provides home healthcare pharmacy activities	3.82%	15	2.80%	11	12.47%	49	18.58%	73	62.34%	245	393	4.33	0.000
9	Assessing patient satisfaction with home healthcare pharmacy services	2.54%	10	3.56%	14	13.23%	52	12.47%	49	68.19%	268	393	4.40	0.000
10	The adverse drug reaction system is included in the home healthcare pharmacy services	2.54%	10	3.56%	14	13.99%	55	8.40%	33	71.50%	281	393	4.43	0.000
11	The medication error system is included in home healthcare pharmacy services	2.81%	11	2.04%	8	5.87%	23	10.71%	42	78.57%	308	392	4.60	0.000
12	The home healthcare pharmacy services provide education and training program	3.05%	12	3.56%	14	3.31%	13	13.99%	55	76.08%	299	393	4.56	0.000
13	The research on home healthcare pharmacy services	5.09%	20	2.54%	10	2.04%	8	11.20%	44	79.13%	311	393	4.57	0.000
14	The cost analysis of home healthcare pharmacy services	4.07%	16	3.05%	12	2.04%	8	13.23%	52	77.61%	305	393	4.57	0.000
15	The home healthcare pharmacy services that are covered by healthcare insurance	5.09%	20	2.54%	10	1.53%	6	18.07%	71	72.77%	286	393	4.51	0.000
16	The transition care system is included in home healthcare pharmacy services	3.82%	15	3.05%	12	2.54%	10	17.56%	69	73.03%	287	393	4.53	0.000
17	The medications reconciliation system is included in geriatric pharmacy services	3.31%	13	2.54%	10	2.80%	11	21.63%	85	69.72%	274	393	4.52	0.000
18	Therapeutic guidelines in home healthcare pharmacy services	3.32%	13	2.55%	10	8.42%	33	7.40%	29	78.32%	307	392	4.55	0.000
19	Therapeutic drug monitoring or pharmacokinetics in home healthcare pharmacy services	4.07%	16	3.05%	12	12.98%	51	5.34%	21	74.55%	293	393	4.43	0.000
20	The community pharmacy provides home healthcare pharmacy services	3.56%	14	3.31%	13	10.43%	41	12.21%	48	70.48%	277	393	4.43	0.000
	<b>Answered</b>											<b>393</b>		
	<b>Skipped</b>											<b>0</b>		

**Table 5: The resources of the home healthcare pharmacy services in the practice.**

	Responses	
	Count	Percentage
Health Practitioners	265	67.60%
Scientific literature	212	54.08%
Peer discussions	67	17.09%
Medical association literature/guidelines/recommendations	60	15.31%
Drug information resources ( Lexicomp-drug information, Micromedex, Epocrates ..etc	174	44.39%
SFDA website	100	25.51%
Drug Bulletin	246	62.76%
Relatives and friends	80	20.41%
Home healthcare education courses	132	33.67%
Internet	241	61.48%
The drug information center at the hospital	169	43.11%
Awareness lectures in a hospital	93	23.72%
Awareness lectures at the primary healthcare center	27	6.89%
Healthcare care awareness events at the market	89	22.70%
Health insurance companies	26	6.63%
Pharmaceutical companies	143	36.48%
<b>Answered</b>	<b>392</b>	
Skipped	1	

pharmacists is not defined and not included in the home health care services teams. Third, pharmacists' experience might affect the home care pharmacy implementation, such as less than one year of experience. That's expected because new graduates need more orientation of the pharmacy system and more clinical knowledge of pharmacy practice. Fourth, the pharmacy staff had high home care practices, and that's expected because of the operating system done by them. Finally, the number of patients at home care services might affect the practice with the lowest practice of 4-6 patients daily if they are more patient and frequently receive home care pharmacy services. The most dependable factors that might positively affect home care pharmacy implementation were the working site, position, and the number of home healthcare services patients. That's expected, as we already mentioned.

On the other hand, some dependable factors, such as locations and number of home care prescriptions, might negatively affect home care pharmacy implementation. If the number of prescriptions increases, it will increase the workload of pharmacists, and there is not enough time to implement complete home health pharmacy services. There is no previous investigation to compare with the current findings.

The findings showed the responders mostly used healthcare practitioners as resources for home care pharmacy services. That's expected

because the pharmacist knew the home health pharmacy while the USA called pharmacy benefits. Both have the same meaning, but the pharmacist is unaware. Besides, the pharmacist used drug bulleting as a resource of home care pharmacy services because they need it for counseling with approved indications and required doses for geriatric patients. The pharmacist also used the internet and scientific literature because they rarely found resources called home care pharmacy services when searching databases and published books. Generally, after the pharmacist finds no information about home care pharmacy services-related issues, they will refer to common drug information books and drug information centers at healthcare facilities. So pharmacists should go before previous resources, saving them time. However, pharmacists might work at community pharmacies or pharmaceutical companies, and private sections do not have those resources. Thus, there is no previous investigation to compare with current findings.

### Limitations

Despite this, the study had various advantages, including a calculated sample size with high reliability and very informative results. However, the research had various limitations; sample techniques were randomized, and there was a wide range of findings regarding the characteristics of responders. Besides, the

results were for a period of time. Therefore, further investigation using the random sampling method is most likely.

## CONCLUSION

The home care pharmacy practice was appropriate. Most pharmacists showed medication error prevention and documentation, research in-home care pharmacy, and cost analysis of home care pharmacy services as the highest components in practice. In contrast, the home care pharmacy's vision, mission, and annual plan were the lowest practice elements. Most pharmacists refer to health care practitioners, drug bulletins, and internet platforms as home care pharmacy services resources. Various factors might negatively affect or positively affect the home care pharmacy practice, such as location, working sites, experience, and pharmacist position. Besides, the number of home care patients and related prescriptions. The home care pharmacy should be universal with standardized pharmacy and associated regulations in Saudi Arabia.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## ACKNOWLEDGEMENT

None.

## Consent for Publications

Informed consent was obtained from all the participants.

## FUNDING

None.

## Ethical Approval

This research was exempted from research and ethical committee or an institutional review board (IRB) approval.

<https://www.hhs.gov/ohrp/regulations-and-policy/decision-charts-2018/index.html>

## ABBREVIATIONS

**MOH:** Ministry of Health; **KSA:** Kingdom of Saudi Arabia; **SPSS:** Statistical Package of Social Sciences; **JASP:** Jeffery's Amazing Statistics Program; **STROBE:** Strengthening the reporting of observational studies in epidemiology statement.

## ORCID ID

Yousef Ahmed Alomi  <https://orcid.org/0000-0003-1381-628X>

Table 6: Multiple regression of Factors with the home healthcare Pharmacy practice implementations.

Model	R	R Square	F	Sig.	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
					B	Std. Error	Beta				Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	.644 <sup>b</sup>	.415	33.491	.000 <sup>b</sup>	2.906	.467			6.217	.000	1.987	3.825		
Location					-.320	.037	-.383		-8.714	.000	-.392	-.248	.801	1.249
Site of work					.080	.011	.290		7.110	.000	.058	.102	.932	1.073
Age (years)					-.050	.080	-.029		-6.23	.533	-.207	.107	.713	1.403
Pharmacist gender					-.062	.083	-.036		-7.751	.453	-.225	.101	.689	1.451
Years of experience in a pharmacy career					-.061	.042	-.068		-1.433	.153	-.144	.023	.688	1.453
Position Held					.415	.091	.190		4.561	.000	.236	.594	.890	1.123
number of homecare prescriptions					-.207	.030	-.450		-6.800	.000	-.267	-.147	.353	2.832
number of homecare patients					.226	.029	.507		7.710	.000	.168	.283	.358	2.796

a. Dependent Variable: home healthcare Pharmacy practice implementations, Predictors: (Constant), Location, Age (years), Pharmacist gender, Position Held, Years of experience in a pharmacy career, number of homecare prescriptions, and number of homecare patients.

Model	B	Bias	Bootstrap for Coefficients			
			Std. Error	Sig. (2-tailed)	Bootstrap <sup>a</sup>	
					Lower	Upper
1 (Constant)	2.906	.029	.661	.001	1.661	4.264
Location	-.320	-.004	.064	.001	-.457	-.203
Site of work	.080	-.001	.014	.001	.052	.109
Age (years)	-.050	.011	.103	.652	-.237	.161
Pharmacist gender	-.062	.001	.104	.553	-.257	.154
Years of experience in a pharmacy career	-.061	-.007	.066	.362	-.198	.065
Position Held	.415	-.004	.130	.002	.153	.669
Number homecare prescription	-.207	.001	.050	.001	-.302	-.112
Number homecare patients	.226	3.257E-05	.046	.001	.135	.313

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

## REFERENCES

1. Saudi Ministry of Health. MOH statistical report [Internet]. Ministry of Health, Saudi Arabia; 2017. 1–318 p. Available from: [https://www.moh.gov.sa/Ministry/About/Documents/MOH\\_ANNUAL\\_BOOKLET\\_2017\\_FINAL\\_\(1\).pdf](https://www.moh.gov.sa/Ministry/About/Documents/MOH_ANNUAL_BOOKLET_2017_FINAL_(1).pdf)
2. Saudi Central Board for Accreditation of Healthcare Institutions. National Standards for Home Healthcare Services. 2022.
3. Ministry of Health. Home Health Care Services [Internet]. Ministry of Health. 2022 [cited 2022 Nov 14]. Available from: <https://www.moh.gov.sa/en/awarenessplatform/Patientsrights/Pages/HomeHealthCare.aspx>
4. Houle S, MacKeigan L. Home care pharmacy practice in Canada: A cross-sectional survey of services provided, remuneration, barriers, and facilitators. *Can J Hosp Pharm*. 2017;70(4):294–300.
5. Triller DM. Home care pharmacy: Extending clinical pharmacy. *Am J Heal Pharm*. 2000;57:1326–31.
6. Reidt S, Morgan J, Larson T, Blade MA. The role of a pharmacist on the home care team: A collaborative model between a college of pharmacy and a Visiting Nurse Agency. *Home Healthcare Nurse*. 2013;31(2):80–7.
7. Debavalya U, Moolasarn S, Orossarum J, Samangri K, Yenwijitsopa A, Jaipen P. The Impacts of Home Care Pharmacy Services in Diabetic Patients. *Thai J Hosp Pharm [Internet]*. 2008;18(1):39–51. Available from: <file:///C:/Users/BIGGY/Downloads/No1Vol18P039-051.pdf>
8. Meyer-Masseti C, Meier CR, Guglielmo BJ. The scope of drug-related problems in the home care setting. *Int J Clin Pharm [Internet]*. 2018;40(2):325–34. Available from: <https://doi.org/10.1007/s11096-017-0581-9>
9. Boles N, Gowac A. The Role of the Pharmacist in Home Healthcare. *Home Health now*. 2017;35(1).
10. Almoajel A, Al-Salem A, LA-G-AJ of, 2016 undefined. The Quality of Home Healthcare Service in Riyadh/Saudi Arabia. *AjcsLeena-LunaCoJp [Internet]*. 2016;5(2). Available from: [http://www.ajcs.leena-luna.co.jp/AJSCPDFs/Vol.5\(2\)/AJSC2016\(5.2-08\).pdf](http://www.ajcs.leena-luna.co.jp/AJSCPDFs/Vol.5(2)/AJSC2016(5.2-08).pdf)
11. Tuffaha LHN and H. Health care and pharmacy practice in Jordan. *Can J Hosp Pharm*. 2017;70(2):150–5.
12. Shannon L. Reidt, Tom A. Larson, Ronald S. Hadsall, Donald L. Uden, Mary Ann Blade RB. Integrating a Pharmacist Into a Home Healthcare Agency Care Model. *Home Healthcare Nurse*. 2014;32(3):146–52.
13. Abbott RA, Moore DA, Rogers M, Bethel A, Stein K, Coon JT. Effectiveness of pharmacist home visits for individuals at risk of medication-related problems: A systematic review and meta-analysis of randomized controlled trials. *BMC Health Serv Res*. 2020;20(1).
14. MacKeigan LD, Nissen LM. Clinical pharmacy services in the home. *Dis Manag Heal Outcomes*. 2008;16(4):227–44.
15. Loh Yik Hin, Wong Kirk ChuanTham Weng Yew, Yim Sau Kit AYH. Guidelines for Home Care. 2015.
16. Charan J, Biswas T. How to calculate sample size for different study designs in medical research? Vol. 35, *Indian Journal of Psychological Medicine*. 2013. p. 121–6.
17. Pourhoseingholi MA, Vahedi M, Rahimzadeh M. Sample size calculation in medical studies. *Gastroenterol Hepatol from Bed to Bench*. 2013;6(1):14–7.
18. G.Ezhumalai. How big a sample do I need require. *Ann SBV*. 2017;6(1):39–41.
19. Johnson TP, Wislar JS. Response rates and nonresponse errors in surveys [Internet]. Vol. 307, *JAMA - Journal of the American Medical Association*. 2012. p. 1805–6. Available from: [http://www.aapor.org/Standard\\_Definitions2.htm](http://www.aapor.org/Standard_Definitions2.htm).
20. Erik von Elm, Douglas G. Altman, Matthias Egger, Stuart J. Pocock, Peter C. Gøtzsche JPV. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for Reporting Observational Studies. *PLoS Med [Internet]*. 2007;4(10):1623–7. Available from: <http://www.epidem.com/>
21. Von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies [Internet]. Vol. 370, *www.thelancet.com*. 2007. Available from: [www.plosmedicine.org](http://www.plosmedicine.org)
22. Liao D, Valliant R. Variance inflation factors in the analysis of complex survey data. *Surv Methodol*. 2012;38(1):53–62.
23. Akinwande MO, Dikko HG, Samson A. Variance Inflation Factor: As a Condition for the Inclusion of Suppressor Variable(s) in Regression Analysis. *Open J Stat*. 2015;05(07):754–67.
24. Thompson CG, Kim RS, Aloe AM, Becker BJ. Extracting the Variance Inflation Factor and Other Multicollinearity Diagnostics from Typical Regression Results. *Basic Appl Soc Psych*. 2017;39(2):81–90.
25. Pharmaceutical Services Programme Ministry of Health Malaysia. HOME CARE PHARMACY SERVICES PROTOCOL. 2019.
26. Ganther JM. Third-party reimbursement for pharmacist services: why has it been so difficult to obtain, and is it really the answer for pharmacy? Vol. 42, *Journal of the American Pharmaceutical Association (Washington, D.C.: 1996)*. 2002. p. 875–9.
27. Scorecard IO. Home healthcare investment opportunity scorecard healthcare and life sciences. 2021.