

# The Home Care Clinical Pharmacy Practice in Saudi Arabia

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## ABSTRACT

**Objectives:** To demonstrate the clinical pharmacy in home health care services in Saudi Arabia. **Methods:** It analyzes a cross-sectional survey discussing home care clinical pharmacy practice in Saudi Arabia. The survey consisted of respondents' demographic information about the workforce's pharmacists, Pharmacotherapy classes utilization for home healthcare patients, and therapeutic guidelines implemented in 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 home care clinical pharmacy practice 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 ( $p=0.000$ ). Most responders stated that pharmacy home healthcare workforces were five or more clinical pharmacists (35.14-41.89%) and full-time pharmacy staff providing home health pharmacy services. Besides, five or more pharmacists (30.89-52.57%) and five or more pharmacy technicians (31.25-51.09%) with statistically significant differences between all workforce numbers ( $p=0.000$ ). Most medications reviewed or dispensed for home healthcare patients include Nutrition support (4.50) and Vitamins and mineral supplements (4.49). They were followed by NSAIDs or Pain killers (4.46) and Antibiotics (4.45), with statistically significant differences between all answers ( $p=0.000$ ). The average score of therapeutic guidelines implemented in Home healthcare Pharmacy services was (4.29). The element "The standard considerations of urology disease therapy guidelines" obtained the highest score (4.44). The element "The standard considerations of acute and chronic kidney disease therapy among geriatric patients" was (4.41), and the aspect "The concerns and management of Gastrointestinal therapeutic guidelines" was (4.38). **Conclusion:** Nutrition support and vitamin were most used as pharmacotherapy classes for home healthcare services. The urology and nephrology therapeutic guidelines were most implemented. Future research is needed to determine most home care clinical pharmacy services and identify the role of clinical practitioners in home health care services in Saudi Arabia.

**Keywords:** Clinical, Pharmacy, Practice, Home Healthcare, Services, Saudi Arabia.

## INTRODUCTION

Drug-related problems have been a crucial topic discussed in the litterateur for a long time and are up-to-date.<sup>[1-8]</sup> The American Society of Health system pharmacists considers an essential part of pharmaceutical care services.<sup>[9,10]</sup> Generally, drug-related problems might cause a bad prognosis and economic burden on the healthcare system locally or internationally for regular patients.<sup>[11,2,6-8,11,12]</sup> However, drug-related problems doubled or tripled in percentages during home healthcare.<sup>[13]</sup> Therefore, the preventive measure of total quality management, drug therapy guidelines, and involvement of clinical pharmacy services is highly suggested.<sup>[14-16]</sup> The Saudi Center for Healthcare Institutions Accreditation (CBAHI) released the quality practice standard of home healthcare.<sup>[17]</sup> All healthcare institutions should

implement those standards emphasizing medication safety regulations.<sup>[17]</sup> Some health organizations implemented drug therapy guidelines for home healthcare services. However, the clinical pharmacist's role in home healthcare is not well established locally.<sup>[14-16]</sup> Various studies discussed the role and clinical benefits of clinical pharmacy services at home healthcare services.<sup>[18-23]</sup> It can prevent or decrease drug-related complications and patient's compliance with medications. Besides, avoid the unnecessary cost of healthcare systems.<sup>[24-28]</sup> Few studies on clinical pharmacy services in home healthcare have been conducted locally or in Gulf and Arabic countries.<sup>[13,15,17,29-38]</sup> The current research aims to determine the clinical pharmacy services emphasized by drug therapy guidelines and related medications at home healthcare services in Saudi Arabia.

## METHODS

The study analyzed a cross-sectional survey that discussed the home care clinical pharmacy 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 the workforce's pharmacists, Pharmacotherapy classes utilization for home healthcare patients, and therapeutic guidelines implemented in Home Healthcare Pharmacy services.<sup>[13,15,17,29-38]</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 a drop-out rate 10%. As a result, the sample size will equal 380-420 with a power of study of 80%.<sup>[39-41]</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 home care clinical pharmacy practice 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. It included a description and frequency analysis, good of fitness analysis, and correlation analysis. Furthermore, an inferential analysis of factors influencing pharmacist practice in-home care and clinical pharmacy services using linear regression was performed. The STROBE (Strengthening the reporting of observational studies in epidemiology statement: guidelines for reporting observational studies) guided the reporting of the current study.<sup>[43,44]</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).

Most responders stated that pharmacy home healthcare workforces had five or more clinical pharmacists (35.14-41.89%). The entire time the pharmacy staff provides home health pharmacy services, five or more pharmacists (30.89-52.57%) and five or more pharmacy

**Table 1: Demographic, social information.**

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		p-value (X2)
Male	195	49.74%		0.920
Female	197	50.26%		
Answered question	392			
Skipped question	1			
Age	Response Count	Response Percent	p-value (X2)	
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			

Table 2: Demographic, social information.			
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 experiencing a 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		

technicians (31.25-51.09%) with statistically significant differences between all workforces numbers ( $p=0.000$ ) (Table 3).

Most medications reviewed or dispensed for home healthcare patients were Nutrition support (4.50) and Vitamins and mineral supplements (4.49). It was followed by NSAIDs or Pain killer (4.46) and Antibiotics (4.45), with statistically significant differences between all answers ( $p=0.000$ ) (Table 4). The average score of therapeutic guidelines implemented in Home healthcare Pharmacy services was (4.29). The element "The standard considerations of urology disease therapy guidelines" obtained the highest score (4.44). The element "The standard considerations of acute and chronic kidney disease therapy among geriatric patients" was (4.41), and the aspect "The concerns and management of Gastrointestinal therapeutic guidelines" was (4.38). In contrast, the lowest score was obtained for the element "The mental and psychiatric therapeutic guidelines" (4.10). The score for the element "The immunization and vaccinations guidelines" was (4.14). For the element "Pain management and palliative care guidelines," it was (4.22), with a statistically significant difference between the responses ( $p<0.001$ ). All aspects of the practice of therapeutic guidelines implemented in Home Healthcare Pharmacy services were statistically significant between responses ( $p<0.000$ ) (Table 5). The score for single-test reliability analysis of McDonald's  $\omega$  was 0.983, Cronbach's  $\alpha$  was 0.982, Gutmann's  $\lambda_2$  was 0.983, Gutmann's  $\lambda_6$  was 0.995, and Greater Lower Bound was 0.998 with statistically significant ( $p<0.05$ ).

### Factors affecting the Pharmacotherapy classes utilization for home healthcare patients

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. *Pharmacotherapy classes utilization for home healthcare patients* includes location, worksite, age (years), gender, experiences, position held, number of homecare prescriptions, and number of homecare patients. Five locations affected the *Pharmacotherapy classes utilization for home healthcare patients*. There are statistically significant differences between all regions ( $p=0.000$ ), with the highest score (4.4690) in the central area. Eleven worksites affected the *Pharmacotherapy classes utilization for home healthcare patients*. The MOH hospital showed the highest scores (3.8583) affected the *Pharmacotherapy classes utilization for home healthcare patients* with a statistically

**Table 3: Number of full-time pharmacy staff provide home health pharmacy services.**

	0		1		2		3		4		5		>5		Total	p-value (X2)
Clinical pharmacist	4.05%	15	2.70%	10	2.16%	8	1.62%	6	12.43%	46	41.89%	155	35.14%	130	370	0.000
Pharmacist	2.44%	9	3.79%	14	1.36%	5	3.25%	12	5.69%	21	52.57%	194	30.89%	114	369	0.000
Pharmacy technician	3.26%	12	1.90%	7	2.17%	8	2.99%	11	7.34%	27	31.25%	115	51.09%	188	368	0.000
<b>Answered</b>															<b>370</b>	
<b>Skipped</b>															<b>23</b>	

**Table 4: Pharmacotherapy classes utilization for home healthcare patients.**

No	Medications	Never		Rarely		Sometimes		Most of the time		Always		Total	Weighted Average	p-value (X2)
1	Antiplatelet	2.04%	8	1.53%	6	3.31%	13	39.69%	0.000	53.44%	210	393	4.41	0.000
2	Anti-seizure	2.80%	11	3.31%	13	3.31%	13	38.68%	152	51.91%	204	393	4.34	0.000
3	Anticoagulant	1.53%	6	0.51%	2	2.55%	10	44.90%	176	50.51%	198	392	4.42	0.000
4	NSAIDs or Pain killer	1.78%	7	1.53%	6	1.78%	7	38.93%	153	55.98%	220	393	4.46	0.000
5	Vitamins and mineral supplements	1.78%	7	0.00%	0	5.34%	21	32.82%	129	60.05%	236	393	4.49	0.000
6	Nutrition support	1.78%	7	1.27%	5	5.60%	22	27.74%	109	63.61%	250	393	4.50	0.000
7	Antineoplastic medications	4.17%	16	3.65%	14	9.64%	37	25.26%	97	57.29%	220	384	4.28	0.000
8	Anti-hepatitis medication	4.83%	19	3.31%	13	9.16%	36	21.63%	85	61.07%	240	393	4.31	0.000
9	Anesthesia medications	4.10%	16	2.82%	11	11.79%	46	17.95%	70	63.33%	247	390	4.34	0.000
10	Anti-thrombosis	2.81%	11	2.04%	8	7.40%	29	23.98%	94	63.78%	250	392	4.44	0.000
11	Anti-depressant	2.04%	8	4.59%	18	9.95%	39	22.45%	88	60.97%	239	392	4.36	0.000
12	Anti-Alzheimer's diseases	3.56%	14	2.29%	9	10.69%	42	18.58%	73	64.89%	255	393	4.39	0.000
13	Anti-psychotics	3.05%	12	2.04%	8	10.69%	42	21.12%	83	63.10%	248	393	4.39	0.000
14	Antibiotics	2.54%	10	3.31%	13	10.18%	40	15.01%	59	68.96%	271	393	4.45	0.000
15	Narcotics and control	4.33%	17	2.54%	10	12.21%	48	14.76%	58	66.16%	260	393	4.36	0.000
	<b>Answered</b>											<b>393</b>		
	<b>Skipped</b>											<b>0</b>		

significant difference between working sites ( $p=0.000$ ) with significance among all sites. The female (4.5025) were affected more than males (4.2895) by *Pharmacotherapy classes utilization for home healthcare patients*, with statistically significant between them ( $p=0.038$ ). The age of the responders affected the *Pharmacotherapy classes utilization for home healthcare*. Pharmacists aged 24-35 showed the highest score (4.4927), with a statistically significant difference between all age groups ( $p=0.000$ ). Five levels of work experience affected the *Pharmacotherapy classes utilization for home healthcare*. The lowest score (2.3222) 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 *Pharmacotherapy classes utilization for home healthcare*, with the highest score (4.4526) obtained for the pharmacy staff with a statistically significant difference between

all levels ( $p=0.000$ ). The number of home care prescriptions affected *Pharmacotherapy classes utilization for home healthcare*. The pharmacist did not know the number of prescriptions, or they can not specify, obtained the lowest scores (2.9867) with a statistically significant difference ( $p=0.000$ ). The number of home care patients affected by *Pharmacotherapy classes utilization for home healthcare*. The group of 4-6 patients daily obtained the lowest scores (3.0194) with a statistically significant difference ( $p=0.000$ ).

The relationship between the Pharmacotherapy classes utilization for home healthcare patients and factors such as location, worksite, age (years), gender, 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 ( $R=0.583$  with  $p=0.000$ ) between

the Pharmacotherapy classes utilization for home healthcare patients and its factors. Two out of eight were non-significant differences ( $p>0.05$ ). However, multiple regression analysis confirmed that three-factor (i.e., locations, age, and No homecare prescription) explained 33.8 %, 13.6%, and 48.9%, respectively of the negative relationship to the variation in perception, with a statistically significant difference ( $p=0.000$ ), ( $p=0.006$ ), ( $p=0.000$ ) respectively. Furthermore, the relationship was verified by the non-existence of multicollinearity with a variance inflation factor (VIF) of 1.249, 1.403, and 2.832, respectively less than three or five as a sufficient number of VIF.<sup>[20-22]</sup> Besides, three-factor (i.e., work site, position, and No homecare patients) explained 22.7 %, 17.3%, and 47.0 %, respectively 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. Furthermore, the relationship was verified by the non-



**Table 5: The types of therapeutic guidelines implemented in Home healthcare Pharmacy services.**

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)
		%	No	%	No	%	No	%	No	%	No			
1	Pain management and palliative care guidelines	2.61%	10	3.92%	15	11.23%	43	33.16%	127	49.09%	188	383	4.22	0.000
2	The mental and psychiatric therapeutic guidelines	3.32%	13	5.36%	21	3.57%	14	53.32%	209	34.44%	135	392	4.1	0.000
3	The immunization and vaccinations guidelines	2.81%	11	3.32%	13	6.63%	26	51.28%	201	35.97%	141	392	4.14	0.000
4	The medication devices used for the geriatric patient	3.56%	14	2.29%	9	3.82%	15	44.27%	174	46.06%	181	393	4.27	0.000
5	Total Parenteral Nutrition guidelines	4.34%	17	4.08%	16	2.81%	11	37.50%	147	51.28%	201	392	4.27	0.000
6	Enteral Nutrition guidelines	4.58%	18	3.56%	14	3.05%	12	40.97%	161	47.84%	188	393	4.24	0.000
7	The standard consideration of anti-stroke therapy among geriatric patients	2.54%	10	3.31%	13	3.82%	15	44.02%	173	46.31%	182	393	4.28	0.000
8	The concerns and management of Gastrointestinal therapeutic guidelines	2.81%	11	1.79%	7	7.14%	28	31.12%	122	57.14%	224	392	4.38	0.000
9	Dementia and Alzheimer's disease therapeutic guidelines	4.08%	16	5.36%	21	3.06%	12	25.26%	99	62.24%	244	392	4.36	0.000
10	The standard considerations of acute and chronic kidney disease therapy among geriatric patients	3.91%	15	5.47%	21	2.86%	11	21.09%	81	66.67%	256	384	4.41	0.000
11	The standard management of Parkinson's disease among geriatric patients	4.08%	16	5.87%	23	2.81%	11	23.98%	94	63.27%	248	392	4.36	0.000
12	The standard considerations of urology disease therapy guidelines	3.82%	15	3.05%	12	5.09%	20	21.12%	83	66.92%	263	393	4.44	0.000
13	The antibiotic guidelines	3.05%	12	2.80%	11	13.23%	52	22.65%	89	58.27%	229	393	4.3	0.000
14	Asthma therapeutic guidelines	3.05%	12	1.78%	7	14.50%	57	17.05%	67	63.61%	250	393	4.36	0.000
	<b>Answered</b>											<b>393</b>		
	<b>Skipped</b>											<b>0</b>		

existence of multicollinearity with a variance inflation factor (VIF) of 1.073, 1.123, and 2.796, respectively less than three or five as an adequate number of VIF (Table 6).<sup>[45-47]</sup>

### Factors affecting the therapeutic guidelines are implemented at the Home Healthcare Pharmacy services

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. *The therapeutic guidelines implemented by Home Healthcare Pharmacy services include location, worksite, age (years), gender, and experiences. Besides, the position held, number of homecare prescriptions, and number of homecare patients. Five locations that affect the therapeutic guidelines are implemented Home Healthcare Pharmacy services. There are statistically significant differences between all regions ( $p=0.000$ ), with the highest score*

(4.4808) in the central area. Eleven worksites affect the therapeutic guidelines implemented in Home Healthcare Pharmacy services. Fourteen worksites affect the *therapeutic guidelines implemented in Home Healthcare Pharmacy services*. The MOH hospital showed the highest scores (3.5776) affecting *therapeutic guidelines implemented in Home Healthcare Pharmacy services* with a statistically significant difference between working sites ( $p=0.000$ ) with significance among all sites.

Table 6: Multiple regression of Factors with the Pharmacotherapy classes utilization for home healthcare patients.

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	.583 b	.340	24.387	.000b	3.190	.499			6.390	.000	2.208	4.172		
					-.284	.039	-.338		-7.239	.000	-.361	-.207	.801	1.249
					.063	.012	.227		5.243	.000	.039	.087	.932	1.073
					-.235	.085	-.136		-2.750	.006	-.402	-.067	.713	1.403
					-.072	.089	-.041		-.807	.420	-.246	.103	.689	1.451
					-.001	.045	-.001		-.018	.986	-.090	.088	.688	1.453
					.379	.097	.173		3.898	.000	.188	.570	.890	1.123
					-.226	.033	-.489		-6.953	.000	-.290	-.162	.353	2.832
					.210	.031	.470		6.722	.000	.149	.271	.358	2.796

a. Dependent Variable: Pharmacotherapy classes utilization for home healthcare patients. Predictors: (Constant), Location, Age (years), Pharmacist gender, Position Held, Years of experience in a pharmacy career, No homecare prescription, and No homecare patients

Model	B	Bias	Std. Error	Sig. (2-tailed)	Bootstrap <sup>a</sup>			
					95% Confidence Interval			
					Lower	Upper		
1	(Constant)		3.190	.037	.641	.001	2.031	4.609
	Location		-.284	-.003	.068	.001	-.430	-.164
	Site of work		.063	.000	.016	.001	.032	.093
	Age (years)		-.235	.002	.101	.032	-.435	-.032
	Pharmacist gender		-.072	-.005	.110	.513	-.290	.141
	Years of experience in a pharmacy career		-.001	-.004	.065	.991	-.137	.124
	Position Held		.379	-.005	.113	.001	.145	.596
	No homecare prescription		-.226	-.002	.047	.001	-.322	-.136
	No homecare patients		.210	.003	.043	.001	.128	.297

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

Table 7: Multiple regression of Factors with the therapeutic guidelines are implemented in Home healthcare Pharmacy services.

Model	R	R Square	F	Sig.	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
					B	Std. Error	Beta	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	.595 b	.355	25.950	.000b	3.659	.433			8.457	.000	2.808	4.509		
					-.313	.034	-.426		-9.220	.000	-.380	-.247	.801	1.249
					.025	.010	.102		2.381	.018	.004	.045	.932	1.073
					-.292	.074	-.193		-3.947	.000	-.437	-.146	.713	1.403
					.033	.077	.021		.428	.669	-.118	.184	.689	1.451
					-.047	.039	-.060		-1.197	.232	-.124	.030	.688	1.453
					.341	.084	.177		4.042	.000	.175	.506	.890	1.123
					-.111	.028	-.274		-3.935	.000	-.166	-.056	.353	2.832
					.138	.027	.351		5.080	.000	.084	.191	.358	2.796

a. Dependent Variable: therapeutic guidelines implementation at home healthcare pharmacy services, Predictors: (Constant), Location, Age (years), Pharmacist gender, Position Held, Years of experience in a pharmacy career, No homecare prescription, and No homecare patients

Model	B	Bias	Std. Error	Sig. (2-tailed)	Bootstrap <sup>a</sup>	
					95% Confidence Interval	
					Lower	Upper
1	(Constant)		.703	.001	2.333	5.061
	Location	-.313	.053	.001	-.429	-.219
	Site of work	.025	.013	.054	-.002	.047
	Age (years)	-.292	.081	.001	-.456	-.145
	Pharmacist gender	.033	.092	.724	-.155	.200
	Years of experience in a pharmacy career	-.047	.062	.452	-.175	.075
	Position Held	.341	.149	.015	.076	.650
	No homecare prescription	-.111	.041	.010	-.191	-.029
	No homecare patients	.138	.034	.001	.068	.199

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

There are non-statistically significant differences between males and females that affect *Home healthcare pharmacy services implementation* ( $p=0.715$ ). The age of the responders affects the *therapeutic guidelines implemented in Home Healthcare Pharmacy services* with almost a non-statistically significant difference between all age groups ( $p=0.048$ ). Five levels of work experience affected the *therapeutic guidelines implemented in Home Healthcare Pharmacy services*. The lowest score (1.9921) 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 affect the *therapeutic guidelines implemented in Home Healthcare Pharmacy services*. The highest score (4.3575) was obtained for the pharmacy staff, with a statistically significant difference between all levels ( $p=0.000$ ). The number of home care prescriptions affected the therapeutic guidelines that Home Healthcare Pharmacy services implemented. The pharmacist did not know the number of prescriptions, or they could not specify it, and obtained the lowest scores (2.5071) with a statistically significant difference ( $p=0.000$ ). The number of home care patients affected the therapeutic guidelines that Home Healthcare Pharmacy services implemented. The group of 4-6 patients daily obtained the lowest scores (2.8750) with a statistically significant difference ( $p=0.000$ ).<sup>[20-22]</sup>

The relationship between the therapeutic guidelines implemented in Home Healthcare Pharmacy services and factors such as location, worksite, age (years), gender, 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 ( $R=0.595$  with  $p=0.000$ ) between the therapeutic guidelines implemented in Home Healthcare Pharmacy services and its factors. Two out of eight were non-significant differences ( $p>0.05$ ). However, multiple regression analysis confirmed that three-factor (i.e., locations, age, and No homecare prescription) explained 42.6 %, 19.3%, and 27.4%, respectively of the negative relationship to the variation in perception, with a statistically significant difference ( $p=0.000$ ), ( $p=0.000$ ), ( $p=0.000$ ) respectively. Furthermore, the relationship was verified by the non-existence of multicollinearity with a variance inflation factor (VIF) of 1.249, 1.403, and 2.832, respectively less than three or five as a sufficient number of VIF.<sup>[20-22]</sup>

Besides, three-factor (i.e., work site, position, and No homecare patients) explained 10.2 %, 17.7%, and 35.1%, respectively of the positive relationship to the variation in perception, with

a statistically significant difference ( $p=0.018$ ) ( $p=0.000$ ), and ( $p=0.000$ ) respectively. Furthermore, the relationship was verified by the non-existence of multicollinearity 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 7).<sup>[45-47]</sup>

## DISCUSSION

Health home care services are mainly provided to bedridden geriatric patients.<sup>[17,34,48]</sup> Besides, disabled patients are those who are unable to move or visit the health care organization regularly.<sup>[17,34,48]</sup> Those types of patients suffer from various diseases such as diabetes, cardiovascular disease, thrombosis, malnutrition, dialysis and chronic renal failure, and cancer illnesses.<sup>[17,34,48]</sup> Those diseases need multiple services such as nutrition support, parental or enteral, anti-diabetes treatment, anticoagulant medication, cardiovascular therapy, pain management, palliative therapy, physical therapy, respiratory therapy-related medications, antibiotics, and vaccinations.<sup>[14,38,49]</sup>

There are also other common chronic systems, such as constipation or diarrhea. Therefore, the home care pharmacist should implement various drug therapy strategies and provide all highly recommended medications for those conditions. The current cross-sectional investigation through self electronic survey was distributed to all types of pharmacists with different experiences and positions. As a result, those demographic information characteristics may reflect the entire pharmacy society.

The study's findings showed that most medications dispensed to home care patients were nutrition support, vitamins, painkillers, and antibiotics. If the responders were working at the hospital and provided enteral or parental nutrition or antibiotics, that would be an appropriate answer.<sup>49</sup> Furthermore, suppose home care services are available for cancer patients. In that case, pain management will be a reasonable answer because the hospital pharmacy can prepare the nutrition support and might dispense the control and potent narcotic medications for cancer patients.<sup>50</sup> Moreover, if the responders work at community pharmacies, vitamins or painkillers might be appropriate answers because the common medications were dispensed, such as simple painkillers and vitamins at over-the-counter medications. Other medications that might be prescribed are anticoagulants for deep vein thrombosis and anti-psychotic or anti-Alzheimer medications for mental illness.<sup>50,51</sup>

All those medications are in high demand and badly needed for home care clinical pharmacy services. Therefore, the role of the home care clinical pharmacist is critical through pain

management medication and nutrition support, in addition to stewardship of antimicrobial or anticoagulation services and psychotic programs monitored by the clinical pharmacist.<sup>[50,52,53]</sup> The geriatric clinical pharmacist might provide excellent performance for home care pharmacy patients.<sup>[54-56]</sup>

Various factors might affect pharmacotherapy classes utilization at home care pharmacy services. The location and working site might be the most utilized, such as the central area and MOH hospitals, which are the most significant governmental part that provides home health care services. Thus, much used of various types of medications. Gender might affect the practice of utilizing with emphasis female gender that might primarily be working with home care pharmacy more than males. The rule of the utilization of pharmacotherapy class may be affected by age and position; with emphasis on the age 24-35 years and pharmacy staff position, they had the highest percentage of practice, which is appropriately the level of a pharmacist working at a home care pharmacy. In contrast, the new graduates with less than one year's experience had the lowest medication practice at home care pharmacy services. That's expected because they still do not have enough home care pharmacy experience. The higher number of patients and prescriptions affects medication utilization at home care pharmacy facilities. That's what's expected from the drug utilization picture in those situations. The working environment, pharmacist position, and the number of home care patients were the most reliable factors that positively influenced the use of pharmacotherapy classes. That's expected, as mentioned above. In the contract, other dependable factors that might negatively affect drug utilization were location, age, and the number of prescriptions. That's expected because the different number of healthcare organizations provide home health services, young generation had much work. Besides, the number of prescriptions might affect utilization, which is related to the number of medications per prescription.

The study's findings showed the average score of therapeutic guidelines at home care pharmacy was appropriate. The most therapeutic approach implemented was drug therapy for acute and chronic diseases. That's why some home care pharmacies provide services to kidney disease patients compared to most medications, such as cardiovascular drugs and vitamins. The other drug therapy guidelines were urology diseases therapy guidelines which were properly needed for bedridden patients and used urine catheters and might use some antibiotics for infection for them, which resemble what had been prescribed.



Besides, most drug therapy guides found about gastrointestinal diseases drug therapy, which needs for Gastrointestinal Tract (GIT) disorders such as constipation or diarrhea for bedridden patients. The home care pharmacy might dispense the appropriate medication, but it did not include the medication classes during the survey.

Moreover, other guidelines but at a lower percentage were implemented, such as drug therapy guidelines for psychiatric disorders, asthma, vaccines, and pain management.<sup>51</sup> All those guidelines are compatible with other drugs prescribed found in the study with lower percentages in the home care pharmacy setting. All previous guidelines highly recommended monitoring by clinical pharmacy services emphasizing geriatrics clinical pharmacy program at home care pharmacy services.<sup>115,31,36</sup> Thus, there is no previous investigation to compare with the current findings.

Various factors might influence the implementation of the therapeutic guidelines. The location and working site might affect the implementation emphasis of the central and MOH hospitals, which demand the guidelines due to the high number of home health care and the high number of prescribed medications. They need to follow therapeutic guidelines to prevent drug abuse or drug-related problems. Besides, to avoid additional unnecessary costs to home care pharmacy services. The lower experiences with less than one year might affect the therapies guidelines implemented which were expected because of background knowledge and low academic qualifications. The pharmacy staff position might highly affect the implementation of therapeutic guidelines because they're primarily working and facing all problems in drug therapy. Therefore, they can quickly implement at-home care pharmacy services. Finally, the number of patients and related prescriptions might affect the implementation of the therapeutic approach. The high number of patients and prescriptions are badly needed to organize appropriate treatment for the patient's condition. Therefore, the most dependable factors that positively affected therapeutic guidelines implementation were working sites, positions, and the number of home care patients. In contrast, other responsible factors negatively affect therapeutic approaches for home care pharmacy services, such as location, age, and the number of prescriptions patients, which were the same reasons mentioned above. Thus, there is no previous investigation to compare with the current findings.

## Limitations

The cross-sectional study explored very critical topics about home care clinical practice locally with high-reliability results and an appropriate calculated sample size. However, the study did not use random sampling techniques. As a result, there is no equal representation from all types of pharmacists, and the home care clinical pharmacy services did not cover all the current performances. Therefore, future studies with a wide range of home care clinical practices and using random sampling methodology are highly suggested.

## CONCLUSION

The home care clinical pharmacy Services emphasized pharmacotherapy classes used, and therapeutic guidelines implementation were clarified. The type of pharmacotherapy classes used is based on the healthcare organization Services provided to the home care patients. The medications mainly were nutrition support therapy and vitamins and minerals supplements. In addition, most home care sections implemented urology, nephrology, and gastrointestinal therapeutic guidelines. Various demographic factors might positively or negatively affect the pharmacotherapy classes and therapeutic guidelines implemented, such as location, working sites, ages, experiences, pharmacist positions, and the number of home care patients and related prescriptions. Therefore, the home care clinical pharmacy practice should be expanded and unified for all healthcare services. Besides, the cost analysis of home care clinical pharmacy and the role of home care clinical pharmacists must be clarified in Saudi Arabia.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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## Consent for Publications

Informed consent was obtained from all the participants

## 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; **CBAHI:** Saudi Center for Healthcare Institutions Accreditation, **SPSS:** Statistical Package of Social Sciences; **JASP:** Jeffery's Amazing Statistics Program; **STROBE:** Strengthening the reporting of observational studies in epidemiology statement; **GIT:** Gastrointestinal Tract.

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