

ORIGINAL ARTICLE

Perceptions of Clinical Pharmacy Services Among Medical Doctors and Nurses in a Tertiary Hospital in Kaduna State, Nigeria

Basira Kankia Lawal¹, Grace Dominic¹, Maryam Bala Muhammad¹, Umar Idris Ibrahim²

¹ Department of Clinical Pharmacy and Pharmacy Management, Kaduna State University, Kaduna, 800200, Nigeria

² Department of Clinical Pharmacy and Pharmacy Practice, Universiti Sultan Zainal Abidin, Besut Campus, 22020 Jerreh Malaysia

ABSTRACT

Introduction: Clinical pharmacy enhances medicine use, medication safety, and patient outcomes. However, its implementation in Nigerian hospitals remains limited due to low awareness and resource constraints. This study aimed to assess the attitudes and perceptions of medical doctors and nurses toward introducing clinical pharmacy services at Barau Dikko Teaching Hospital (BDTH), Kaduna, Nigeria. **Method:** A cross-sectional survey was conducted among medical doctors and nurses at BDTH. A paper-based questionnaire divided into three sections with an open comment area was used. Descriptive statistics and correlation analysis were performed to assess the relationship between years of post-qualification experience and respondents' attitudes. **Results:** Of the 230 participants, 82 (35.7%) were medical doctors, and 148 (64.3%) were nurses. The majority (93.7%) had a positive attitude toward the introduction of clinical pharmacy services and supported adding clinical pharmacists to the healthcare team. Years of post-qualification experience were negatively correlated with attitudes toward clinical pharmacy services ($r_s = -0.16$, $p = 0.013$). **Conclusion:** Medical doctors and nurses at BDTH generally support the introduction of clinical pharmacy services. Immediate measures should be taken to implement these services in BDTH and other hospitals. Interprofessional education should be encouraged to enhance collaboration and healthcare quality.

Malaysian Journal of Medicine and Health Sciences (2025) 21(6):1-6. doi:10.47836/mjmhs.v21.i6.1403

Keywords: Clinical pharmacy; Kaduna state; Interprofessional practice; Perceptions, Doctors and nurses

Corresponding Author:

Umar Idris Ibrahim, PhD

Email:umaribrahim@unisza.edu.my

Tel: +60194318566

INTRODUCTION

Ward-based clinical pharmacy services are common in the United States, Australia, and the United Kingdom (1). However, in many hospitals in Nigeria, the uptake of clinical pharmacy services is rather limited, and in places where services are rendered, there is a need for integration owing to disparities in clinical pharmacy services.

Clinical pharmacy services are an integral part of modern healthcare systems, aimed at optimizing medication therapy, improving patient outcomes, and

reducing healthcare costs. Globally, these services are well-established and widely implemented, particularly in developed countries like the United States, Australia, and the United Kingdom. For instance, in the United States, approximately 50% of hospitals provide ward-based clinical pharmacy services, and similar practices have been reported in over 60% of healthcare institutions in the United Kingdom (2,3).

In contrast, the development and implementation of clinical pharmacy services in Nigeria remain limited and fragmented. A 2021 study reported that less than 20% of Nigerian hospitals had integrated ward-based clinical pharmacy services, highlighting significant gaps in the availability and scope of these essential services (4).

As pharmacy has clinically evolved over the years, its

impact on healthcare outcomes has been discussed in many studies. Evidences from researches have shown that clinical pharmacy services provide significant reduction in adverse drug events, length of hospital stay and re admission, and other studies confirmed that clinical pharmacists' services contributed to a positive impact such as improved medication adherence, enhanced therapeutic outcomes, better management of complex treatment regimens, reduction in medication errors, and overall improvement in patient satisfaction and quality of life in oncology, cardiology, hematology, emergency and pediatric department (2-7).

The World Health Organization in 2010 stated that, the quality of pharmaceutical care offered to patients is dependent on the collaboration and interaction between various healthcare professionals, such as physicians, pharmacists, nurses, and other allied staff (8). Negative perceptions of the roles of clinical pharmacists such as doubts about their expertise in direct patient care, misconceptions that their responsibilities are limited to dispensing medications, or resistance from other healthcare professionals could hinder the provision of pharmaceutical care services (9). For example, in rural Sweden, physicians doubt the knowledge and clinical skills of clinical pharmacists (10), and in Iceland, pharmacists are not considered part of the healthcare team (11).

Approval for the inclusion of the consultant pharmacist cadre in 2019 into the scheme of service in Nigeria summed up the importance of pharmacists as medicine professionals within a functioning interdisciplinary healthcare team (4). However, Pharmacists are still perceived as drug dispensers by other healthcare professionals, also ineffective clinical training, and the lack of proper regulation are challenges to clinical pharmacists' responsibilities in Nigeria (12). Therefore, this study sought to obtain the perceptions of clinical pharmacy services among medical doctors and nurses in a tertiary hospital in Kaduna State, Nigeria.

MATERIALS AND METHODS

Study design and setting

A cross-sectional study was conducted among 230 medical doctors and nurses at Barau Dikko Teaching Hospital (BDTH), Kaduna, Nigeria.

Study population

The study population were all medical doctors (190) and nurses (378) practicing at BDTH. All undergraduate medical and nursing students were excluded from the study.

Sampling technique

Convenience sampling technique was used to meet the medical doctors as they gather for the departmental seminar/meeting. At the time of the study there were 190

medical doctors and 378 nurses at BDTH. As such, a total sampling technique was adopted for the study.

Data Collection

Data were collected using a paper-based questionnaire which was divided into three sections, plus an open comment section for additional remarks. The questionnaire used was adopted from a study conducted in Sri Lanka (13). The questionnaire sought to obtain the general perspectives of medical doctors and nurses on how the interprofessional management related to both patients and the healthcare team. Section A of the questionnaire asked for basic demographic information of the participants. Section B contains nine (9) questions that sought the opinions of medical doctors and nurses on the addition of clinical pharmacists in the healthcare team. It uses a five-point scale ranging from strongly disagree, disagree, no opinion, agree, and strongly agree. Section C contains eight (8) questions that asked about the roles of clinical pharmacists from the perspectives of medical doctors and nurses. It had two response options (Yes and No).

The study questionnaires were distributed to the participants during their departmental activities. Focal persons were identified from the various departments and specialties to aid in the distribution of the questionnaires.

Data Analysis

Data analysis was conducted using SPSS, version 21. Descriptive statistics were employed to summarize the characteristics of the study participants, as well as to assess medical doctors' and nurses' attitudes towards the inclusion of clinical pharmacy services. A positive attitude towards clinical pharmacy services was defined as providing a "yes" response to at least four out of the eight attitude items. Statistical significance was determined at a p-value of <0.05.

Ethical Consideration

This was obtained from the BDTH Ethics Committee (BDTH/MAC/GEN/134/VOL/1), and participants who agreed to complete the questionnaire provided consent for the study. All participants were assured of confidentiality.

RESULT

Socio-demographic Characteristics of Respondents

The frequency distributions of the respondents were as follows. 55 (23.9%) Males and 175 (76.1%) females participated in the survey; 35.7% (n=82) and 64.3% (n=148) were medical doctors and nurses, respectively. Based on age distribution, 90 (39.1%) respondents were between 20-30 years of age, 79 respondents representing 34.3% of the distribution were within 31-40 years, respondents between the ages of 41-50 years made up 17.8% (n=41) of the population, and 8.7% (n=20) are

within 51-60 years of age. Respondents' years of post-graduation experience were also measured. In which 103 respondents representing 44.8% had five to less than five years of experience. In addition, 58 (25.2%) respondents had 6-10 years of experience, 31(13.5%) respondents were in the category of 11-15years, while those with 16 to more than 25 years of experiences formed the least number of respondents. The socio-demographic characteristics of respondents is presented in Table I.

Table I: Socio-demographic characteristics of Respondents (n = 230)

Parameters	Category	Frequency	Percentage (%)
Gender	Male	55	23.9
	Female	175	76.1
Age	20-30	90	39.1
	31-40	79	34.3
	41-50	41	17.8
	51-60	20	8.7
Occupation	Medical doctor	82	35.7
	Nurse	148	64.3
Years of experience	0-5	103	44.8
	6-10	58	25.2
	11-15	31	13.5
	16-20	19	8.3
	21-25	9	3.9
	25 and above	10	4.3

Attitudes and perception of medical doctors and nurses regarding the addition of clinical pharmacist to the healthcare team

The majority of the respondents reported that having a clinical pharmacist added to the healthcare team is a good idea [n=216 (93.9%)], and [n=119 (51.7%)] of respondents disagreed with the statement that adding a pharmacist to the team is a waste of money and completely not necessary. Similarly, 199 (86.5%) of the respondents agreed that the current standards of care in public hospitals in Nigeria could be improved by introducing a clinical pharmacist to the team. Similarly, when asked about their happiness in welcoming the services of a competent clinical pharmacist to the team, 213(92.6%) agreed. More than half of the respondents (n=126, 54.8%) disagreed that pharmacists had no place to advise medical doctors and nurses about medicines, and 189 (82.2%) agreed that pharmacists can play an important role in tailoring drug therapy for individual patients. It can be seen that most of the study population had positive perception towards inclusion of clinical pharmacists in the health care team (Table II).

Table II: Attitudes and Perception of Medical doctors and Nurses regarding the addition of Clinical Pharmacist to the Healthcare Team

STATEMENTS	SD	D	N	A	SA
Adding a clinical pharmacist to the team is a good idea	9 [3.9 %]	4 [1.7 %]	1 [0.4 %]	106 [46.1 %]	110 [47.8 %]
Adding a pharmacist to the team is a waste of money and completely unnecessary	90 [39.1 %]	119 [51.7 %]	10 [4.3 %]	7 [3.0 %]	4 [1.7 %]
Current standard of care in public hospitals in Nigeria could improve by introducing clinical pharmacist to support the team	7 [3.0 %]	12 [5.2 %]	12 [5.2 %]	136 [59.1 %]	63 [27.4 %]
You would be happy to welcome the service of a competent clinical pharmacist to the team	3 [1.3 %]	8 [3.5 %]	6 [2.6 %]	143 [62.2 %]	70 [30.4 %]
Patients often do not understand the medicines and changes that have occurred in the hospital	13 [5.7 %]	29 [12.6 %]	20 [8.7 %]	125 [54.3 %]	43 [18.7 %]
Errors with medicines happen, but nothing is put in place to prevent the errors happening again	39 [17.0 %]	86 [37.4 %]	22 [9.6 %]	71 [30.9 %]	12 [5.2 %]
Pharmacists have no place in advising doctors or nurses about medicine	63 [27.4 %]	126 [54.8 %]	16 [7.0 %]	21 [9.1 %]	4 [1.7 %]
Pharmacists can play an important role in tailoring drug therapy for individual patients	9 [3.9 %]	14 [6.1 %]	18 [7.8 %]	131 [57.0 %]	58 [25.2 %]
Pharmacists can play an important role of improving patient's adherence to medication regimens	8 [3.5 %]	14 [6.1 %]	10 [4.3 %]	118 [51.3 %]	80 [34.8 %]

SD=strongly disagree, D=disagree, N=neutral, A= agreed, SA= strongly agree

Role of the Clinical Pharmacist from the Medical doctors' and Nurses' perspectives

Table III shows respondents' assessments of the roles of clinical pharmacists based on occupational perception. Medical doctors agreed more with the pharmacist's role in checking whether patients' allergies were documented as compared to the nurses, with a distribution of 76 (92.7%) and 133 (89.9%), respectively. Respondents also agreed that alerting prescribers to any drug interactions that may have been overlooked is also a pharmacist role, with the medical doctors agreeing the most with 80 (97.6%) and 135 (91.2%), respectively. Similarly, alerting the prescriber to any suspected adverse drug reactions, documenting, and providing assistance with

management where necessary was generally agreed to be a pharmacist role with medical doctors also agreeing the most 80 (97.6%) and 91.9 %. Similar trends were observed with the preceding questions on pharmacists' roles with the medical doctors and nurses agreeing as follows: Assisting staff with techniques in medicine administration (e.g., noting before or after food, how fast to administer an IV antibiotic 75 (91.5%) and 118 (79.7%), respectively, annotating the drug chart with any tips to minimize drug error (e.g., writing the generic name of the drug when brand has been prescribed 76 (92.7%) and 112 (82.4%), respectively, and ensuring that all changes to patients' therapy are intentional and not due to unintentional errors of 78 (95.1%) and 123 (83.1%), respectively. Respondents also agree that ensuring that all drugs and doses are safe and appropriate for a patient is a pharmacist role, but nurses have a greater percentage of views than medical doctors, 138 (93.2%) and 75 (91.5%), respectively.

Table III: Role of the Clinical Pharmacist from the Medical doctors' and Nurses' Perspectives

STATEMENTS	YES		NO	
	MD	RN	MD	RN
Checking whether patients' allergies are documented	76 [92.7%]	133 [89.9%]	6 [7.3%]	15 [10.1%]
Alerting the prescriber to any drug interaction that may have been overlooked	80 [97.6%]	135 [91.2%]	2 [2.4%]	13 [8.8%]
Alerting prescriber to any suspected adverse drug reactions, documenting and provide assistance with management where necessary	80 [97.6%]	136 [91%]	2 [2.4%]	12 [8.1%]
Teaching the patient or patient care giver on administration	74 [90.2%]	131 [88.5%]	8 [9.8%]	17 [11.5%]
Ensuring all drugs and doses are safe and appropriate for a patient	75 [91.5%]	138 [93.2%]	7 [8.5%]	9 [6.1%]
Assisting staff with administration techniques of medicines (e.g., noting before or after food, how fast to administer an IV antibiotics)	75 [91.5%]	118 [79.7%]	7 [8.5%]	30 [20.3%]
Annotating the drugs chart with any tips to minimize drug error (e.g., writing the generic names of the drugs when brand has been prescribed)	76 [92.7%]	112 [82.4%]	6 [7.3%]	26 [17.6%]
Ensuring that all changes to patient's therapy are intentional are not due to unintentional error	78 [95.1%]	123 [83.1%]	4 [4.9%]	25 [16.9%]

MD=medical doctors, RN=registered nurse.

Relationship between the years of post-graduation experience and mean attitude and perception of medical doctors and nurses regarding the addition of clinical pharmacists to the healthcare team

Table IV shows that the mean attitude and perception of medical doctors and nurses regarding the addition of clinical pharmacists to the healthcare team was negatively correlated with year of post-graduation experience, which was statistically significant (Correlation coefficient = -0.164; p-value = 0.013). This shows that as one variable increases by one unit, the other variable decreases which implies an inverse relationship. From the correlation output, coefficient of is significant at p-value = 0.013 < 0.05 therefore the study concludes that there is negative and significant relationship between respondents' attitude and perception regarding the addition of clinical Pharmacist to the Healthcare Team and their years of post-graduation experience.

Table IV: Correlation between the Years of Post-graduation Experience and Mean Attitude and Perception of Medical Doctors and Nurses Regarding the Addition of Clinical Pharmacists to the Healthcare Team

		Year of experience	
Mean perception	Correlation coefficient	-0.164	1.000
Spearman' rho correlation	Sig. (2-tailed)	.013	.
N		230	230

DISCUSSION

This study assessed the attitudes and perceptions of medical doctors and nurses at BDTH toward the inclusion of clinical pharmacy services in the healthcare team. The findings revealed overwhelmingly positive attitudes, with 93.7% of respondents expressing support for clinical pharmacy services. Most believed that including clinical pharmacists would enhance patient care and improve treatment outcomes, particularly through activities such as medication review, drug interaction checks, and adverse drug reaction management.

Interestingly, the study found that medical doctors were generally more supportive than nurses regarding specific clinical responsibilities of pharmacists. Doctors particularly endorsed roles like verifying patient allergies, identifying potential drug interactions, and managing adverse reactions, highlighting a recognition of pharmacists' specialized expertise in medication safety.

Another important finding was the negative correlation between years of post-qualification experience and attitude towards clinical pharmacy services ($r = -0.16$, $p = 0.013$). This suggests that younger healthcare professionals or those with fewer years of practice were more receptive to the inclusion of clinical pharmacists compared to their more experienced counterparts.

These findings align with similar studies globally. In Malaysia, Saudi Arabia, and Sri Lanka, healthcare professionals have shown similarly favorable attitudes toward the integration of clinical pharmacists into patient care teams (13, 14, 15, 16). A study in Ethiopia also reported that 85.71% of healthcare workers supported the inclusion of clinical pharmacists (17). These findings reflect a growing global recognition of the role of pharmacists beyond traditional dispensing functions.

Additionally, a study by Abdulwahab et al. (18) suggested that pharmacists with added clinical qualifications are better positioned to contribute meaningfully to patient care, a notion also supported by respondents in this study. Hayat et al. (19) emphasized the pharmacist's role in medication reconciliation, while others have highlighted their impact on improving medication adherence and quality of life in chronic disease patients (20, 21, 22).

Despite this general positivity, some skepticism remains. A minority of respondents expressed concerns, such as one nurse who remarked that "nurses are capable of doing their jobs without interference from pharmacists." This highlights a need for clearer role definitions and interprofessional education, especially where clinical pharmacy is newly introduced. Similar sentiments were reported in studies by Hatem et al. (23) and Crafford et al. (24), where resistance stemmed from unclear role boundaries and limited understanding of pharmacists' clinical contributions.

Our findings regarding more positive attitudes among younger professionals are consistent with Hatem et al. (23), who found that physicians with fewer years of experience were more open to the clinical role of pharmacists. This could be attributed to changes in professional training curricula, which may now place more emphasis on team-based care and collaborative practice.

While most participants acknowledged the potential of clinical pharmacy services to improve patient outcomes, they also emphasized the importance of competence. Some raised concerns about the readiness of pharmacists to take on clinical roles, which echoes the findings of Tegegn et al. (25), who noted challenges in pharmacists' clinical preparedness in low-resource settings.

CONCLUSION

The medical doctors and nurses of BDTH showed positive attitude, perceptions and expectations towards the inclusion of clinical pharmacy services in BDTH healthcare team. Furthermore; the findings from this study revealed that medical doctors and nurses in BDTH acknowledged the role of clinical pharmacists in hospital setting and how they form an integral part of

inter-professional health care team. They also showed willingness in cooperating with clinical pharmacists to improve therapeutic outcome. Therefore, new measures to extend clinical pharmacy services to all the hospitals in Kaduna state should be adopted. Further research particularly qualitative research should be conducted to express wider views and opinions of medical doctors and nurses from other hospitals on clinical pharmacy roles and services on patient care in Kaduna state.

ACKNOWLEDGEMENTS

The authors are highly grateful to all the participant for their participation in this study and their support in conducting the study.

REFERENCE

1. Makowsky MJ, Schindel TJ, Rosenthal M, Campbell K, Tsuyuki RT, Madill HM. Collaboration between pharmacists, physicians and nurse practitioners: a qualitative investigation of working relationships in the inpatient medical setting. *Journal of interprofessional care*. 2009; 23(2):169-84. doi.org/10.1080/13561820802602552.
2. Atkinson J. Advances in pharmacy practice: a look towards the future. *Pharmacy*. 2022; 10(5):125. doi.org/10.3390/pharmacy10050125.
3. Bond CA, Raehl CL, Franke T. Medication errors in United States hospitals. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*. 2001; 21(9):1023-36. doi.org/10.1592/phco.21.13.1023.34617.
4. Udoh A, Akpan M, Ibrahim UI, Lawal BK, Labaran KS, Ndem E, Amorha K, Matuluko A, Tikare O, Ohabunwa U, Kpokiri E. Clinical pharmacy services provided in public sector hospitals in Nigeria: a national survey. *International Journal of Pharmacy Practice*. 2021; 29(5):471-9. doi.org/10.1093/ijpp/riab046.
5. Farmer BM, Hayes BD, Rao R, Farrell N, Nelson L. The role of clinical pharmacists in the emergency department. *Journal of Medical Toxicology*. 2018; 14:114-6. doi.org/10.1007/s13181-017-0634-4.
6. Naserallallah LM, Hussain TA, Jaam M, Pawluk SA. Impact of pharmacist interventions on medication errors in hospitalized pediatric patients: a systematic review and meta-analysis. *International journal of clinical pharmacy*. 2020; 42(4):979-94. doi.org/10.1007/s11096-020-01034-z.
7. World Health Organization. Framework for action on interprofessional education and collaborative practice. World Health Organization; 2010 [2025 Feb 5]. Available from: <https://pubmed.ncbi.nlm.nih.gov/21174039/>.
8. Sun Q, Wan C, Xu Z, Huang Y, Xi X. Association of pharmaceutical care barriers and role ambiguity and role conflict of clinical pharmacists. *Frontiers in Pharmacology*. 2023; 14:1103255. doi.

- org/10.3389/fphar.2023.1103255.
9. Sjulander M, Gustafsson M, Gallego G. Doctors' and nurses' perceptions of a ward-based pharmacist in rural northern Sweden. *International Journal of Clinical Pharmacy*. 2017; 39:953-9. doi.org/10.1007/s11096-017-0488-5.
10. Blondal AB, Jonsson JS, Sporrang SK, Almarsdottir AB. General practitioners' perceptions of the current status and pharmacists' contribution to primary care in Iceland. *International journal of clinical pharmacy*. 2017; 39:945-52. doi.org/10.1007/s11096-017-0478-7.
11. Itua EO, Bature JT, Eruaga MA. Pharmacy practice standards and challenges in Nigeria: a comprehensive analysis. *International Medical Science Research Journal*. 2024; 4(3):295-304. doi.org/10.51594/imsrj.v4i3.921.
12. Shanika LG, Wijekoon CN, Jayamanne S, Coombes J, Coombes I, Mamunuwa N, Dawson AH, De Silva HA. Acceptance and attitudes of healthcare staff towards the introduction of clinical pharmacy service: a descriptive cross-sectional study from a tertiary care hospital in Sri Lanka. *BMC health services research*. 2017; 17:1-8. doi.org/10.1186/s12913-017-2001-1.
13. Chandrasekhar D, Mohanlal SP, Mathew AC, Hashik PM. Impact of clinical pharmacist managed patient counselling on the knowledge and adherence to antiepileptic drug therapy. *CEGH*. 2020 [2025 Feb 5]; 8(4):1242-7. Available from: <https://colab.ws/articles/10.1016%2Fj.cegh.2020.04.021>
14. Ching ML, Chin LH, Yin NW. Perceptions and expectations of doctors and nurses towards clinical pharmacy services in Tawau hospital. *Malaysian Journal of Pharmaceutical Sciences*. 2020;18(1):1-4. doi.org/10.21315/mjps2020.18.1.1.
15. Alsuhebany N, Alfehaid L, Almodaimagh H, Albekairy A, Alharbi S. Attitude and perception of physicians and nurses toward the role of clinical pharmacists in Riyadh, Saudi Arabia: a qualitative study. *SAGE open nursing*. 2019; 5:2377960819889769. doi.org/10.1177/2377960819889769.
16. Hambisa S, Abie A, Nureye D, Yimam M. Attitudes, opportunities, and challenges for clinical pharmacy services in Mizan-Tepi University Teaching Hospital, Southwest Ethiopia: Health Care Providers' Perspective. *Advances in Pharmacological and Pharmaceutical Sciences*. 2020; 2020(1):5415290. doi.org/10.1155/2020/5415290.
17. Abdulwahab AA, Shomuyiwa DO, Chukwuemeka N, Augustine AM, Abdulwasiiu MA, Chinecherem AE, Kolade UR, Awolola TO, Olawehinmi T, Adebisi YA, Hub PI. Challenges facing pharmaceutical care provision in Nigerian tertiary hospitals: A short review. *AIMS Medical Science*. 2022; 9(4):486-95. doi.org/10.3934/medsci.2022026.
18. Hayat K, Mustafa ZU, Godman B, Arshed M, Zhang J, Khan FU, Saleem F, Lambojon K, Li P, Feng Z, Fang Y. Perceptions, expectations, and experience of physicians about pharmacists and pharmaceutical care services in Pakistan: findings and implications. *Frontiers in Pharmacology*. 2021; 12:650137. doi.org/10.3389/fphar.2021.650137.
19. Ahmed S, Bridar SS, Ahmed A, Halcher S. Role of Clinical Pharmacist in Improving of Medication Adherence and Quality of Life in Chronic Disease Patients: A Brief Overview. *ASPS*. 2022 [2025 Feb 5]; 6(7). Available from: <https://actascientific.com/ASPS/ASPS-06-0884.php>.
20. Kabba JA, James PB, Hanson C, Chang J, Kitchen C, Jiang M, Yang C, Fang Y. Sierra Leonean doctors' perceptions and expectations of the role of pharmacists in hospitals: a national cross-sectional survey. *International journal of clinical pharmacy*. 2020; 42:1335-43. doi.org/10.1007/s11096-020-01096-z.
21. Ibrahim UI, Lawal BK, Awwal M, Ladan MM. Readiness for Interprofessional Education Among Health Profession Students at a Nigerian University: A Cross-sectional Study. *Education in Medicine Journal*. 2024;16(3):77-86. doi.org/10.21315/eimj2024.16.3.7.
22. Hatem NA, Yousuf SA, Mohamed Ibrahim MI, Al-Galal GS. Insights into participation in ward rounds in hospitals: A survey of clinical pharmacists' perceptions. *Journal of Pharmaceutical Policy and Practice*. 2024;17(1):2285957. doi.org/10.1080/20523211.2023.2285957.
23. Crafford L, Kusurkar RA, Bronkhorst E, Gous AG, Wouters A. Understanding of healthcare professionals towards the roles and competencies of clinical pharmacists in South Africa. *BMC health services research*. 2023;23(1):290. doi.org/10.1186/s12913-023-09222-z.
24. Tegegn HG, Abdela OA, Mekuria AB, Bhagavathula AS, Ayele AA. Challenges and opportunities of clinical pharmacy services in Ethiopia: a qualitative study from healthcare practitioners' perspective. *Pharmacy Practice (Granada)*. 2018;16(1). doi.org/10.18549/pharmpract.2018.01.1121.