

Implementation and Predictors of Pharmaceutical Care Practices for Chronic Disease Management among Community Pharmacists in Southern Nigeria.

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ABSTRACT

Background: Chronic non-communicable diseases constitute a major public health challenge, particularly in low- and middle-income countries where access to continuous, patient-centered care remains limited. Community pharmacists are strategically positioned to support chronic disease management through the delivery of pharmaceutical care services. This study evaluated the implementation of pharmaceutical care services for chronic disease management in community pharmacies in Southern Nigeria and identify factors associated with advanced pharmaceutical care practices.

Methods: A descriptive cross-sectional study was conducted among licensed community pharmacists practicing in registered community pharmacies in Uyo metropolis, Akwa Ibom State, Nigeria. Data were collected using a validated 66-item structured questionnaire assessing pharmaceutical care activities, professional confidence, and practice infrastructure. Descriptive statistics were used to summarize the data, while multivariable binary logistic regression was employed to identify factors associated with the implementation of advanced pharmaceutical care practices. Statistical significance was set at $p < 0.05$.

Results: A total of 153 pharmacists participated in the study. 26.1% maintained patient medical records, 35.9% routinely assessed medication adherence, 39.9% screened for concurrent herbal medicine use, and 11.8% assessed medication affordability. Pharmacists with postgraduate or fellowship qualifications were significantly more likely to assess medication adherence (adjusted odds ratio [AOR] = 5.84, 95% confidence interval [CI]: 2.61–13.08; $p < 0.001$) and screen for herbal medicine use (AOR = 3.42, 95% CI: 1.64–7.12; $p = 0.001$) than those with undergraduate qualifications. Years of professional practice were not significantly associated with implementation of advanced pharmaceutical care activities.

Conclusion: Despite high professional confidence among community pharmacists, implementation of comprehensive pharmaceutical care for chronic disease management remains limited by inadequate clinical documentation and follow-up practices. Strengthening postgraduate clinical training, improving documentation systems, and supporting policy initiatives that promote structured pharmaceutical care services may enhance the quality of chronic disease management in community pharmacies in Nigeria.

Keywords: Chronic disease management; Community pharmacy; Medication adherence; Pharmaceutical care; Southern Nigeria.

1. INTRODUCTION

Chronic non-communicable diseases (NCDs), including cardiovascular diseases, diabetes mellitus, chronic respiratory diseases, and cancers, are the leading causes of morbidity and mortality worldwide. According to the World Health Organization (WHO), NCDs account for approximately 74% of all global deaths, with nearly three-quarters of these deaths occurring in low- and middle-income countries (LMICs) [15]. The growing burden of chronic diseases continues to place considerable pressure on healthcare systems, highlighting the need for sustainable, patient-centered models of care. Effective management of chronic diseases extends beyond diagnosis and prescribing. It requires continuous monitoring, medication optimization, patient education, adherence support, and coordinated multidisciplinary care.

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Consequently, healthcare systems globally have increasingly recognized the need to integrate pharmaceutical care services into routine chronic disease management [4]. Pharmaceutical care has evolved into a fundamental component of contemporary pharmacy practice. Since its introduction by Hepler and Strand, it has shifted the pharmacist's role from product-oriented dispensing to patient-centered medication management aimed at optimizing therapeutic outcomes, preventing drug therapy problems, and improving patients' quality of life. Community pharmacists are uniquely positioned to provide these services because they are highly accessible healthcare professionals who frequently interact with patients requiring long-term pharmacotherapy [6, 13]. Evidence from systematic reviews has demonstrated that pharmacist-led interventions improve medication adherence, blood pressure control, glycaemic outcomes, asthma control, and overall quality of life among patients with chronic diseases [3, 9]. Consequently, the International Pharmaceutical Federation (FIP) and other professional organizations advocate greater integration of pharmaceutical care services into primary healthcare systems. [7]. In many LMICs, including Nigeria, community pharmacies often represent the first point of contact with the healthcare system. Their accessibility places community pharmacists in a strategic position to contribute to chronic disease prevention, medication optimization, patient education, adherence monitoring, and early identification of drug-related problems. However, implementation of comprehensive pharmaceutical care remains inconsistent because of barriers such as inadequate documentation systems, limited continuing professional development, insufficient workforce, poor collaboration with other healthcare professionals, and the absence of reimbursement mechanisms for cognitive pharmacy services [2, 12]. Nigeria is experiencing a rapid epidemiological transition, with increasing prevalence of hypertension, diabetes mellitus, and other chronic diseases. Although several Nigerian studies have explored pharmacists' knowledge, attitudes, and perceived barriers to pharmaceutical care [2, 10], relatively few have comprehensively evaluated the actual implementation of pharmaceutical care activities in routine community pharmacy practice using multivariable analytical approaches. Furthermore, evidence from Southern Nigeria remains limited, creating an important knowledge gap regarding the extent to which pharmaceutical care principles have been integrated into chronic disease management. This study was therefore undertaken to evaluate the implementation of pharmaceutical care services for chronic disease management among community pharmacists in Uyo metropolis, Southern Nigeria. Specifically, the study assessed patient assessment practices, medication counselling, follow-up activities, availability of pharmaceutical care infrastructure, and factors associated with the implementation of advanced pharmaceutical care services. The findings are expected to provide evidence that can inform pharmacy education, professional practice, and health policy aimed at strengthening the role of community pharmacists in chronic disease management.

2.0. MATERIALS AND METHODS

2.1 Materials

2.1.1 Study participants

The study population comprised licensed pharmacists practicing in registered community pharmacies within Uyo metropolis. The 153 eligible participants included superintendent pharmacists and pharmacists on duty who had at least six months of professional experience and were directly involved in patient care in 64 randomly selected community Pharmacies. Pharmacists who declined participation or were unavailable during the study period were excluded.

2.1.2 Questionnaire

The questionnaire was a structured 66-item self-administered questionnaire.

2.1.3 Statistical software

The IBM SPSS Statistics version 26.0 software was used for analysis

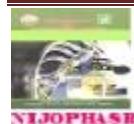
2.2 Methods

2.2.1 Study design

This study employed a descriptive cross-sectional survey design to evaluate the implementation of pharmaceutical care services for chronic disease management among community pharmacists in Uyo metropolis, Akwa Ibom State, Nigeria. The study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

2.2.2 Study setting

The study was conducted in registered community pharmacies located in Uyo metropolis, the capital of Akwa Ibom State, South-South Nigeria. Community pharmacies in the metropolis provide accessible primary healthcare services, including medication dispensing, patient counselling, and management of chronic diseases.



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2.2.3 Sampling procedure

At the time of the study, 77 registered community pharmacies operated within Uyo metropolis. The minimum sample size of pharmacies ($n = 64$) was determined using Slovin's formula with a 5% margin of error. 170 self-administered questionnaires were distributed across the randomly selected pharmacies, 153 duly completed questionnaires were returned by practicing pharmacists, corresponding to a response rate of 90.0%.

2.2.4 Questionnaire development

The self-administered questionnaire was developed from established pharmaceutical care frameworks and relevant literature. The instrument comprised sections assessing demographic and professional characteristics, pharmacy characteristics, implementation of pharmaceutical care activities, patient assessment and counselling practices, follow-up and monitoring activities, pharmacists' perceptions and professional confidence, and availability of pharmaceutical care infrastructure and monitoring devices.

2.2.5 Validation

Content validity was established by a multidisciplinary panel consisting of clinical pharmacists, public health researchers, and a psychometrician. The overall Scale Content Validity Index (S-CVI/Ave) was 0.91, indicating excellent content validity. Face validity was assessed among practicing community pharmacists, and minor revisions were made to improve clarity. A pilot study involving 15 pharmacists outside the study area confirmed the feasibility of the questionnaire. Internal consistency was assessed using Cronbach's alpha coefficients, which ranged from 0.81 to 0.89 across the questionnaire domains, indicating good to excellent reliability.

2.2.6 Data collection

Data were collected using the validated structured 66-item self-administered questionnaire from eligible informed consenting Pharmacists across the 64 selected community pharmacies. The participants completed the questionnaire anonymously and the completed questionnaires were checked for completeness before data entry.

2.3 Statistical Analysis

Data were analyzed using IBM SPSS version 26.0. Descriptive statistics summarized participants and pharmaceutical care practices, while Pearson's chi-square test assessed associations between categorical variables. Multivariable binary logistic regression was used to identify independent predictors of advanced pharmaceutical care implementation, adjusting for gender, qualification, years of practice, and pharmacy ownership. Results were presented as adjusted odds ratios (AORs) with 95% confidence intervals (CIs), with $p < 0.05$ considered statistically significant.

3. RESULTS

3.1 Demographic and Professional Profile of the Participants

A total of 153 community pharmacists participated in the study. Most respondents were aged between 21 and 40 years (68.0%). The cohort was composed mostly of early-to-mid career professionals. (Table 1)

Table 1: Demographic and professional profile of participants (N = 153)

Characteristic	Category	N	%
Gender	Male	77	50.3
	Female	76	49.7
Age Group (years)	21–30	52	34.0
	31–40	52	34.0
	41–50	43	28.1
	>50	6	3.9
Highest Qualification	Undergraduate (B.Pharm)	108	70.6
	Postgraduate/ Fellowship	45	29.4
Years of Practice	1–10 years	95	62.1
	>10 years	58	37.9

B.Pharm = Bachelor of Pharmacy.



3.2 Community Pharmacies Characteristics

Most participating pharmacies 62.5% were pharmacist-owned, while 37.5% were owned by non-pharmacists. Geographically, 93.7% were situated within residential areas while 6.3% were located in commercial area. Every facility surveyed (100%) were fully registered with Pharmacy Council of Nigeria (PCN) with current license. (Table 2)

Table 2: Community Pharmacies characteristics (N = 64)

Variable	Category	n	%
Ownership Configuration	Pharmacist-Owned	40	62.5
	Non-Pharmacist Owned	24	37.5
Geographic Location	Residential Area	60	93.7
	Commercial Center	4	6.3
PCN Registration Status	Permanent License	64	100.0
	Provisional License	0	0.0

PCN = Pharmacy Council of Nigeria

3.3 Pharmaceutical Care Practices

Routine implementation of basic pharmaceutical care activities was high. All respondents reported routinely identifying the medication recipient, assessing presenting symptoms, reviewing current medications, providing non-pharmacological advice where appropriate, and referring patients to physicians when necessary. Most pharmacists counselled patients regarding medication name, dosage, frequency of administration, adverse effects, storage conditions routinely and encouraged follow-up visits whereas, the implementation of advanced pharmaceutical care activities was considerably lower. (Table 3)

Table 3: Pharmaceutical care practices (N = 153)

Activity/Clinical Metric	Routine Execution (n)	Routine Execution (%)	Non-Routine/Omitted (n)	Non-Routine/Omitted (%)
Identification of medication recipient	153	100.0	0	0.0
Assessment of presenting symptoms	153	100.0	0	0.0
Review of current medications	153	100.0	0	0.0
Assessment of non-pharmacological management	153	100.0	0	0.0
Referral to physician when necessary	153	100.0	0	0.0
Systemic collection of patient age	76	49.7	77	50.3
Assessment of religious considerations	46	30.1	107	69.9
Evaluation of medication adherence	55	35.9	98	64.1
Assessment of herbal medicine use	61	39.9	92	60.1
Evaluation of medication affordability	18	11.8	135	88.2



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Discuss treatment duration	92	60.1	61	39.9
Collect patient contact for follow-up	46	30.1	107	69.9
Carryout home visits	46	30.1	107	69.1

3.4 Pharmacists' Perceptions and Professional Confidence

All respondents (100%) agreed that community pharmacists play an important role in chronic disease management and reported confidence in their ability to provide pharmaceutical care services.

3.5 Availability of Pharmaceutical Care Infrastructure

Private counselling areas, blood pressure monitoring devices, blood glucose meters, and asthma inhaler counselling services were available in all participating pharmacies. However, only 26.1% maintained functional patient medical record systems. Weight scales and digital thermometers were available in 39.9% and 30.1% of pharmacies, respectively.

3.6 Factors Associated with Advanced Pharmaceutical Care Implementation

Multivariable logistic regression identified postgraduate or fellowship qualification as an independent predictor of advanced pharmaceutical care implementation. Compared with pharmacists holding undergraduate qualifications, those with postgraduate training were significantly more likely to assess medication adherence (AOR = 5.84; 95% CI: 2.61–13.08; $p < 0.001$) and screen for concurrent herbal medicine use (AOR = 3.42; 95% CI: 1.64–7.12; $p = 0.001$). Years of professional experience, gender, and pharmacy ownership were not significantly associated with either outcome (Table 4).

Table 4: Logistic regression analysis (N = 153)

Predictor Variable	Evaluates Medication Adherence	P-value	Evaluates Herbal Medicine Use	P-value
	Adjusted OR (95% CI)		Adjusted OR (95% CI)	
Highest Qualification				
Undergraduate (B.Pharm)	1.00 (Reference)	—	1.00 (Reference)	—
Postgraduate/ Fellowship	5.84 (2.61–13.08)	< 0.001	3.42 (1.64–7.12)	0.001
Years of Practice				
1–10 Years	1.00 (Reference)	—	1.00 (Reference)	—
>10 Years	1.22 (0.54–2.76)	0.634	1.45 (0.68–3.09)	0.334
Pharmacy Ownership				
Non-Pharmacist Owned	1.00 (Reference)	—	1.00 (Reference)	—



Predictor Variable	Evaluates Medication Adherence		Evaluates Herbal Medicine Use	
Pharmacist-Owned	1.56 (0.72–3.38)	0.262	1.18 (0.57–2.44)	0.655
Gender				
Female	1.00 (Reference)	—	1.00 (Reference)	—
Male	0.94 (0.46–1.92)	0.864	0.88 (0.44–1.76)	0.718

OR = Odds Ratio; CI = Confidence Interval. *Statistically significant at $p \leq 0.001$. Model Diagnostics: Adherence Model (Nagelkerke $R^2 = 0.284$; Hosmer-Lemeshow $\chi^2 = 4.12$, $p = 0.846$). Herbal Model (Nagelkerke $R^2 = 0.198$; Hosmer-Lemeshow $\chi^2 = 6.33$, $p = 0.610$).

3.7 Bivariate Analysis

Bivariate analyses showed no significant association between years of professional experience and implementation of medication adherence assessment or herbal medicine screening. Conversely, pharmacists with postgraduate qualifications were significantly more likely to maintain patient medical records than those with undergraduate qualifications ($p < 0.001$)

4. DISCUSSION

This study evaluated the implementation of pharmaceutical care services for chronic disease management in community pharmacies in Southern Nigeria and identified factors associated with advanced pharmaceutical care practices. Although community pharmacists demonstrated high professional confidence and generally positive perceptions of their clinical role, important gaps were identified in the implementation of advanced pharmaceutical care activities, particularly in medication adherence assessment, documentation of patient care, medication affordability assessment, and longitudinal follow-up. These findings suggest that positive professional attitudes alone are insufficient to ensure consistent implementation of comprehensive pharmaceutical care. A major finding of this study is the complete saturation of professional confidence and perceived self-efficacy (100.0%) alongside low execution rates for advanced pharmaceutical care tasks. Every surveyed pharmacist expressed absolute confidence in their ability to manage chronic conditions. This pattern aligns with previous studies from Nigeria and other low- and middle-income countries, where pharmacists generally recognize their expanding role in chronic disease management [1, 8]. However, despite this positive perception, implementation of several key pharmaceutical care activities remained limited. This discrepancy between professional confidence and actual practice highlights the influence of organizational, educational, and structural barriers on service delivery. Similar observations have been reported in studies describing the gap between pharmacists' willingness to provide patient-centered care and the practical constraints encountered in routine community pharmacy practice [10]. One of the most important findings of this study is the low rate of patient documentation. Less than one-third of participating pharmacists maintained functional patient medical records, despite the universal availability of private counselling areas. This matches patterns seen across other sub-Saharan African countries but stands in stark contrast to developed nations where integrated electronic health (EHR) systems are standard practice [14]. Effective documentation is fundamental to continuity of care, medication review, and the monitoring of therapeutic outcomes. Limited documentation may reduce opportunities to identify medication-related problems and evaluate long-term treatment outcomes among patients with chronic diseases. The low adoption of patient medical record systems (26.1%) is a result of the high cost of EHR infrastructure and the absence of a regulatory mandate requiring structured longitudinal patient records for dispensing. Strengthening documentation systems, particularly through affordable electronic pharmaceutical care platforms, may substantially improve continuity of care within community pharmacy practice. The use of alternative medication or therapy is commonly high among Nigerian chronic disease patients [11]. In this study, it was seen that medication adherence assessment and screening for herbal medicine use were performed infrequently. Both activities are recognized as essential components of pharmaceutical care because they enable pharmacists to identify preventable causes of treatment failure, adverse drug reactions, and drug-herb interactions. Given the widespread use of complementary and herbal medicines in many African settings, integrating routine adherence assessment and herbal medicine screening into community pharmacy practice could improve medication safety and therapeutic outcomes. A concerning finding is the widespread neglect of financial variables during patient evaluations, with only 11.8% of the surveyed pharmacists routinely assessing the affordability



of prescribed medications. This trend aligns with similar observations from Ghana and Sudan, where community pharmacy practices remain highly clinical but structurally disconnected from the economic realities of their patients [5]. In Nigeria, where out-of-pocket healthcare expenditure remains high, medication cost can substantially influence adherence to long-term treatment. Incorporating affordability assessment into routine pharmaceutical care may enable pharmacists to recommend clinically appropriate and financially sustainable treatment options, thereby improving adherence and reducing avoidable treatment interruptions. A significant result of this study was that pharmacists with postgraduate or fellowship qualifications were significantly more likely to implement advanced pharmaceutical care activities than those holding undergraduate qualifications alone. This association remained statistically significant after adjustment for demographic and practice-related factors. These findings suggest that advanced clinical education may strengthen pharmacists' competence in patient assessment, documentation, and medication monitoring. Nevertheless, because of the cross-sectional design, causal relationships cannot be established, and longitudinal studies are required to determine whether advanced education directly improves practice outcomes. Notably, years of professional experience were not significantly associated with the implementation of advanced pharmaceutical care activities. This finding suggests that professional experience alone may not be sufficient to improve clinical practice without continuing professional development and structured postgraduate training. Investment in lifelong learning and competency-based education may therefore be necessary to strengthen pharmaceutical care delivery within community pharmacy settings. This study has several strengths. It included a relatively large sample of licensed community pharmacists, employed a validated and reliable questionnaire, and used multivariable logistic regression to identify independent predictors of pharmaceutical care implementation. These methodological strengths increase confidence in the robustness of the findings. However, several limitations should be acknowledged. First, the cross-sectional design precludes causal inference. Second, the use of self-reported data may have introduced recall and social desirability bias, potentially leading to an overestimation of pharmaceutical care practices. Third, the study was conducted in a single metropolitan area, which may limit the generalizability of the findings to rural settings and other regions of Nigeria. Future multicentre studies incorporating direct observation or simulated patient methodologies would provide a more comprehensive evaluation of pharmaceutical care practice. The findings highlight opportunities to strengthen pharmaceutical care delivery within Nigerian community pharmacies. Educational institutions should continue to strengthen patient-centered clinical training, while professional bodies and policymakers should promote continuing professional development, improve access to electronic documentation systems, and develop policies that recognize and support cognitive pharmaceutical care services. These measures may facilitate greater integration of community pharmacists into multidisciplinary chronic disease management programmes.

5 CONCLUSION

This study demonstrated that although community pharmacists in southern Nigeria possess high professional confidence and recognize their important role in chronic disease management, implementation of comprehensive pharmaceutical care remains suboptimal. Important gaps were identified in medication adherence assessment, patient documentation, affordability assessment, and structured follow-up. Postgraduate clinical training was independently associated with greater implementation of advanced pharmaceutical care activities, whereas years of professional experience alone were not. These findings highlight the importance of competency-based professional development in strengthening pharmaceutical care delivery. Improving access to structured documentation systems, promoting continuing professional education, and developing policies that support pharmacist-led cognitive services may enhance chronic disease management within community pharmacy practice. Further multicentre and longitudinal studies are recommended to evaluate the impact of these interventions on patient outcomes.

DECLARATIONS

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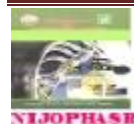
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Conflict of Interest

The authors declare that they have no competing interests that could have influenced this study

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Authors' Contributions

Udoh IE and Akwaowoh AE designed the study and drafted the manuscript. Nkanta EP distributed and retrieved the questionnaires and inputted the data. Akwaowoh AE analysed the data and Udoh IE reviewed and edited the manuscript. All authors read and approved of the final manuscript.

AI Disclosure.

The authors declare that Gemini was used to improve language and correct grammatical syntax, Quillbot was used to check plagiarism. The authors take full responsibility for the content and writing of this manuscript.

Ethical Approval

Ethical approval was granted by the University of Uyo Health Research Ethics Committee with reference number UU/CHS/IHREC/Vol.1/039 dated October 24, 2023. before. Participation was voluntary, written informed consent was obtained from all respondents, and confidentiality and anonymity were maintained throughout the study.

Informed consent.

All participants read, signed and returned the informed consent form that was designed according to HREC format

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