Original Research Article

Assessment of Knowledge and Competencies of Community Pharmacists for differentiated HIV Care and Services in Jos, Nigeria

ABSTRACT

Background: knowledge and competence of community pharmacists in HIV care, are essential for translating the goals of differentiated care into improved outcomes.
Aims: To assess the knowledge and competence of community pharmacists in Jos, for differentiated HIV care and services.
Study design: Cross-sectional questionnaire survey.
Place and Duration of Study: Community pharmacies in Jos North and Jos South local government areas of Plateau state, North-Central Nigeria, between September toand November, 2018.
Methodology: We included community pharmacists who responded to six items on knowledge of HIV therapeutics with each correct answer recording a score of 1 and zero for wrong answers. Respondents with a correct score of 5 or 6 represent good knowledge. We examined competence on a 36 item scale graded 1 for weak competence and 5 for strong competence. Factor analysis; reduce the 36 scale items down to competency domains. Frequencies and percentages for reported competencies were presented. In addition, aggregated scores for each of the competency domains were used to compare respondents based on years of experience, educational level and employment status in community pharmacy. All levels of significance were set at p≤ 0.05.
Results: 73 out of 110 community pharmacists responded to the questionnaire. Of these, only 25% reported good level of knowledge in HIV therapeutics. 69% reported strong competency in identifying drug therapy problems, 31% inter-professional and patient communication. There was statistically significant difference in competency domains based on years of practice experience and employment status<0.05. Rrespondents with 10 years or less, of practice experience recorded higher mean ranked scores compared to those with 11 or more years. Similarly, employed pharmacists recorded higher mean ranked scores than those who owned their business.
Conclusion: Overall**,** respondents reported low knowledge and weak competency in HIV care emphasizing the need for specialized training before implementation of differentiated care model.

Keywords: knowledge, community pharmacists, competence, differentiated care, knowledge, competence, community pharmacists, differentiated care, Nigeria.

1. INTRODUCTION

Remarkable success recorded in the prevention and treatment of infection with the human immunodeficiency virus (HIV) over the last two decades, is expected to be consolidated with the achievement of the UNAIDS 90-90-90 targets of diagnosing 90% of all HIV-positive persons, providing ART for 90% of those diagnosed, and achieving viral suppression for 90% of those treated by the year 2020; as an essential step towards ending the HIV/AIDS pandemic by the year 2030 [1,2]. Laudable as the 90-90-90 targets may be, it is believed that achievement of the goals of this strategy would significantly weaken health systems and impede the fight against the rising burden of non-communicable diseases (NCDs) in low-income countries (LICs) [3]. This underscores the imperatives of adopting community based models of HIV care and support services to enhance screening and treatment of new patients, as well as the early identification of patients lost to follow-up in a bit to retain more on treatment and improve overall clinical outcomes[4].

Comment [G1]: Expansion needed for the first time use of abbreviations.

The community pharmacy setting offers a ready structure for this innovative model of care by simplifying processes of obtaining antiretroviral drugs (ARVs) in a friendly and discrete environment especially because they open long into the evenings, weekends and holidays, which guarantee wider spread ~~and~~ access for the local population unlike services offered in public hospitals. Community ~~-~~based models of care for stable patients living with HIV adopt the principles of decentralization and task shifting designed to deliver antiretroviral therapy (ART) efficiently and encourage long-term retention of patients[5]. This model otherwise known as differentiated care for HIV reduces the extra burden on the overstretched workforce in the health systems of developing countries like Nigeria [6]. This model has been developed and tried in settings like the United Kingdom (UK) with very good success indices in terms of improving clinical outcomes. In the UK model, a group of patients indented as difficult to engage and retain in the traditional style of outpatient care due to complex health and social issues related to HIV infection, achieved excellent viral suppression and had better adherence with more patients retained on care after being enrolled for supervised administration of ARVs in the community pharmacy[7]. Using multi-dimensional community based approaches for delivering HIV treatment services closer to the people has shown promise in improving ART uptake, retention of patients in care and decongestion of public health facilities[6]. Hence, the World Health Organization (WHO) recommends this as a global strategy to end HIV/AIDS by year 2030[2]; particularly in developing countries with high burden of HIV. However, achieving this target depends a lot on the competencies of providers in these community based facilities.

A competence is the acquisition of sufficient knowledge, psychomotor, communication and decision-making skills and attitudes to enable the performance of actions and specific tasks to a defined level of proficiency. Competency statements have been ascribed as a method by which expectations of professional practice may be articulated, for the benefit of both the practitioners and the general public [8]. Whereas professional proficiency and productivity cannot be reduced to a series of observable or measurable activities contextualized by competency statements, such statements provide the template against which standards of practice may be developed and measured. This is applicable in the case of stepping down ART services to community pharmacies in view of the additional responsibilities of pharmacists' evolving clinical roles. With regards to integration of HIV care, models have been proposed for pharmacist beyond the general dispensing of ARVs. In this context, the actual services delivered by pharmacists in HIV care have been conceptualized to include: focusing on the patients as a whole, customizing interventions to individual patient circumstances, empowering patients to take responsibility for their own health care, collaborating with clinical and nonclinical providers to address patient needs and developing sustained relationships with patients[9]. A non-governmental program developed in Nigeria for the involvement of pharmacists and pharmacies in HIV care and support services beyond the efficient management of the ARV supply chain highlighted the positive contributions pharmacist in the community bring to the HIV care spectrum[8]. Although pharmacists have been recognized as having the potential to enhance HIV care outcomes, the training needs for knowledge and competency in these aspects of HIV care have long been identified[10]; such knowledge and competence are essential for translating the lofty ideals of task shifting and community base models of care into practical measurable indices of improved care outcomes. Therefore the objectives of the current study were to assess knowledge and competencies of community pharmacists on HIV care and services as a basis for integrating community pharmacies in the community friendly model of HIV care and services.

2. METHODS

Study Design and Population

This was a cross-sectional questionnaire survey of community pharmacists in Jos-North and Jos-South Local Government Areas of Plateau State, Nigeria. The two Local Government Areas make up the centre of Jos, the capital of Plateau State in North-Central Nigeria. According to the 2006 census figures of the Nigerian National Population Commission (NPC), the State has an estimated population above 3.2 million, with about 750,000 residing in the study area[11]. The city had 97 community pharmacies on registers of the Pharmacist Council of Nigeria (PCN) as at the first of July, 2018. This was the sampling frame used to identify and recruit participants for the study. Ethical clearance NHREC/21/05/05/00571 was obtained from the Bingham University Teaching Hospital, Jos, Nigeria. Respondents completed and returned written informed consents. All data collected were managed and stored confidentially. Only aggregated anonymous data were reported in this study to preserve respondents' confidentiality.

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The study questionnaire was developed through an iterative process of drafts and reviews by the research team, guided by the literature and in consultation with specialists and experts in HIV/AIDs care and services to ensure validity of the instrument. The final draft questionnaire consisted of four sections: the first was designed to elicit demographic characteristics of respondents, the second centred on competencies of community pharmacists for HIV care and services, the third focused on views and attitudes of community pharmacists regarding integration of community pharmacies for HIV care and services while the fourth section dealt with community pharmacists' knowledge of HIV pharmacotherapy. Only the sections on knowledge and competencies were reported in this paper. Community pharmacists were approached in their registered premises for data collection. Completed questionnaires were retrieved one week after administration with two follow-up visits at one weekly interval.

Data Analysis

Collected data were managed on the Statistical Package for Social Sciences (SPSS®) version 20. Simple descriptive statistics comprising frequencies and percentages were used to analyze demographic data. Aggregate scores were computed for the six knowledge items on HIV care. Each correct answer recorded a score of 1 with respondents achieving a minimum of 0 and a maximum of 6. Knowledge levels were conceptualized as poor for scores of 1-2, average for scores of 3-4 and good for scores of 5-6. Similarly, respondents were graded on a scale of 1, low to 5 excellent, on each of the 36 competency items. Competency levels were conceptualized as weak for scores of 1 to 3 and strong for scores of 4 and 5.

Reliability of the competency scale was determined using Cronbach's alpha for internal consistency, where a value above 0.7 was considered reliable. The 36 items of the competency scale were subjected to factor analysis to reduce the competency scale items into sub-domains of pharmaceutical care skills sets, using the principal component analysis (PCA). Prior to performing PCA, the suitability of data for factor analysis was assessed by inspection of the correlation matrix, the Kaiser-Meyer-Oklin measure of sampling adequacy and the Bartlett's test of sphericity. Aggregate scores were calculated for the performance of respondents on each of the competency domains.
We hypothesized that community pharmacists would score differently for each of the competency domains based on their years of experience in the community pharmacy, their level of education whether they had postgraduate or basic pharmacy degree and depending on whether they owned their business or they were employed in the community pharmacy. Nonparametric tests were used to compare the knowledge and competency of respondents based on hypothesized demographic characteristics, with all significance levels set at $p \leq 0.05$.

3. RESULTS

A total of 73 community pharmacists out of 110 responded to the questionnaire giving a response rate of 66.4%. Mean age of respondents was 37.7 ± 7.8 years. Majority of respondents had over ten (10) years work experience in community pharmacy. Slightly above 70% had only the minimum Bachelor of Pharmacy or Pharm.D qualification. A little above 40% owned their business as against less than 60% who were employed either as superintendent or locum pharmacists. Table 1 presents details of demographic characteristics

Table 1: Demographic Characteristics of Community Pharmacists (n= 73)

Characteristic	Frequency (n)	Percentage (%)
Sex		
Male	45	61.6
Female	28	38.4
Highest educational qualification		
B.Pharm.	50	69.4
PharmD	1	1.4
MSc/MPharm/MA	14	19.4
FPCPharm	6	8.3
PhD	1	1.4
Years of practice in community pharmacy		

0-5	17	23.3
6-10	23	31.5
11 Plus	32	45.2
Employment Status in community pharmacy		
Owner	31	42.5
Superintendent	26	35.6
Locum	16	21.9

Knowledge of HIV Pharmacotherapy

One quarter of community pharmacists in the study scored between 5 and 6 correct answers corresponding to good knowledge of HIV therapeutics, while less than 10 % scored 1 or 2 corresponding to poor knowledge Figure 1

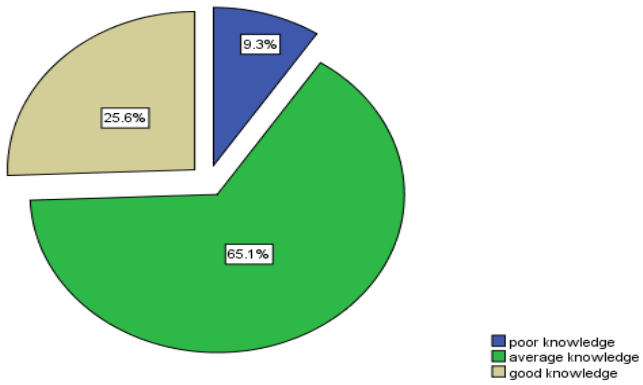

Figure 1: Community Pharmacist Level of Knowledge of HIV Therapeutics

Competencies of Community Pharmacists for HIV Care and Services

The study measured key pharmaceutical care competencies using a 36 items scale. Overall reliability for internal consistency of the scale was indicated by a Cronbach alpha value of 0.92. Ss uitability of the data for factor analysis was confirmed by results of KMO measure of sampling adequacy, which was 0.77 and Bartlett's test of Sphericity, which was significant at p=0.000. PCA reduced the 36 items of the competency scale into nine underlying domains that explained a total of 77% of the variance in the data. The derived competency domains were labeled based on the individual scale items with heavy loading on each component as shown in table 2: medication information and management, basic therapeutic principles, patient monitoring, inter-professional and patient communication, responsibility for pharmacotherapy, identification of drug therapy problems, empiric therapeutic decisions and using biomarkers to monitor therapy.

Comment [G2]: Expansion of the abbreviation needed on first time use.

Comment [G3]: Expansion of abbreviation needed.

149 **Table 2: Factor Loading of Competency Scale Items**

Competency domain	Loading of item
1. Medication Information and Management	
Capacity to retrieve biomedical literature	.826
Ability to identify credible and reliable biomedical literatures from data sources	.760
Ability to interpret, integrate relevant data to provide answers to questions	.725
Demonstrate knowledge in pathophysiology	.699
Demonstrate capacity for critical thinking, analysis, systhesis and evaluation of biomedical literatures	.678
Demonstrate knowledge in pathophysiology, epidemiology and risk factors of tropical diseases	.652
2. Patient Assessment	
Organize, interpret and analyze patient specific data	.865
Synthesize patient data to form assessment	.820
Develop and prioritize medical problem list	.629
Assess the pathogenesis, etiology, risk factors and medical complications	.624
Assess the appropriateness, effectiveness and choice of therapy	.612
3. Basic Therapeutic Principles	
Pharmacodynamics	.808
Pharmacokinetics	.744
Drug use in special conditions: pregnancy, paediatric, elderly and lactation	.632
Non-drug therapies	.627
Interpretation of laboratory results	.613
4. Patient Monitoring	
Interact with patients, family and other professionals to develop therapeutic relationship	.809
Review physical assessment	.641
Identify disease state, progression and complications; evaluate therapeutic efficacy and adverse drug reactions	.600
Define patients' goal of therapy, treatment objectives and targets	.560
Collect patients' specific data and identify drug therapy problems	.559
Identify preventive and health education strategies	.500
5. Inter-Professional and Patient Communication	
Identify possible patient education barriers	.844
Use appropriate method and presentation style to educate patients and other health professionals	.728
Conduct medication needs assessment of patients and other health professionals	.722
Document ADRs using appropriate format	.654
Document intervention, follow-up the patient and assess outcome	.518
Discuss therapeutic plan with colleagues and the physicians	.433
6. Responsibility for Pharmacotherapy	
Take responsibility for patients' medication needs	.772
Assess patients' adherence, barriers and facilitators of adherence	.760
Explore non-pharmacological measures including lifestyle and behavioural strategies	.575
7. Identifying Drug Therapy Problems	
Identify potential and actual drug therapy problem	.685
Identify contra-indications, drug interactions and strategies to resolve them	.674
8. Empiric Therapy Decision	
Herbal medicine	.764
Empiric antibiotic use	.600
9. Using Biomarkers to Monitor Therapy	.795

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 11 iterations.

Highest competency reported by community pharmacist was in the area of identifying drug therapy problems (69.0% strong competency) while the weakest competency reported was with regards to inter-professional and patient communication (31.4% strong competency). Details of reported competencies across the other domains are shown in Table 3.

Table 3: Aggregate Competency Scores of Community Pharmacists

Competency domain	**% reporting weak competency**	**% reporting strong competency**
Medication information and management	56.5	43.5
Patient assessment	56.5	43.5
Basic therapeutic principles	47.0	53.0
Patient monitoring	54.4	45.6
Inter-professional and patient communication	68.6	31.4
Responsibility for pharmacotherapy	33.8	66.2
Identifying drug therapy problems	31.0	69.0
Empiric therapeutic decisions	65.2	34.8
Using biomarkers in monitoring therapy	40.0	60.0

A comparison of the competency of respondents on the basis of years of experience, level of educational qualification and employment status in the community pharmacy showed mixed results. Kruskal-Wallis tests revealed statistically significant difference based on years of practice experience, for patient assessment competency (p=.000), basic therapeutic principles (p=0.03),identifying drug therapy problems (p=0.01), responsibility for pharmacotherapy (p=0.01), and using biomarkers in monitoring therapy (p=0.002).Post-hoc Mann-Whitney test showed that respondents with 0-5 years and those with 6-10 years of practice experience recorded higher mean ranked scores compared to respondents with 11 or more years of experience (Table 4). However, there was no statistical difference in scores of community pharmacists reported for medication information and management, inter-professional and patient communication as well as empiric therapeutic decision competency domains. Similarly, Kruskal-Wallis test was statistically significant for employment status in the pharmacy for competency domains of patient assessment (p=0.007) and patient monitoring (p=0,005). Post-hoc analysis revealed that the difference was in lower mean scores for owners compared with those of locum and superintendent pharmacists. In terms of educational qualification of community pharmacists, Mann-Whitney tests were not significantly different between those with the Bachelors of Pharmacy qualification compared with those that had additional postgraduate qualifications.

174 Table 4 Mean ranked scores of community pharmacist for competency domains based on years of
175 experience

Competency Domain	Work Experience (years)	N	Mean Rank	*p*-value
Patient assessment	0-5	19	30.97	0.00
	11 and above	25	16.06	
Basic therapeutics	0-5	17	24.53	0.06
	11 and above	23	17.52	
Patient monitoring	0-5	19	27.97	0.05
	11 and above	24	17.27	
Inter-professional and patient communication	0-5	19	26.18	0.10
	11 and above	25	19.70	
Responsibility for therapeutics	0-5	19	29.58	0.03
	11 and above	26	18.19	
Identifying drug therapy problems	0-5	19	28.58	0.01
	11 and above	26	18.92	
Empiric therapy decision	0-5	18	20.97	0.82
	11 and above	22	20.11	
Using Biomarkers to monitor therapy	0-5	19	27.95	0.01
	11 and above	25	18.36	
Medication information and management	0-5	19	26.87	0.05
	11 and above	25	19.18	
Patient assessment	6-10	20	28.75	0.01
	11 and above	25	18.40	
Basic therapeutics	6-10	21	27.26	0.02
	11 and above	23	18.15	
Patient monitoring	6-10	20	27.98	0,01
	11 and above	21	26.17	
Inter-professional and patient communication	6-10	25	21.26	0.22
	11 and above	25	19.70	
Responsibility for therapeutics	6-10	21	27.45	0,12
	11 and above	26	21.21	
Identifying drug therapy problems	6-10	21	29.60	0.01
	11 and above	26	19.48	
Empiric therapy decision	6-10	21	23.55	0.42
	11 and above	22	20.52	
Using Biomarkers to monitor therapy	6-10	21	29.90	0.00
	11 and above	25	18.12	
Medication information and management	06-10	20	27.03	0.06
	11 and above	25	19.78	

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DISCUSSION

Result of this study with regards to knowledge on HIV/AIDS pharmacotherapy differs from a similar study carried out in South-East Nigeria where community pharmacists showed high knowledge of HIV pharmacotherapy(12) but was similar findings of a study in India(13). This overall average level of knowledge may be attributed to a number of factors including the nature of community pharmacies being more business orientated. In this regard, the delivery of HIV care mainly through donor agency funded programs promotes an exemption policy that provides ARVs free of cost. Thus it is not profitable for community pharmacists to stock HIV/AIDs medication or even considered it necessary to expand their knowledge base in that area since they do not often encounter those patients. Furthermore, considering that majority of the respondents had only the basic undergraduate qualification, they would not have been exposed to postgraduate level opportunity for expanding their knowledge base on HIV/AIDS therapeutics. Knowledge is obtained, and clinical skills are developed through formal education and training programs, including Doctor of Pharmacy degree and postgraduate residency programs, lifelong learning, and continuing professional development. ACCP (2008) white paper on competencies indicates that clinical pharmacist competence is achieved when one possesses the knowledge, skills, and attitudes required to provide direct care to patients and to ensure rational medication use t(14).

Comment [G4]: Expansion needed.

Findings in our study confirmed the expertise of community pharmacists in identify drug therapy problems. This aligns with results of a Canadian study –which highlighted the important role community pharmacists play in HIV/AIDS care, including: selection of potent antiretroviral regimen, monitoring, managing drug-drug interactions, adherence, and prevention of development of resistance; as key components of identifying drug therapy problems(15). High competency reported in the area of identifying drug therapy problems is not surprising considering the traditional expertise of pharmacists in managing therapies. Additionally, the low level of competency reported in the area of patient assessment and monitoring may be attributed to the stated fact that HIV/AIDS care in Nigeria does not routinely occur in the community pharmacy setting. Hence, most community pharmacists are not likely to encounter this category of patients in their usual practice. A competency characterized by specialization, often with associated certification is an endorsement of the capacity to deliver quality professional services and treatment outcome (16). Continual learning of new knowledge is essential in developing competence and the enhancement of critical thinking and problem-solving skills through practice. It is argued that repetition is essential in the development of practice skills, and thus the average levels of performance vary depending upon the amount of patient care practice encountered(14). This was reflected in the fairly high report of competency in the basic principles of pharmacotherapy (application of pharmacokinetics, pharmacodynamics, non-drug management and provision of therapy in special conditions such as pregnancy, paediatric and elderly patients).

Our study results on the relationship between years of practice experience of community pharmacists and their scores on the competency domains could be explained by the fact that recently in Nigeria, there is a gradual evolution in the curriculum for pharmacy degree among Universities. The younger streams of pharmacists have an elaborate patient-centered clinical pharmacy program demonstrated in their higher competency scores compared with those of older graduates of pharmacy. However, it should be noted that competency and performance are not interchangeable terms. Whereas competency refers to what a professional can do, performance relates to what a professional actually does in practice, based on a variety of contingencies and mitigating factors(17). Thus, notwithstanding the higher competency scores of younger pharmacists, when it comes to actual performance, the experiences of older graduates may compensate especially with regards to making safe and rational choices in therapy. This would be beneficial for differentiated HIV care in community pharmacies since the physical isolation of community pharmacies away from other healthcare professionals demands that care provided in this setting should be done by professionals, who recognize their own limitations and can refer at the first signs of therapeutic misadventures

Our findings with regards to the influence of employment status on patient assessment and monitoring competencies may explained by the traditional business orientation of some sole proprietors whose focus is more on reimbursements and incentives rather than patient care. However, it is gladdening to know that where superintendents and locums are employed, they tend to focus more on the patient care

process. This is a positive development for the concept of differentiated care in HIV management. A critical component of improving national health care centers is the need to improve the safe and effective use of medications(18). The concept of medication information and the evolving role of the pharmacists in providing medication information is a fundamental responsibility of the pharmacists. The information may be patient specific which is presented as an integral part of pharmaceutical care (PC) or in the development of therapeutic guidelines and publishing newsletters(19). Our findings suggest that superintendent and locum pharmacists achieved higher mean ranked scores than the owners, for competencies in medication information and management. Note worthy is the fact that from the survey carried out, the educational qualification of the community pharmacists had no influence on their competencies. While it is logical to think that additional relevant qualification and certification could increase the knowledge and skills of professionals; our results indicated that less than 30% of respondents possessed higher qualifications than the bachelor of pharmacy. This finding agrees with results of a study conducted in Enugu, South-East Nigeria among community pharmacist to assess the impact of qualification on the provision of pharmaceutical care (PC) which revealed that though, provision of PC was not dependent on qualification, the quality and level of PC services provided by participants in their study reflect the level of qualification attained.

4. CONCLUSION

Overall, our study found an average level knowledge of HIV therapeutics among community pharmacists in Jos with the highest competency being that of identifying drug therapy problems and lowest competency in the area of inter-professional and patient communication. Thus community pharmacist in Jos would require additional training in HIV care related skill sets before meaningful integration of differentiated care for HIV/AIDs in community pharmacies.

COMPETING INTERESTS

All authors declare no competing interests.

Consent

No patients were used in the study. Community pharmacists were fully informed of the objectives of the study including the fact that aggregated and anonymized data collected in the study would be published.

ETHICAL APPROVAL (WHERE EVER APPLICABLE)

All authors hereby declare that the study was examined and approved by the ethics committee of Bingham University Teaching Hospital via ethical clearance ref: **NHREC/21/05/05/00571** (copy attached).

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