

# A cross-sectional evaluation of advanced pharmacy practice and specialisation among hospital pharmacists in a Nigerian tertiary health institution: trends, barriers and recommendations

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## Abstract

**Introduction:** Hospital pharmacy has evolved to include advanced roles such as medication therapy management, pharmacogenomics, and collaborative prescribing. Advanced pharmacy practice and specialisation (APPS) plays a crucial role in improving healthcare access, reducing costs, enhancing the quality of care, and achieving better patient outcomes. This study assessed the extent of APP and specialisation at the University of Abuja Teaching Hospital (UATH), identified key challenges, and proposed recommendations for improving APP in Nigeria

**Method:** This cross-sectional, mixed-methods study collected quantitative data through a self-administered online questionnaire, while qualitative data was collected through five interviews. Data were analysed using SPSS (v23) and inductive thematic analysis. Census sampling was employed, and ethical approval was granted by the UATH Ethical Review Board (UATH/HREC/PR/2024/0/9192).

**Results:** Of the 48 respondents, 79% expressed interest in specialisation, although only 37% had commenced residency training and 44% held advanced certifications. Engagement in advanced pharmacy practice was limited to 50%, and pharmacists lacked prescribing rights. Interest in specialisation was significantly influenced by qualification, with B.Pharm/M.Pharm holders showing greater interest ( $p=0.014$ ). Younger pharmacists expressed less interest in pursuing specialization. Motivations for pursuing specialisation included career advancement (54%), personal interest (50%), and improved patient care (40%). Qualitative data revealed that limited financial support, insufficient institutional support, and professional barriers such as the absence of a structured specialisation pathway, limited recognition of APP, and limited interprofessional collaboration were major obstacles.

**Conclusion:** Improving access to funding for specialisation training, implementing supportive policies such as the consultancy cadre, and increasing awareness and education on the value of APP are essential towards its wider adoption in Nigeria.

**Keywords:** pharmacists, advanced pharmacy practice, specialisation, hospital pharmacy, Nigeria, challenges, recommendations

## Introduction

Hospital pharmacy is a vital component of the healthcare system, focusing on the safe and effective use of medications within hospital settings. Hospital pharmacists play a crucial role in patient care, ensuring the proper selection, administration, and monitoring of drug therapy.<sup>1</sup> Over the years, hospital pharmacy practice has evolved from its traditional role of dispensing medications to more advanced functions, including medication therapy management, pharmacogenomics, and clinical pharmacotherapy.<sup>1</sup> The evolution of pharmacy practice has led to the development of advanced practice and specialisation.

Many countries have recognised the need for specialist pharmacists in various fields, such as oncology, critical care, and infectious diseases.<sup>2</sup>

However, the debate on specialisation continues with divided perspectives. Critics argue that expanding pharmacists' roles in medication management might lead to fragmented care if coordination is inadequate.<sup>3</sup> Recent concerns have also emerged regarding the economic implications of advanced pharmacy operations for patients.<sup>4</sup> Conversely, others see it as necessary for improving patient outcomes.<sup>2</sup> Advanced pharmacy practice is critical for enhancing patient care, reducing medication errors, and ensuring optimal therapeutic outcomes.<sup>5</sup> Specialised pharmacists contribute significantly to multidisciplinary healthcare teams, offering expert knowledge in medication management. In Nigeria, efforts have been made to incorporate advanced practice into hospital pharmacy, particularly through curricular reforms like the introduction of the Doctor of Pharmacy (PharmD.) degree,<sup>6</sup>

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and professional recognition initiatives for pharmacists with advanced practice certifications.<sup>7</sup> The primary means of achieving specialisation in Nigeria is through postgraduate training programmes. The West African Postgraduate College of Pharmacists (WAPCP) provides a structured pathway for specialisation, requiring a minimum of 3 years of practice before enrolment. The fellowship programme lasts for 5 years, leading to the recognition of fellows as specialised pharmacists.<sup>8</sup> Additionally, the approval and introduction of the PharmD. degree by the Pharmacy Council of Nigeria (PCN), the institution responsible for the regulation of pharmacy education and practice in Nigeria, offers a crucial curricular reform for pharmacy students to acquire advanced clinical skills to foster specialisation and advanced pharmacy practice.<sup>9</sup> Despite these developments, Nigeria still faces significant challenges in fully implementing specialised hospital pharmacy practice. Key barriers include workforce shortages, institutional resistance, financial constraints, and limited awareness among healthcare administrators.<sup>6</sup> These factors continue to impede the rollout of the consultancy cadre, a designation designed to recognise and formally integrate pharmacists with advanced training, a high level of pharmaceutical expertise, and extensive pharmacy skills and experience in patient care into clinical decision-making roles.<sup>10</sup> Unlike some other countries where pharmacists play an integral role in hospital clinical decision-making and prescribing, Nigeria is still in the initial stages of integrating specialised pharmacy roles into hospital practice. Globally, hospital pharmacy practice has advanced significantly, with specialised pharmacists actively participating in patient care teams.<sup>11</sup> Several research studies have examined advanced pharmacy practice and specialisation (APPS) trends in the United Kingdom,<sup>12</sup> the United States,<sup>2</sup> New Zealand, Australia, Japan, South Africa and Canada.<sup>11-14</sup> identifying both limitations and drivers. However no comparable research has been conducted in Nigeria. Hence, this research aims to assess the extent of APPS implementation at the University of Abuja Teaching Hospital (UATH), identify challenges hindering APPS, and provide contextually appropriate recommendations for improving advanced pharmacy practice in Nigeria.

The research setting, University of Abuja Teaching Hospital (UATH), represents a significant Nigerian healthcare institution located in Gwagwalada, Abuja, Federal Capital Territory.<sup>15</sup> The 520-bed teaching hospital (expandable to 800 beds) serves dual roles in healthcare provision and professional education for pharmacy and medical students.<sup>15</sup> UATH was selected as the research site due to its multiple specialised units presenting opportunities for APPS.

## Method

### *Study Design*

This cross-sectional, mixed-method study collected quantitative and qualitative data from hospital pharmacists in UATH. Data was collected over three weeks from 28 August to 17 September 2024. The data collection tool (questionnaire)

collected quantitative data using closed-ended questions, while qualitative data was collected through in-depth key-informant interviews with 5 senior members of staff with over 10 years of experience in hospital pharmacy. The data from the quantitative response was compared with that of the qualitative responses to identify areas of convergence or divergence.

### *Study Population*

The University of Abuja Teaching Hospital was chosen for this research because it is one of the largest tertiary health institutions in Abuja that provides specialised health services to patients, providing an opportunity for advanced pharmacy practice.

### *Inclusion and Exclusion Criteria*

The pharmacists included in this study were registered pharmacists with the Pharmacy Council of Nigeria (PCN) and were actively working as pharmacists with UATH. Non-hospital pharmacists, those practicing outside UATH or pharmacists on extended leave were excluded from this study.

### *Questionnaire Design*

The data collection process involved the use of a self-administered online semi-structured questionnaire. This validated survey instrument, which received approval from the Hospital's ethics committee, contained 17 items organised into four distinct sections. The questionnaire was structured to gather comprehensive information about various aspects of pharmacy practice. The first section focused on participant demographics through five targeted questions. The second section, also comprising five questions, examined trends in advanced hospital pharmacy training. Four questions in the third section explored advanced pharmacy practice, while the concluding section utilised three questions to identify factors that influence the development and implementation of advanced pharmacy practice.

### *Data Collection*

The quantitative data was collected online using Google Forms, and qualitative data was collected through interviews. The survey instrument was circulated through the hospital's pharmacy platform after an initial explanation of the research objectives and aim. To complement the quantitative data, qualitative information was obtained through in-depth interviews. These interviews focused on two key areas: the challenges faced in advanced pharmacy practice and training and recommendations for future improvements in the field.

### *Sampling and Sampling Size*

The study employed a census sampling approach to collect survey data from pharmacists employed at UATH. From a total of 56 pharmacists employed at UATH, 48 participated in the survey, yielding a response rate of 86%. For the qualitative component, pharmacists who had at least 10 years of experience and specialisation certification were interviewed.

All responses were anonymized, and informed consent was given by all participants before participating in the research.

### Data Analysis

Quantitative data was analysed using Statistical Package for Social Sciences (SPSS), version 23, by International Business Machines (IBM). Descriptive analysis was done to analyse frequencies in participants' responses, while the Pearson Chi-square test was done to assess if demographic information influenced participants' interest in advanced hospital pharmacy practice. Qualitative responses were analysed using inductive thematic analysis. Responses were first categorised into codes, and the codes were grouped into larger themes.

### Ethics

Ethical approval was obtained from the UATH Ethical Review Board with approval number UATH/HREC/PR/2024/0/9192. All participants provided informed consent before participation. Complete anonymity was maintained throughout the data collection and analysis process to protect participant privacy and confidentiality.

## RESULTS

### Quantitative Data Analysis

Of 56 employed pharmacists, 48 participated in the survey, yielding a response rate of 86%. Of the 48 respondents, 25 (52.1%) were male and 23 (47.9%) females. Most respondents, 21 (43.8%) were below 30 years, and 23 respondents (47.9%) had less than 5 years of experience. See Table 1 for additional demographic information.

**Table 1.** Demographic Factors

Demographic Factor	Number (n)	Percentage (%)
Gender		
Male	25	52.1
Female	23	47.9
Age		
Under 30 years	21	43.8
30-39 years	5	10.4
40-49 years	10	20.8
50 years and above	12	25
Highest Educational Qualification		
Bachelor of Pharmacy (B. Pharm)	30	62.5
Master's degree	13	27.1
Doctor of Pharmacy (PharmD.)	1	2.1
Others	4	8.3
Years of Experience		
0-5 years	23	47.9
6-10 years	3	6.3

Demographic Factor	Number (n)	Percentage (%)
11-15 years	7	14.6
16-20 years	5	10.4
21-25 years	5	10.4
26 -30 years	5	10.4
Pharmacy Unit		
EPU	7	14.6
Inpatient	7	14.6
NHIS Pharmacy	5	10.4
Theatre Pharmacy	5	10.4
Store	5	10.4
Accident and Emergency (Surgical)	4	8.3
Obstetrics and Gynaecology	4	8.3
Accident and Emergency (Medical)	4	8.3
Endocrine Unit	2	4.2
ENT	2	4.2
Antiretroviral Pharmacy	2	4.2
GOPD	1	2.1

Abbreviation: ENT – Ear, Nose and Throat; EPU – Emergency Paediatric Unit; NHIS -- National Health Insurance Scheme; GOPD – General Outpatient Department

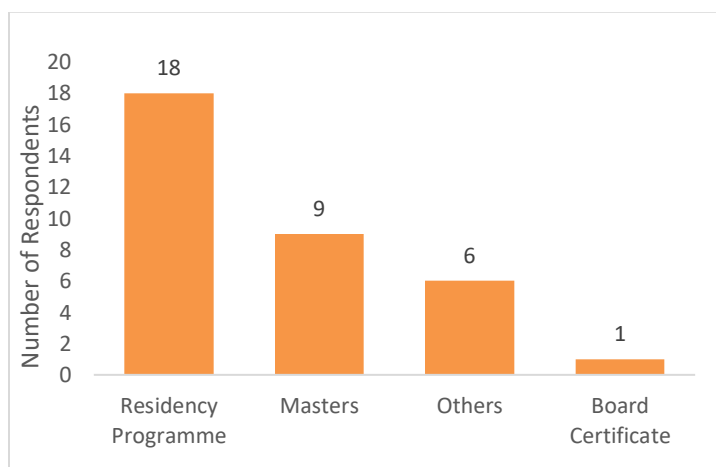
In the second survey section on advanced practice training and professional development, 38 (43.8%) respondents expressed interest in pursuing a specialisation in hospital pharmacy. Of these, 21 respondents had already engaged in training and certification relevant to this specialisation and 18 respondents had started their residency programme as indicated in Table 2.

The Chi-square test was used to determine whether demographic factors significantly influenced the desire to pursue specialisation and revealed no significant associations, except for the degree held by individuals. Specifically, a significant association was found ( $P = 0.014$ ) between the level of education and interest in pursuing specialization in hospital pharmacy practice, as presented in Table 3.

**Table 2.** Trends of education on advanced pharmacy practice and specialisation

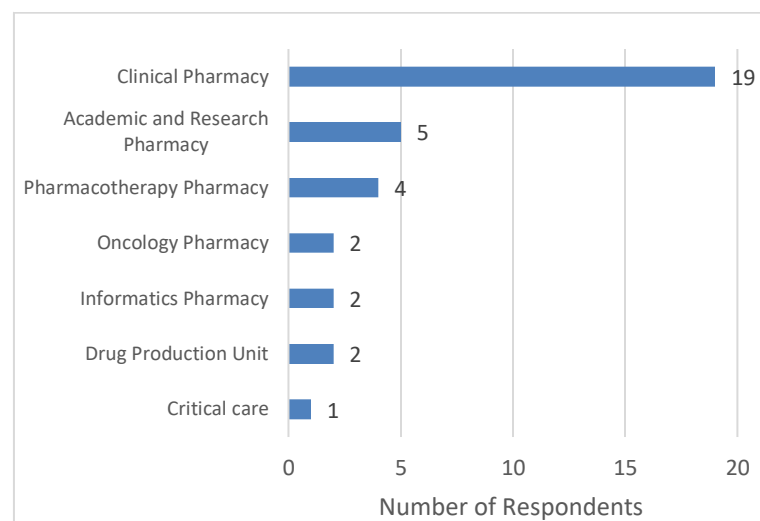
Question	Number (n)	Percentage (%)
Are you interested in pursuing a specialisation in hospital pharmacy practice?		
Yes	38	79.2
No	5	10.4
Maybe	5	10.4
Have you started a residency programme?		
Yes	18	37.5
No	30	62.5
If yes, how many years of residency have you done?		
< 1 year	2	4.2
1-3 years	10	20.8
3-6 years	4	8.4
>6 years	2	4.2
Have you taken any additional training or certification for your specialisation?		
Yes	21	43.8
No	27	56.3

The data in Figure 1 below shows that among the UATH pharmacists pursuing specialisation, the residency programme through the West African Postgraduate College of Pharmacists (WAPCP) was the most popular pathway, with 18 respondents choosing this route. Specialisation through a master's programme emerged as the second most sought-after option with 9 respondents.

**Figure 1.** Training on advanced pharmacy practice and specialisation

The third section of the questionnaire reported trends in advanced pharmacy practice. Half of the respondents, 24 (50%), indicated active engagement in one form of advanced practice. Conversely, 31 (64.6%) noted that pharmacists did not possess prescribing rights within the hospital. Additionally, 24 respondents (50%) indicated that the hospital does not offer adequate opportunities or policies to support advanced pharmacy practice, as illustrated in Figure 2.

The most common types of advanced practice reported were clinical pharmacy (19 respondents, 39.6%), academic and research pharmacy (5 respondents, 10.4%), and pharmacotherapy pharmacy (4 respondents, 8.3%), as illustrated in Figure 3.

**Figure 3.** Common areas of advanced pharmacy practice respondents are engaged in

The fourth section of the survey examined the common factors influencing the development and implementation of advanced pharmacy practice. Key motivations for pursuing specialisation included career advancement (26 respondents, 54.2%), personal interests (24 respondents, 50%), improved patient care (19 respondents, 39.6%), and job opportunities (10 respondents 20.8%). Additional factors that could impact specialisation trends included the availability of training programs (27 respondents, 56.3%), institutional support (19 respondents, 39.6%), government policies (19 respondents, 39.6%), financial incentives (17 respondents, 35.4%), and peer influence (11 respondents, 23%). The primary challenges identified in engaging with advanced pharmacy practice were high workload (15 respondents, 31.3%), lack of organisational support (14 respondents 29.2%), limited training opportunities (11 respondents, 23%), and financial constraints (10 respondents, 20.8%). This information is presented in Table 4.

**Table 4.** Factors that impact trend of Advanced Pharmacy Practice and Specialisation

Question	Number (n)	Percentage (%)
Motivation for Specialisation		
Career Advancement	26	54.2
Personal Interest	24	50
Improved Patient Care	19	39.6
Job opportunities	10	20.8
Mentor influence	6	12.5
Financial incentives	5	10.4
Factors influencing specialisation trend		
Availability of training programmes	27	56.3
Institutional support	19	39.6
Government policies	19	39.6
Financial incentives	17	35.4
Peer influence	11	23
Challenges in pursuing advanced pharmacy practice		
High workload	15	31.3
Lack of organisational support	14	29.2
Lack of training opportunities	11	23
Financial constraints	10	20.8

### Qualitative Data Analysis

The challenges associated with advanced pharmacy practice can be better understood through the lived experiences of pharmacists, as expressed during the interviews. Responses to the questions were categorised into challenges and recommendations and analysed thematically.

Regarding challenges, three themes from eight subthemes were identified: lack of financial support, inadequate institutional support, and professional limitations.

#### Lack of financial support

The lack of financial support theme emerged from two subthemes – lack of financial support from the hospital and lack of government funding for advanced pharmacy training and specialisation. This theme was mentioned as a major challenge.

Regarding the lack of financial support from the hospital, one of the participants had this to say:

*“The institution wants people to progress and develop but they do not have the financial resources to support them. 2-3 years*

*ago, the chief medical director budgeted only five million Naira [10,000 USD] for training for the whole hospital. So, you can imagine if you were to go for [WAPCP] fellowship, how much would it cost to travel for lectures and sit for exams, the budget [from the hospital] for training is so meagre...:”*  
Participant 1

Lastly, at the national level, the lack of government funding for training in APPS, and high out-of-pocket payment was also mentioned by a participant saying:

*“The Government is not funding advanced pharmacy practice and specialisation training programmes. It is a sad reality, but despite this limitation, people still go out of their way to make sure they develop themselves, paying out-of-pocket.”*  
Participant 5

#### Inadequate institutional support

There are three subthemes identified under the main theme of institutional challenges, which are inadequate organizational (hospital) support for professional specialisation, inadequate manpower, and limited implementation of the government policies.

A participant mentioned that the support of the hospital for professional specialisation was questionable.

*“The institution [hospital] does not oppose people to progress and develop themselves, but do they have the capacity to support the pharmacists to go for advanced pharmacy training?”* Participant 1.

Additionally, inadequate manpower and specialists in the hospital were also a limitation to the expression of APPS.

*“There is a lack of manpower to train the younger generation ...There are not enough specialists to train residents and students.”* Participant 3

Furthermore, the lack of implementation of the government policies on advanced pharmacy practice in the hospital was mentioned. A participant had this to say:

*“The [pharmacy] consultancy cadre has been integrated into the civil service commission [by the Federal Government] ...It has been gazetted. Recently, the government issued circulars [to support the consultancy cadre], however, we are still awaiting implementation.”* Participant 1

#### Professional limitations

This theme emerged from three interrelated subthemes namely, limited expressions for practice, lack of recognition APPS, and lack of interprofessional collaboration from other health workers.

Regarding the lack of expression of advanced pharmacy practice, a participant stated:

*“Collaborative prescribing is done in many institutions [hospitals] with the consultancy cadre, but here it is still limited.” Participant 1*

Another participant said:

*“Unlike doctors that have a well-structured scheme [for specialisation] from the onset, we [pharmacists] are still trying to develop ours.” Participant 3*

Furthermore, the lack of expression was associated with the absence of a suitable environment for advanced pharmacy practice.

*“For almost 20 years, there is no suitable environment [for advanced pharmacy practice] in the hospital.” Participant 1*

Regarding lack of recognition a participant had this to say:

*“For you to be recognised in this institution, nobody gives you that recognition. Recently, pharmacists had to rise to make sure they are recognised.” Participant 1*

Lack of interprofessional collaboration was also mentioned by multiple participants as demonstrated by the following statements:

*“Despite the government recognising advanced pharmacy practice and consultancy cadre and giving approvals, doctors are kicking against it as if it is their personal project” Participant 1*

*“There is lack of support from doctors. It has been a tug of war for the hospital trying to implement the consultancy cadre directives from the circular.” Participant 2*

On the other hand, interviewed participants provided constructive recommendations to address the identified challenges. These recommendations were categorised into four key themes: providing financial support, providing institutional support, professional advocacy and training, and professional practice and recognition.

#### **Providing financial support**

Participant emphasised the importance of financial support both from the hospital and government.

One participant referred to this with the following statement:

*“The management of UATH should sponsor pharmacists for their specialisation programme to motivate them.” Participant 2*

Another participant mentioned incentives and financial support from the government.

*“There needs to be incentives and financial support from the government to facilitate training on specialisation.” Participant 3*

#### **Enhancing institutional support**

Analysis revealed three key recommendations for improving institutional support. The recommendations focused on increasing staff numbers, implementing government policies, and establishing supportive work-study policies. Among these, the need for additional staffing emerged as the most emphasised recommendation. This was expressed saying:

*“The hospital needs to employ more staff so as to lessen the workload on staff so we can achieve efficiency in advanced practice.” Participant 4*

The second sub-theme was implementing government policies:

*“The management of UATH should simply comply with the federal government’s directive and convert qualified pharmacists into consultants.” Participant 3*

Another said:

*“The implementation of the consultant cadre will motivate other pharmacists to take up specialisation.” Participant 5*

The third sub-theme was expressed as implementing favourable work-study policy support.

*“There should be organisational support, favourable work-study policy, for the pharmacist to acquire knowledge needed to achieve specialisation.” Participant 5*

#### **Professional advocacy and training**

Three subthemes emerged focusing on professional development: increasing awareness, advocacy, and education about the benefits of APPS; providing affordable training opportunities; and implementing mandatory training. Regarding awareness of the benefits of APPS, a participant noted:

*“These practices already exist in other countries so when we see the benefits [of advanced pharmacy practice] we quickly seek ways to adopt them into our practice.” Participant 3*

Two additional participants said:

*“There is a need to promote seminars and programmes that educate pharmacists and other health professionals on the relevance of specialisation and advanced pharmacy practice.” Participant 4*

*“More awareness on the importance of advanced pharmacy practice is needed in the field of pharmacy.” Participant 5*

Regarding affordable training opportunities, a participant responded:

*“Potential improvements like affordable certification programmes, specialised training and mentorship for advanced pharmacy practice should be made available.” Participant 5*

One participant recommended mandatory training courses.

*“Pharmacists should be made to undergo mandatory education and training programme to keep updated with latest practice and advancements.” Participant 4*

### **Improved professional practice and recognition**

This theme encompasses three subthemes: fostering a conducive environment for interprofessional collaborations, expanding opportunities for advanced pharmacy practice, and recognition of consultancy cadre.

Turning to a conducive environment for interprofessional collaboration, Participant 2 remarked:

*“All professionals should have a team spirit [for interprofessional collaboration] towards having the best for their patients.” Participant 2*

Similarly, participants were articulate in emphasising the importance of creating opportunities for advanced pharmacy practice:

*“The role and responsibilities of specialised pharmacists should be defined and should not be performed by any other person.” Participant 4*

*“Regular ward rounds with the pharmacist and dedicated pharmacist-patient counselling sessions should be initiated to incorporate advanced pharmaceutical care into practice.” Participant 5*

Regarding recognition of the consultant pharmacy cadre, a participant highlighted:

*“Some hospitals have implemented consultancy cadre and [consultant pharmacist] are being incentivised and recognised, it should be implemented here also.” Participant 1*

### **Discussion**

Overall, this research assessed the trends of APPS in UATH, while also identifying potential barriers and providing actionable recommendations to enhance advanced pharmacy practice and specialization (APPS). In summary, approximately four-fifths (79.2%) of participating pharmacists expressed an

interest in pursuing a specialisation in hospital pharmacy. However, fewer than two-fifths (37.5%) have commenced a residency programme. Similarly, just over two-fifths (43.8%) have taken a training or certification related to specialisation, with the residency programme through the WAPCP (18 respondents), and master programmes (9 respondents) being the most explored training platforms. Nevertheless, half (50%) are involved in at least one form of advanced pharmacy practice. Approximately two-thirds (64.6%) acknowledged the absence of prescribing rights for pharmacists, and half (50%) did not perceive the institution as providing sufficient opportunities for specialisation and advanced pharmacy practice.

Although the primary motivations for pursuing APPS identified in this study include career advancement (54.2%), personal interest (50%), and improved patient care (39.6%), participants also highlighted several significant challenges. These included high workload (31.3%), lack of organisational support (29.2%), and lack of training opportunities (23%). Turning to qualitative responses, the lack of financial support, the lack of institutional support, and professional challenges were identified as the major challenges to advancing pharmacy practice. In contrast, key recommendations to strengthen APPS included improved financial support, enhanced institutional support, professional advocacy, and increased training opportunities, improved professional practice, and better recognition of professional practice.

Analysis of demographic factors revealed that the younger generation (under 30 years) demonstrated the least interest in hospital pharmacy specialisation (66.7%) compared to other age groups: 30-39 years (80%), 40-49 years (90%), and pharmacists over 50 (91.7%), as shown in Table 3. This indicates a concerning decline in interest in hospital pharmacy specialisation among early-career pharmacists, aligning with Thin and colleagues' systematic review, which identifies high turnover rates in hospital pharmacy practice.<sup>16</sup> These findings underscore the urgent need for enhanced advocacy regarding APPS targeted at younger practitioners. The motivation for specialisation identified in this research align with report from other studies from across the United States of America (U.S.), Canada, and United Kingdom (Scotland), providing potential leverage points for advocacy efforts.<sup>13</sup>

Despite progress in integrating specialised roles, significant barriers persist. Both quantitative and qualitative data highlight three key challenges: financial constraints, excessive workload, and insufficient organisational support. To begin, financial limitations particularly inhibit training uptake in APPS, a challenge that was also highlighted by Deasy and colleagues in their systematic review.<sup>13</sup> Government funding for advanced pharmacy practice training in New Zealand, which enabled pharmacists to study overseas in priority specialty areas, enhanced the participation and delivery of pharmacist-led medicine management services.<sup>14</sup> Similarly, the

government of Singapore providing scholarships to pharmacists to pursue specialist training, and higher degrees (Doctorate and Master's) has significantly improved advanced pharmacy practice expressions.<sup>14</sup> Financial incentives, training reimbursement, access to expert trainers, and improved remuneration for specialisation were found to consistently drive APPS in other settings, including in Canada, Portugal, and the United Kingdom.<sup>11</sup> Implementing scholarships, cost reimbursement and incentives for training on APPS by the government and the hospital may promote advanced training uptake and improve their recognition within hospital settings. Furthermore, UATH needs to strengthen its workforce by employing additional pharmacists, and pharmacy technicians and administrators to manage non-clinical responsibilities. This would create opportunities for skilled pharmacists to engage in patient care, collaborative prescribing, and other advanced practice activities.

A significant institutional barrier to implementing gazetted pharmacy specialisation structures and consultancy cadre has been opposition from doctors. Similar interprofessional tensions between doctors and pharmacists have been documented globally, including in Britain, South Africa, New Zealand, and Malaysia during attempts to establish advanced clinical pharmacy practice.<sup>11,12,14</sup> The support of doctors, and other health professionals was crucial for implementing advanced pharmacy practice collaborative care model in US hospitals.<sup>2</sup> Doctors must recognise how advanced pharmacy practice reduces adverse effects, shortens hospital stays, improves the quality of care and lowers mortality rate,<sup>5</sup> moving beyond the stereotypical perceptions of doctors as prescribers and pharmacists as dispensers of medicines alone.

Strategies to establish efficient interprofessional collaboration with doctors should include: developing a mutual recognition of roles and technical capabilities of both professionals; promoting interprofessional education from the undergraduate through postgraduate levels; establishing communication training to facilitate effective collaboration promoting shared values and trust; and incentivising collaborative practice.<sup>17,18</sup> Additionally, clearly defining the role and scope of advanced pharmacy practice will prevent other health professionals from perceiving pharmacists as encroaching in their roles or trying to take their jobs.<sup>11,12</sup> Lastly, leveraging telemedicine may offer additional opportunities for enhancing interprofessional communication and collaboration. Nevertheless, UATH leadership must implement government policies supporting advanced pharmacy practice and recognise consultant pharmacists within the hospital framework.

Unlike other healthcare professions with structured specialisation pathways, Nigerian pharmacists often navigate specialisation independently. The Pharm.D curriculum has introduced a more patient-centered approach to pharmacy education and practice but lacks nationwide implementation.

While the WAPCP fellowship provides a pathway for specialisation, its requirements and duration limit accessibility. There is a need for more integrated, structured, affordable, and short-term certification programmes for APPS in Nigeria.

Postgraduate training, residency programs, fellowships, and advanced pharmacy degrees (master's and doctorate) should be emphasised to promote advanced pharmacy practice in Nigeria. We recommend that the Pharmacy Council of Nigeria (PCN) establish a board certification programme for pharmacy specialisation. These programs can focus on specific areas of advanced pharmacy practice such as pharmacotherapy, nuclear pharmacy, oncology pharmacy, geriatric pharmacy, and nutrition support. Similar board certification programs delivered by the Board of Pharmacy Specialists, a division of the American Pharmacists Association (APhA) in the U.S. and other certification and qualification accreditation system in Japan, South Africa, and Singapore have successfully improved specialisation uptake in those settings.<sup>11</sup> Furthermore, U.S. Hospitals where pharmacists perceived the institutions valued board certification programs and provided incentives for advanced certifications had a significantly higher number of board certified pharmacists ( $p < 0.001$ ).<sup>13</sup> This suggests that implementing similar board certification programs may enhance the uptake and the recognition of pharmacy specialisation in the hospital. Moreover, for successful establishment of board certification programmes, PCN should prioritise engaging diverse stakeholders including educational institutions, patient advocacy groups, the Ministry of Health, and healthcare professional associations; emphasising pharmacists' unique skill sets and specialisation benefits. It is also important they consider available human resources (trainers, administrators, and support staff) and logistical implications of such training. Perhaps initially developing an online certification platform could mitigate costs and geographical constraints before establishing physical infrastructure.

Specialisation significantly enhances pharmaceutical care quality, improves patient safety, and optimises therapeutic outcomes. Equipping pharmacists with advanced clinical skills through formalised specialisation pathways would promote a more efficient and collaborative approach to patient management within the Nigerian healthcare system.

#### **Strength and Limitation**

The mixed-methods design of this study provides advantages over purely quantitative approaches as it captures the subjective experiences of hospital pharmacists regarding advanced pharmacy training and practice. Consequently, the recommendations developed for improving APPS are more contextually relevant to the Nigerian setting and represent a bottom-up approach. However, this study's generalisability is limited by its small sample size ( $n=48$ ).

**Conclusion**

While the role of advanced and specialised pharmacists in the healthcare sector, particularly in clinical settings such as tertiary health institutions, cannot be over emphasised, several factors still exist that hinder professional development in Nigeria. Most hospital pharmacists in UATH, Nigeria, agreed financial constraints, excessive workload, and a lack of institutional support are drawbacks and barriers to achieving APPS. However, it is impressive that regardless of the drawbacks, a considerable number of hospital pharmacists in UATH have either gained certifications in consultancy or are enrolled in a fellowship programme. Finally, there is a need to address the challenges as the early career community in UATH are mostly uninterested in pursuing a specialisation certification as they may not envision many prospects in it.

**Data Availability Statement:** The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

**Ethics Statement:** The study was approved by the University of Abuja Teaching Hospital (UATH) Ethical Review Board with approval number - UATH/HREC/PR/2024/0/9192.

**Authors' Contribution**

- Emily Ditari Sika - Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.
- Olanrewaju Olamide Popoola - Conceptualization, Data curation, Data analysis, Methodology, Project administration, Validation, Supervision, Writing – original draft, Writing – review & editing
- Virginia Giolito - Conceptualization, Data curation, Data analysis, Methodology, Project administration, Validation, Supervision, Writing – original draft, Writing – review & editing
- Zainab Galadima Abubakar - Conceptualization, Data curation, Data analysis, Methodology, Project administration, Validation, Supervision, Writing – original draft, Writing – review & editing
- Stephen Chubiyojo - Conceptualization, Data curation, Data analysis, Methodology, Project administration, Validation, Supervision, Writing – original draft, Writing – review & editing

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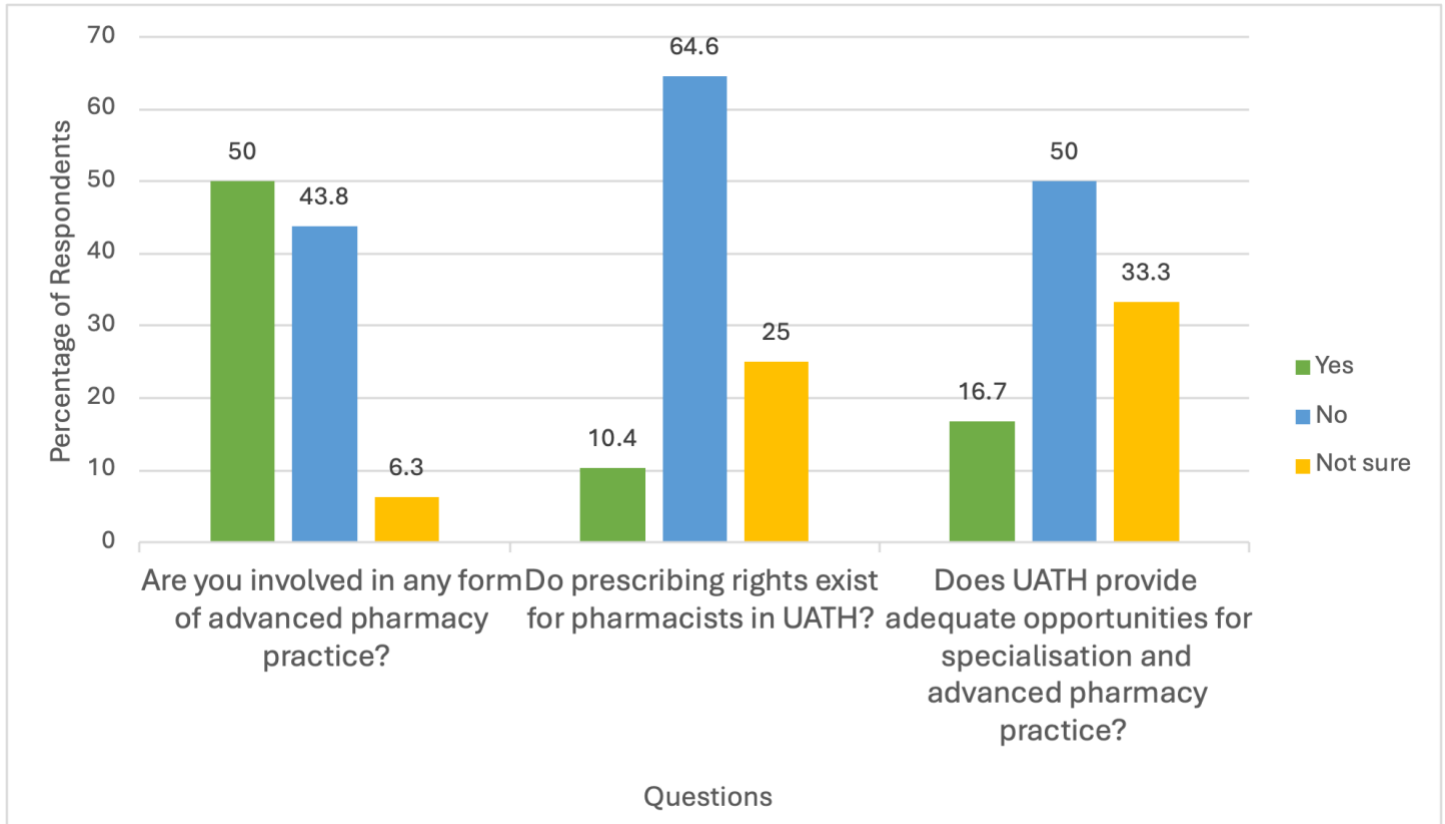
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**Table 3.** Cross tabulation of demographic factors and interest in pursuing a specialisation in hospital pharmacy practice

Demographic Factors	Are you interested in pursuing a specialisation in hospital pharmacy practice?			Total	P-value
	Yes (%)	No (%)	Maybe (%)		
Age					0.481
Under 30 years	14 (66.7)	3 (14.3)	4 (19)	21	
30-39 years	4 (80)	0 (0)	1 (20)	5	
40-49 years	9 (90)	1 (10)	0 (0)	10	
50 years and above	11 (91.7)	0 (0)	1(8.3)	12	
Gender					0.429
Male	20 (80)	3 (12)	2 (8)	25	
Female	18 (78.3)	1 (4.3)	4 (17.4)	23	
Highest Educational Qualification					0.014
Bachelor of Pharmacy	22 (73.3)	3 (10)	5 (16.7)	30	
Master's degree	13 (100)	0 (0)	0 (0)	13	
Doctor of Pharmacy	0 (0)	1(100)	0 (0)	1	
Others	3 (75)	0 (0)	1 (25)	4	
Years of Experience					0.627
0-5 years	15 (65.2)	3 (13)	5 (21.7)	23	
6-10 years	3 (100)	0 (0)	0 (0)	3	
11-15 years	6 (85.7)	1 (14.3)	0 (0)	7	
16-20 years	5 (100)	0 (0)	0 (0)	5	
21-25 years	4 (80)	0 (0)	1 (20)	5	
26 -30 years	5 (100)	0 (0)	0 (0)	5	

**Figure 2.** Trends in Advanced Pharmacy Practice and Specialisation

Abbreviation: UATH – University of Abuja Teaching Hospital