



## Evolving role of pharmacy technicians in pharmaceutical care services: Involvement in counselling and medication reviews



Chinonyerem O. Iheanacho<sup>a,\*</sup>, Oluwakemi Adeyeri<sup>b</sup>, Uchenna I.H. Eze<sup>b</sup>

<sup>a</sup> Department of Clinical Pharmacy and Public Health, Faculty of Pharmacy, University of Calabar, Cross River State, Nigeria

<sup>b</sup> Department of Clinical Pharmacy and Biopharmacy, Faculty of Pharmacy, Olabisi Onabanjo University, Sagamu, Ogun State, Nigeria

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### ABSTRACT

**Background:** Previous non-clinical traditional role of pharmacy technicians (PTs) has evolved considerably. Therefore, adequate understanding of PTs' practice of pharmaceutical care (PC) services is essential for appropriate skill mix in provision of services.

**Objectives:** The objectives of the study were to: (1) assess PTs' sources of information and practice of pharmaceutical care, and (2) assess differences in patient-centered care practices between PTs in hospital and community pharmacy settings.

**Methods:** Cross-sectional survey was conducted among 100 pharmacy technicians using a structured questionnaire. Descriptive analysis was performed using SPSS version 24.0, and involvement in pharmaceutical care practices was assessed on a 3-point Likert scale.  $P < 0.05$  was significant.

**Results:** A total of 73 (73.0%) PTs participated in the study and 44 (60.3%) practiced in hospitals. Almost all 70 (95.9%) had previously heard of PC. Sources of information was associated with place of practice ( $p = 0.001$ ), highest degree ( $p = 0.003$ ) and age ( $p = 0.000$ ). Only a quarter 21 (28.8%) indicated it was patient-centered. The majority often assisted in dispensing/counselling 62 (84.9%). Over half often provided responsible advice on over-the-counter medicines 50 (68.5%), assisted in managing patients' medication information 49 (67.1%), initiated pharmaceutical care 43 (58.9%) and answered questions on side effects/interactions of medicines 40 (54.8%), respectively. The least often performed task was discussing possible change in therapy 21(34.2%). Significant differences were found between hospital PTs and community PTs in the frequency of intake of patients/clients for PC ( $p = 0.026$ ) and assisting in dispensing/counselling ( $p = 0.018$ ).

**Conclusions:** Various sources of information was observed and this was associated with selected socio-demographics. Several PC activities were often undertaken by PTs, and some differences in practice of these activities was seen between the practice areas.

### 1. Introduction

Pharmacy practice has evolved and developed in the recent decades with a shift from drug products to the patients. Patient-centered pharmaceutical services enhance the cost and safety of healthcare.<sup>1</sup> Its design ensures the achievement of optimum medication use and improved patient outcomes. This process, which is mostly achieved by addressing medication-related needs, is known as pharmaceutical care (PC).<sup>2</sup> It involves collaboration between pharmacists and relevant stakeholders in the healthcare team, to ensure the use of safe and effective medicines to achieve positive outcomes. This has resulted in expanded scope of pharmacy practice in recent times.

As the scope of pharmacy practice expands, several impediments to optimal delivery of pharmaceutical care have remained. These include shortages of pharmacists, increasing complexity of medication regimens, and increasing acuity of patients and the associated workload.<sup>3</sup> These observed challenges have created opportunities for delegation of certain patient-centered care activities to pharmacy technicians.<sup>1</sup> Pharmacy technicians (PTs) are well positioned to augment direct patient care services because of their knowledge of the medication distribution system in their respective health care centres.<sup>4</sup> As an integral part of the pharmacy workforce, PTs have been previously involved in only technical and clerical duties, but the evolution of pharmacy practice to a patient-centered service has created expanded roles for this cadre of pharmacy staff.<sup>5</sup> These new roles which are

*Abbreviations:* PTs, Pharmacy Technicians; PC, Pharmaceutical Care; OTC medicines, Over-the-counter medicines; PCN, Pharmacists Council of Nigeria.

\* Corresponding author at: Department of Clinical Pharmacy and Public Health, University of Calabar, Cross River State PMB 1115, Nigeria.

E-mail address: [coiheanacho@unical.edu.ng](mailto:coiheanacho@unical.edu.ng) (C.O. Iheanacho).

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noted to be patient-centred,<sup>6</sup> are already increasingly practiced in some countries,<sup>1,7</sup> where technicians have shown significant competences,<sup>8</sup> to ensure its effective delivery. This has allowed pharmacists to be deployed primarily to settings where they practice direct patient care.<sup>4</sup> However, there is scarcity of literature to show that this is done in Nigeria.

Although pharmacy practice has significantly evolved in many regions of the world, it has not changed much in Africa. Unlike in some countries, practice of patient-centered care by pharmacists is constantly faced with several obstacles and oppositions in Nigeria.<sup>9</sup> There is very poor documentation of patient care activities in hospital and community pharmacy settings,<sup>10,11</sup> shortage of pharmacists,<sup>12,13</sup> lack of specialization and career structure, medical dominance and opposition, lack of policies that support clinical pharmacy practice,<sup>13</sup> almost inexistent practice of pharmacists' ward rounds in most hospitals, and low access to patients' medication records. These have led to low pace of development and evolution of PC practice in the country.

Meanwhile, pharmacy practice in Nigeria is regulated by the Pharmacists' Council of Nigeria (PCN) which also maintains a register of pharmacists, pharmaceutical premises and pharmacy technicians.<sup>14</sup> Pharmaceutical premises are required to be under the direct control and supervision of a superintendent pharmacist who ensures the discharge of obligations to the patients.<sup>15</sup> PTs in Nigeria are required to be registered by the PCN to be eligible to practice in Nigeria, and they must renew their license permit annually. The registration is done after graduation from a PCN accredited school for PTs. PTs' education and practice are also regulated by the PCN, and they are required to practice under the supervision of a registered pharmacist.<sup>16</sup> Their roles are both product and patient oriented, involving dispensing, counselling, provision of drug information/health tips, compounding, inventory management, billing and maintaining records, among others.<sup>17</sup>

However, low implementation of clinical pharmacy services by pharmacists in the country<sup>9,18,19</sup> potentially pose a risk of low practice of PC among PTs in Nigeria. Awareness of patient-centered care by PTs is crucial for its practice and should be considered priority. Several sources, including learning curricula and workshops among others, are reliable sources of equipping PTs with relevant skills for patient-centered pharmaceutical services. Improving relevant clinical skills may also be associated with practice setting.<sup>20</sup> Therefore, depending on the anticipated extent of their independent provision of clinical services, PT in Nigeria may need additional focused training to enhance practical application of knowledge coupled with basic clinical skills. Continuing education or work-place training may satisfy the need for this focused learning.

To facilitate optimum patient care, every cadre of pharmacy workforce should be abreast with the current trends in practice. Meanwhile, search of literature revealed scarcity of data on the role of PTs in West Africa including Nigeria. Previous studies in Nigeria have focused on pharmacists, therefore almost nothing is known about PTs' involvement in PC services. This study intends to fill this gap in knowledge by exploring PTs' evolving role in patient care and their involvement in new roles. In order to identify potential gaps in practice, the objectives of the study were to: (1) assess PTs' sources of information and practice of pharmaceutical care, and (2) assess differences in patient-centered care practices between PTs in hospital and community pharmacy settings.

## 2. Method

### 2.1. Study setting

The study was conducted in public and private hospitals, and community pharmacies in Ogun state. Ogun state is located in the South-western part of Nigeria with an area of 16,409.26 km<sup>2</sup> and a population of 2,728,098 as at 2006 population census. The state has a Federal Medical Centre, a teaching hospital and several other health facilities and community pharmacies. An institution for the training of PTs is also located in the state, but only a maximum of 25 students are expected to be admitted

each year, which is also the case in other schools for training PTs in the country.<sup>16,17</sup>

### 2.2. Study design and study population

A cross-sectional study was carried out from April to July 2021 among PTs who practiced in hospitals and community pharmacies in Ogun State, Nigeria. From the PCN register, only 160 PTs had a practice permit at the study time. Using an online sample size calculator,<sup>21</sup> a sample size of 98 was calculated, and this was rounded-up to 100. As a result of unavailable comprehensive data of PTs, an assumption of 4 PTs per facility was made, and a total of 25 facilities were randomly selected through balloting, for the study.

### 2.3. Eligibility criteria

Only PTs who worked under the supervision of pharmacists and were willing to participate in the study, were included. Those who did not work in clinical settings and those from whom informed consent was not obtained were excluded.

### 2.4. Outcome measures

The primary study outcome measure was awareness of pharmaceutical care by the study participants. The secondary outcome measure was the involvement of pharmacy technicians in PC activities. PC was defined as patient-centered care, involving the responsible provision of drug therapy for definite outcomes, in collaboration with other health care professionals.

### 2.5. Study tool

The questionnaire was prefaced with an introduction of the survey and a request for sincere responses to the questions. It was a structured questionnaire that was designed to obtain the required information for measurement of PTs' awareness and involvement in pharmaceutical care activities. Involvement of PTs in patient-centered pharmacy practice is a current trend among the pharmacy workforce, and the questionnaire was designed based on this theoretical frame work.

The self-administered questionnaire was developed and designed from various literatures on pharmaceutical care and the roles of pharmacy technicians.<sup>22-25</sup> The questionnaire was made up of three parts; part one was used to obtain socio-demographic information of the respondents which included place of work, highest degree obtained, years of post-qualification, age and gender. Part two elicited PTs' previous information of PC. Previous information about pharmaceutical care, first source of information and definition of pharmaceutical care were used to assess PTs' awareness of PC. Questions asked include: have you ever heard of pharmaceutical care? This question employed a 'Yes' or 'No' response scale. Respondents were also asked about their first source of information using an open-ended question. To assess awareness of PC concepts among respondents, 7 definitions were listed, and respondents were requested to select the correct definition of PC. Part three of the survey instrument measured the involvement of PTs in PC activities on a 3-point Likert scale of, 1 = Rarely, 2 = Sometimes, 3 = often. The core parameters used to measure PTs' involvement in PC activities were participation in OTC medicine counselling, medication review and patient counselling.

The initial draft of the questionnaire was vetted by six experts (clinical pharmacists who were versed in pharmaceutical care). Before administration, questionnaires were pre-tested among 15 pharmacy technicians who did not form part of the study participants to ascertain a proper understanding of the questions. Based on feedback, minor rewording and modifications of some items were made to suit respondents' comprehension. Reliability was computed using Cronbach's alpha.

## 2.6. Data collection

The self-completion questionnaire was administered to all PTs who practiced in selected hospitals and community pharmacies within the state, according to the stated inclusion/exclusion criteria. This was done either personally or through the Heads of Departments, and each completed questionnaire was collected immediately. Data collection was done consecutively for a 3-month period, from April 1, 2021 to July 2, 2021.

## 2.7. Statistical analyses

Returned questionnaires were coded for easy referencing. The responses from the study were entered into Microsoft Excel Software for easy sorting, and they were double checked for correctness by 2 of the authors. The reliability of this questionnaire was performed using Cronbach's Alpha method of SPSS version 24. Cronbach's alpha of at least 0.7 is considered reliable.

All data were analyzed using SPSS version 24.0 for descriptive statistical analysis. Frequencies and percentage were determined. Relationship between demographic profile and awareness of PC was explored using cross tabs and Fisher's exact test (F). Association between socio-demographic characteristics and correct definition of PC was also assessed using Fisher's exact test (F) and probability value. Differences in practice of PC activities by hospital and community PTs were also analyzed using cross tabs and Fisher's exact test (F).  $P$  – Value <0.05 were considered significant.

## 2.8. Ethics approval

Ethics approval was obtained from the Health Research Committee of the Federal Medical Center, Abeokuta before questionnaires were administered. The ethical approval had the reference number HREC/04/03/2021. Informed consent was also sought and obtained from study participants prior to the study.

## 3. Results

A response rate of 73% was achieved, 25 eligible participants declined consent to participate in the study, and 2 returned questionnaires were grossly incomplete, hence could not be used for the study. Cronbach's Alpha of 0.887 was observed, showing reliability of the questionnaire.

**Table 1**

Socio-demographic characteristics of the pharmacy technicians and awareness of pharmaceutical care.

Items	Frequency (N = 73)	Percentage (%)	Awareness			P-value
			Yes n (%)	No n (%)	Nil n (%)	
Place of practice						0.914
Hospital	44	60.3%	41 (56.2)	2 (2.7)	1 (1.4)	
Community pharmacy	28	38.4%	28 (38.4)	0 (0.0)	0 (0.0)	
Not indicated	1	1.4%	1 (1.4)	0 (0.0)	0 (0.0)	
Post qualification years						0.794
1–5	26	35.6%	24 (32.9)	1 (1.4)	1 (1.4)	
6–10	16	21.9%	16 (21.9)	0 (0.0)	0 (0.0)	
11–15	9	12.3%	9 (12.3)	0 (0.0)	0 (0.0)	
Above 15	11	15.1%	10 (13.7)	1 (1.4)	0 (0.0)	
Not indicated	11	15.1%	11 (15.1)	0 (0.0)	0 (0.0)	
Highest degree						0.814
Bachelor of science	5	6.8%	5 (6.8)	0 (0.0)	0 (0.0)	
Ordinary national diploma	19	26.0%	18 (24.7)	0 (0.0)	1 (1.4)	
Diploma in pharmacy technology	30	41.1%	29 (39.7)	1 (1.4)	0 (0.0)	
Not indicated	19	26.0%	18 (24.7)	1 (1.4)	0 (0.0)	
Age						0.598
Below 30	36	49.3%	35 (47.9)	0 (0.0)	1 (1.4)	
30–39	14	19.2%	14 (19.2)	0 (0.0)	0 (0.0)	
40–49	20	27.4%	18 (24.7)	2 (2.7)	0 (0.0)	
50–59	2	2.7%	2 (2.7)	0 (0.0)	0 (0.0)	
Not indicated	1	1.4%	1 (1.4)	0 (0.0)	0 (0.0)	
Gender						0.241
Male	32	43.8%	31 (42.5)	0 (0.0)	1 (1.4)	
Female	41	56.2%	39 (53.4)	2 (2.7)	0 (0.0)	

Over half 44 (60.3%) practiced in hospitals, while 29 (39.7%) practiced in community pharmacies. More respondents 26 (35.6%) had less than 5 years practice experience, with less than one third 16 (21.9%) of the respondents' population having 6–10 years practice experience. Majority were females 41 (56.2%) and less than 30 years of age 36 (49.3%). See [Table 1](#).

Almost all respondents 69 (94.6%) had heard of PC and sources of information was associated with several socio-demographic characteristics, including place of practice ( $p = 0.001$ ), highest degree ( $p = 0.003$ ) and age ( $p = 0.000$ ). Workshop/workplace/media 17 (37.0%) and pharmacist/school 24 (32.8%) represented the highest sources of information, while reference books 9 (12.3%) was the least source of awareness. Meanwhile, 11 (15.1%) did not indicate their source of awareness of PC. More respondents in hospital practice 23 (31.5%) had heard of PC from workplace/workshop/media, than those in community practice 6 (8.2%). See [Table 2](#).

Several respondents 26 (35.6%) did not select a definition of PC among the listed options, but more than a quarter 21 (28.8%) indicated it is patient-centered collaborative pharmacy practice. Correct definition of PC was not associated with respondents' socio-demographic characteristics. Details are in [Table 3](#).

The majority of study participants often assisted in dispensing process and counselling 62 (84.9%) than other surveyed patient-centred activities. Over half of respondents often provided responsible advice on over-the-counter medicines 50 (68.5%), often assisted in managing patients' medication information 49 (67.1%), initiated pharmaceutical care 43 (58.9%) and often answered questions on side effects/interactions of medicines 40 (54.8%), respectively. The least often performed tasks was, discussing possible change in therapy 21 (34.2%). Significant differences were found between hospital PTs and community PTs in the frequency of intake of patients/clients for pharmaceutical care ( $p = 0.026$ ) and assisting in dispensing process and counselling ( $p = 0.018$ ). See [Table 4](#).

## 4. Discussion

This study revealed important findings regarding sources of information on pharmaceutical care and its practice among PTs. Sources of information on PC was associated with PTs socio-demographics. Another critical finding from the study was poor awareness of the concept of PC among respondents. Several PC activities were often undertaken by PTs, and this was

**Table 2**

Association between socio-demographic characteristics of the pharmacy technicians and sources of information about pharmaceutical care.

Items	Sources of information				P-value
	Reference books	Pharmacist/school	Workshop/media/work place	Not indicated	
	<i>n</i> = 9 (12.3%)	<i>n</i> = 24 (32.8%)	<i>n</i> = 17 (37.0%)	<i>n</i> = 11 (15.1%)	
Place of work					<b>0.001*</b>
Hospital	2 (2.7)	11 (15.1)	23 (31.5)	8 (11.0)	
Community pharmacy	5 (6.9)	13 (17.8)	6 (8.2)	3 (4.1)	
Not indicated	2 (2.7)	0 (0.0)	0 (0.0)	0 (0.0)	
Post qualification years					0.062
1–5	6 (8.2)	9 (12.3)	5 (6.9)	6 (8.2)	
6–10	0 (0.0)	8 (11.0)	6 (8.2)	2 (2.7)	
11–15	0 (0.0)	1 (1.4)	7 (9.6)	1 (1.4)	
Above 15	1 (1.4)	2 (2.7)	8 (11.0)	0 (0.0)	
Not indicated	2 (2.7)	4 (5.5)	3 (4.1)	2 (2.7)	
Highest degree					<b>0.003*</b>
Bachelor of science	1 (1.4)	2 (2.7)	0 (0.0)	2 (2.7)	
Ordinary national diploma	6 (8.2)	1 (1.4)	1 (1.4)	2 (2.7)	
Diploma in pharmacy technology	1 (1.4)	12 (16.4)	15 (20.5)	2 (2.7)	
Not indicated	1 (1.4)	9 (12.3)	4 (5.5)	5 (6.8)	
Age					<b>0.000*</b>
Below 30	6 (8.2)	13 (17.8)	11 (15.1)	6 (8.2)	
30–39	2 (2.7)	7 (9.6)	5 (6.8)	0 (0.0)	
40–49					
50–59	1 (1.4)	3 (4.1)	11 (15.1)	5 (6.8)	
Above 60	0 (0.0)	0 (0.0)	2 (2.7)	0 (0.0)	
Not indicated	0 (0.0)	1 (1.4)	0 (0.0)	0 (0.0)	
Gender					0.885
Male	3 (4.1)	13 (17.8)	12 (16.4)	4 (5.5)	
Female	6 (8.2)	11 (15.1)	17 (23.3)	7 (9.6)	

\* Statistically significant.

associated with place of practice. Hospital PTs frequently practiced the initiation of PC, and engaged in dispensing and counselling.

#### 4.1. Sources of information of PC

Almost all study participants had heard of PC, and source of information was majorly work place/workshops/media. Being a topical issue and a recent trend in pharmacy practice, necessary attention is required for raising its awareness, and ensuring its development and practice, particularly in regions of low evidence of its practice. A previous study in Brazil demonstrated the relevance of training PTs in pharmaceutical care.<sup>26</sup> Sources of information on pharmaceutical care services has not been previously assessed among PTs in Nigeria, therefore this finding provides evidence for in-depth and further assessment of awareness and knowledge of PTs on pharmaceutical care. The evolution of pharmacy practice has created the need for patient-centered functions of PTs in developed countries,<sup>5,6</sup> emphasizing the need for increased awareness among the Nigerian PTs. Meanwhile, the concept of patient-centered care is not listed in the curriculum for PTs in Nigeria.<sup>16,17</sup> This may not provide technicians with necessary knowledge about the practice model. Respondents' demographic characteristics was not associated with awareness of PC.

Meanwhile, age, educational qualification and practice setting were associated with sources of information of PC by respondents. A previous study in Nigeria reported association of socio-demographic characteristics of health professionals with awareness.<sup>27</sup> High awareness was also noted among health professionals in Nigeria on preventive health care.<sup>28</sup> Meanwhile, the majority of respondents did not give a definition of PC, and only few defined it as patient-centered pharmacy practice. On the contrary,

**Table 3**

Definition of pharmaceutical care by pharmacy technicians and associated socio-demographic characteristics.

Variables	Frequency (N = 73)	Percentage
One to one relationship with patients	4	5.5%
Ability to demonstrate clinical pharmacy practice	2	2.7%
Care given to patient after complain	13	17.8%
Relationship between pharmacist and patient	3	4.1%
<b>Patient-centred pharmacy practice involving pharmacy and other health care given to improve patient's quality of life</b>	<b>21</b>	<b>28.8%</b>
Patient oriented health care to improve quality of life	2	2.7%
Identification, monitoring and resolution of actual and potential drug-related problem	2	2.7%
Not indicated	26	35.6%
Variables	Correct definition of pharmaceutical care n (%)	P – value
Place of work <i>N</i> = 21 (28.8%)		0.886
Hospital	15 (20.6)	
Community pharmacy	6 (8.2)	
Not indicated	0 (0.0)	
Post qualification years		0.279
1–5	7 (9.6)	
6–10	6 (8.2)	
11–15	4 (5.5)	
Above 15	3 (4.1)	
Not indicated	1 (1.4)	
Highest degree		0.073
Bachelor of science	0 (0.0)	
Ordinary national diploma	6 (8.2)	
Diploma in pharmacy technology	12 (16.4)	
Not indicated	3 (4.1)	
Age		0.079
Below 30	12 (16.4)	
30–39	3 (4.1)	
40–49	6 (8.2)	
50–59	0 (0.0)	
Not indicated	0 (0.0)	
Gender		0.753
Male	10 (13.7)	
Female	11 (15.0)	

all respondents in a previous study of pharmacists were aware of the concept of PC.<sup>29</sup> This observed difference in findings may be associated with differences in educational curriculum and training. As the current model for pharmacy practice, it is expected that adequate knowledge of its concept is seen across the pharmacy cadre. The study also did not find significant association between correct definition of PC and respondents' demographics. This finding reflects the need for massive dissemination of PC concepts among PTs of all characteristics within Nigeria. This may involve its inclusion in their teaching curricula and regular trainings.

#### 4.2. Role in patient counselling

Dispensing and counselling were the most frequently performed tasks, while engaging in discussions for possible change in therapy was least often performed by our respondents. This findings provide new insights into pattern of practice of patient-centered care by the study participants. Elementary dispensing is a major course in the curriculum for PTs in Nigeria,<sup>16,17</sup> and this may likely have created the sense of dispensing duty in the technicians. It has also been one of the traditional roles of pharmacists, possibly creating deeper awareness of the practice among the sub cadres. Similarly, a previous study found that PTs were actively involved in identification of patients that required pharmacists' counselling.<sup>30</sup> However, to optimally achieve expected goals, effective training, adequate supervision, clear practice boundaries and adequate regulation and implementation of guiding principles are very essential.

**Table 4**

Pharmacy technician's involvement in the practice of pharmaceutical care activities in hospital and community settings in a Nigerian State.

Items	N	Rarely	Sometimes	Often
The intake of patient for pharmaceutical care	70	6 (8.2)	21 (28.8)	43 (58.9)
Assist in dispensing process and counselling	71	2 (2.7)	7 (9.6)	62 (84.9)
Participate in drug use review	71	13 (17.8)	25 (34.2)	33 (45.2)
Discuss possible change in therapy	72	26 (35.6)	21 (28.8)	21 (34.2)
Answer questions on drug side effects and interaction	72	5 (6.8)	27 (37.0)	40 (54.8)
Responsible advise on OTC medicine	68	3 (4.1)	15 (20.5)	50 (68.5)
Assist in managing patients' medication information	72	12 (16.4)	11 (15.1)	49 (67.1)

  

Items	N	Hospital N = 44		Community N = 29		Fisher's exact test / P-value
		Rarely / sometimes	Often	Rarely / sometimes	Often	
The intake of patient for pharmaceutical care	70	17 (23.3%)	25(34.2%)	10 (13.7%)	18(24.7%)	F = 6.691 P = <b>0.026*</b>
Assist in dispensing process and counselling	71	2 (2.8%)	41 (56.2%)	7 (9.6%)	21 (28.8%)	F = 7.061 P = <b>0.018*</b>
Participate in drug use review	71	20 (27.4%)	24 (32.9%)	18 (24.7%)	9 (12.3%)	F = 3.400 P = 0.210
Discuss possible change in therapy	72	27 (37.0%)	18 (24.7%)	20 (27.4%)	7 (9.6%)	F = 1.891 P = 0.401
Answer questions on drug side effects and interaction	72	18 (24.7%)	26 (35.6%)	13 (17.8%)	14 (19.2%)	F = 0.395 P = 0.928
Responsible advise on OTC medicine	68	12 (16.4%)	30 (41.1%)	6 (8.2%)	20 (27.4%)	F = 1.954 P = 0.389
Assist in managing patients' medication information	72	11 (15.1%)	34 (46.6%)	12 (16.4%)	15 (20.5%)	F = 3.222 P = 0.212

\* Statistically significant.

Participation in dispensing and counselling process significantly differed between hospital and community pharmacies. Finding aligns with a study by Boughen et al. in UK where hospital pharmacy PTs reportedly performed more clinical tasks than PTs in community pharmacies.<sup>31</sup> Although dispensing of medicines and patient counselling were routine tasks of community and hospital PTs in UK, PTs in hospital settings were more often involved in dispensing/counselling, compared to those in community pharmacy settings.<sup>31</sup> This findings is likely a result of more apparent clinical setting of the hospital. Also, in their study, Friesner et al. demonstrated that PTs are able to perform tasks and expanded roles, depending on several factors which includes practice settings.<sup>32</sup> Meanwhile, variations in practice settings is related to variations in perceptions of community and hospital pharmacy practice.<sup>33</sup>

The intake of patients for PC, was observed to be often practiced by over half of respondents. This practice significantly differed between hospital and community pharmacy PTs. Similarly, patient consultation was a regular practice among PTs in both hospital and community practice settings in UK.<sup>31</sup> Desires to expand practice roles and tasks was majorly seen in community pharmacy PTs compared to hospital PTs in UK.<sup>31</sup> Consistent with this, Horon and Hennessey suggest that these expanded roles may create additional opportunities for pharmacists.<sup>7</sup> The expanded roles of PT have been shown to be necessitated by pharmacists' newly evolved clinical roles, to create additional time for effective discharge of patient-centered roles and more specialized duties. However, these expanded roles for pharmacists still remain elusive in most parts of Nigeria, where several obstacles have prevented their practice.<sup>9,18,19</sup> This may have inversely created little or no perceived need and vacuum to be filled by the expanded roles of PTs as seen in some developed countries.

#### 4.3. Role in OTC medicine counselling

Responsible advice on over-the-counter (OTC) medicines and assistance in managing patients' medication information was observed to be practiced by more than half of the respondents. This is consistent with findings from Denmark where PTs were involved in drug-related counselling that showed positive outcomes.<sup>34</sup> A previous study in Nigeria reported poor knowledge of appropriate OTC selection and OTC-related side effects among some

drug vendors.<sup>35</sup> High prevalence of OTC medicines misuse was also observed in previous studies in Nigeria,<sup>36,37</sup> suggesting more attention on provision of OTC medicines advice and counselling by pharmacy personnel. Meanwhile, drug information is a recognized service in community and hospital pharmacies.<sup>38</sup> Although OTC medicines are relatively safe, proper counselling is essential to prevent potential adverse effects, especially in contraindications. Education and pharmacy personnel training are useful approaches that aid in detecting drug-related problems,<sup>39</sup> and as such should be regularly adopted in practice settings.

#### 4.4. Medication reviews

The least often performed task by the PTs was discussing possible change in therapy. This requires specialized competencies and extra training of PTs for safe and efficient practice. Practice of medication reviews and medication therapy management have been previously shown among PTs in UK.<sup>31</sup> Participation of PTs in medication reviews and medication reconciliation with associated positive impact was also demonstrated by Buck et al. in Denmark.<sup>40</sup> This Danish study also suggests the use of pharmacist's developed protocol for this PT review,<sup>40</sup> to ensure patient safety.

The evolution of pharmacy practice in various parts of the world and the slow pace of development of PC in other parts, particularly in Africa, underscores the relevance of this study. This study brings evidence of current state of practice of PC among PTs in Nigeria, and contributes to the growing evidence of evolution of pharmacy practice. Limitations of potential self-reporting bias in the practice of PC may be associated with our study. Small sample size arising from small number of PTs in the location is another limitation of this study.

#### 5. Conclusions

Various sources of information was observed, and this was associated with selected socio-demographics. Several PC activities were often undertaken by PTs, and some differences in practice was seen between PTs in hospital and community settings. Workplace trainings and other forms of enlightenment are essential for improving PT awareness of PC concept, to facilitate and promote its practice.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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