

Impact of PharmD training on pharmacy practice among graduates of non-traditional PharmD degree programme in Nigeria

Elijah N. A. Mohammed^{1,2}, Rasaq Adisa³, Oluwatoyin A. Odeku⁴

¹Department of Clinical Pharmacy and Pharmacy Practice, University of Benin, Benin-city, Nigeria.

²NAEM Consulting, Lekki Peninsula, Lagos, Nigeria.

³Department of Clinical Pharmacy and Pharmacy Administration, University of Ibadan, Ibadan, Nigeria.

⁴Department of Pharmaceutics and Industrial Pharmacy, University of Ibadan, Ibadan, Nigeria.

Corresponding author: Oluwatoyin A. Odeku

E-mail: pejuodeku@yahoo.com; o.odeku@ui.edu.ng

Telephone: +234 805 732 0466

ABSTRACT

Background: Current trends in pharmacy require that pharmacists acquire additional knowledge, skills, and the right orientation towards patient-centered care. The non-traditional PharmD training tagged 'Special PharmD (SPD) conversion programme' was designed to equip and train pharmacists with a Bachelor of Pharmacy (B.Pharm) degree in requisite competencies to deliver pharmaceutical care. Two sets of pharmacists were therefore trained at the University of Benin between 2018 and 2020. However, there has been no study to comprehensively explore the impact of the training on pharmacy practice among the participants.

Objective: To evaluate the impact of PharmD training on practice among the graduates of SPD.

Methods: A cross-sectional questionnaire-guided web-based survey was conducted among the SPD graduates. The questionnaire converted to Google Form was sent to eligible respondents via individual email contact and pharmacist-designated WhatsApp platforms. Data were summarized with descriptive statistics. Chi-square, Mann-Whitney-U, and Kruskal-Wallis tests were used to determine the differences in participants' responses at $p < 0.05$.

Results: Sixty (42.7%) respondents had 11-20 years of experience in practice. A total of 109 (76.8%) self-sponsored the training, and 127 (89.4%) found the SPD courses taught generally useful. The experience gained (115; 47.7%) and the skills acquired (81; 33.3%) were the vastly positive impression that the training left on participants. Communication skills (112; 78.9%), drug information (108; 76.1%) and pharmacotherapy (105; 73.9%) were courses rated as extremely relevant and applicable to practice. Team or collaborative care (99; 69.7%); communication skills (98; 69.0%) and self-confidence in handling clinical issues (97; 68.3%) were the competencies mostly improved by the training. Almost all (137; 96.5%) encouraged the schools of pharmacy to commence a PharmD conversion programme.

Conclusion: The impact of non-traditional PharmD training on pharmacy practice among the participants is vast. Improved team or collaborative care, communication skills, and self-confidence in handling clinical issues were identified as core additional skills gained from the training. The overwhelming majority encouraged the commencement of the PharmD conversion programme by all the schools of pharmacy. However, the observed weaknesses need to be closely addressed for improved output.

Keywords: Non-traditional PharmD, Impact on practice, University of Benin, Nigeria

Impact de la formation de Docteur en pharmacie sur la pratique pharmaceutique parmi les diplômés d'un programme non traditionnel de docteur en pharmacie au Nigéria

Elijah N. A. Mohammed^{1,2}, Rasaq Adisa³, Oluwatoyin A. Odeku⁴

¹Département de Pharmacie Clinique et de Pratique Pharmaceutique, Université du Bénin, Benin-city, Nigéria

²NAEM Consulting, péninsule de Lekki, Lagos, Nigéria

³Département de pharmacie clinique et d'administration pharmaceutique, Université d'Ibadan, Ibadan, Nigeria

⁴Département de pharmacie et de pharmacie industrielle, Université d'Ibadan, Ibadan, Nigeria

Auteur correspondant: Oluwatoyin A. Odeku

Courriel: pejuodeku@yahoo.com ; o.odeku@ui.edu.ng

Téléphone: +234 805 732 0466

RÉSUMÉ

Contexte: Les tendances actuelles en pharmacie exigent que les pharmaciens acquièrent des connaissances et des compétences supplémentaires, ainsi qu'une bonne orientation vers des soins centrés sur le patient. La formation non traditionnelle de docteur en pharmacie (PharmD) intitulée " Programme de conversion Special PharmD (SPD) " a été conçue pour équiper et former les pharmaciens titulaires d'une licence en pharmacie (B.Pharm) dans les compétences requises pour fournir des soins pharmaceutiques. Deux groupes de pharmaciens ont donc été formés à l'Université du Bénin entre 2018 et 2020. Cependant, aucune étude n'a exploré de manière exhaustive l'impact de la formation sur la pratique pharmaceutique chez les participants.

Objectif: Évaluer l'impact de la formation de pharmD sur la pratique des diplômés du SPD.

Méthodes: Une enquête transversale en ligne guidée par un questionnaire a été menée auprès des diplômés du SPD. Le questionnaire converti en formulaire Google a été envoyé aux répondants éligibles par courrier électronique individuel et par l'intermédiaire des plateformes WhatsApp conçues pour pharmaciens. Les données ont été résumées à l'aide de statistiques descriptives. Les tests du chi carré, de Mann-Whitney-U et de Kruskal-Wallis ont été utilisés pour déterminer les différences dans les réponses des participants à $p < 0,05$.

Résultats: Soixante répondants (42,7%) avaient entre 11 et 20 ans d'expérience dans la pratique. Au total, 109 (76,8%) ont autofinancé leur formation et 127 (89,4 %) ont trouvé les cours SPD dispensés utiles en général. L'expérience acquise (115 ; 47,7%) et les compétences acquises (81 ; 33,3%) constituent l'impression très positive que la formation a laissée aux participants. Les compétences en communication (112 ; 78,9%), les renseignements sur les médicaments (108 ; 76,1%) et la pharmacothérapie (105 ; 73,9%) étaient des cours jugés extrêmement pertinents et applicables à la pratique. Les soins en équipe ou en collaboration (99 ; 69,7%) ; les compétences en communication (98 ; 69,0 %) et la confiance en soi dans la gestion des problèmes cliniques (97 ; 68,3%) étaient les compétences les plus améliorées par la formation. Presque tous (137 ; 96,5%) ont encouragé les écoles de pharmacie à lancer un programme de conversion en PharmD .

Conclusion: L'impact de la formation PharmD non traditionnelle sur la pratique pharmaceutique des participants est immense. L'amélioration des soins en équipe ou en collaboration, les compétences en communication et la confiance en soi dans la gestion des problèmes cliniques ont été identifiées comme des compétences supplémentaires essentielles acquises grâce à la formation. L'écrasante majorité a encouragé toutes les écoles de pharmacie à lancer le programme de conversion au PharmD en pharmacie. Toutefois, les faiblesses observées doivent être soigneusement corrigées pour améliorer les résultats.

Mots-clés : PharmD non traditionnel, impact sur la pratique, Université du Bénin, Nigeria

INTRODUCTION

Major revolutions have occurred in Pharmacy education and practice worldwide. Notable is the introduction of the Doctor of Pharmacy (PharmD) programme which has now become the gold standard in many developed and developing countries.^{1,2,3} The Doctor of Pharmacy (PharmD) degree programme is a professional degree programme that trains students for careers as pharmacists. The PharmD curriculum primarily focuses on gaining knowledge of biological sciences with clinical components that teaches future pharmacists to be healthcare providers. The training represents the increasing responsibility that pharmacists have in healthcare systems and the high trust that the people have in them.⁴⁻⁶ Studies in countries that have embraced and implemented PharmD programmes demonstrated that pharmacists with PharmD had continued to make significant contributions that positively influenced the pharmacy educational institutions as well as providing interventions to reduce adverse drug events in out-patients and in-patient clinical settings.⁷⁻¹¹

The PharmD degree is relatively new in Nigeria and most universities are yet to adopt the programme or awaiting approval from the National Universities Commission (NUC).^{1,12} At present, both PharmD and Bachelor of Pharmacy (B. Pharm) are the certifying degrees offered to graduates of Pharmacy. The slow progress in PharmD commencement or implementation by many Faculties of Pharmacy may be linked to several factors including the low level of appropriate academic manpower, lack of proper training for pharmacists, restricted access to the hospitals to train pharmacy students, increasing hostility and continuous resistance from medical profession against patient-oriented pharmaceutical services, as well as unwillingness on the part of some pharmacists to take up additional patient care roles and responsibilities.^{3,12} Nevertheless, with the proactive steps taken by the Pharmacy Council of Nigeria (PCN) and the National Universities Commission (NUC) to issue a deadline of 2024 for all schools of Pharmacy in Nigeria to commence the PharmD programme. It has now become mandatory for every school of pharmacy to restructure its curriculum to fit into the Benchmark Minimum Academic Standard (BMAS) set by NUC for the PharmD programme.

The NUC approval of the Doctor of Pharmacy degree as the entry-level qualification for pharmacists to practice in Nigeria has created the need to have academic

manpower with requisite clinical training and skills, as well as the right orientation towards patient-centred pharmaceutical care, to train the prospective PharmD students. The training provides the opportunity for pharmacists with B. Pharm. to upgrade their knowledge in patient-focused care and is also expected to produce a workforce of experienced pharmacists who will develop and nurture the 6-year PharmD programme in the various universities. It is against this background that the Pharmacy Council of Nigeria in collaboration with the University of Benin and the Nigerian Association of Pharmacists and Pharmaceutical Scientists in the Americas (NAPPSA) floated a one-year PharmD conversion training programme for holders of B. Pharm. degree tagged 'Special PharmD (SPD) conversion programme' for pharmacists in the academia, as well as accredited preceptors for pharmacy clinical clerkship programme in Nigerian Universities. The PharmD conversion training programme was modelled after the non-traditional PharmD degree training in the US, where experienced pharmacists with a Bachelor of Pharmacy degree upgrades to PharmD through a conversion programme.

In this regard, two sets of pharmacists from different areas of pharmacy practice were trained between 2018-2019 and 2019-2020, across the entire country. The SPD training was designed as a clinically-intensive programme, with professional practice experiential exposure in hospital and community pharmacy, in addition to the expanded contents for other conventional pharmaceutical science courses. However, since the completion of the SPD training by the two sets of graduates, who have subsequently returned to their respective practice sites, there has not been any study to comprehensively explore the impact of the knowledge and skills acquired by participants on their routine pharmacy practice. This study is therefore aimed at evaluating the impact of the training on practice of the SPD graduates in Nigeria.

METHODS

Study design

A cross-sectional questionnaire-guided web-based survey was conducted among the two sets of Special PharmD (SPD) graduates from the University of Benin between 2018 and 2020.

Study site: Web-based study**Inclusion/exclusion criteria**

Pharmacists who participated in the SPD training programme between 2018 and 2020 were enrolled in the study, while those who did not partake in the SPD training programme, as well as those who participated in the training but did not have an active Gmail account to access the Google form, were excluded.

Sample size determination

The list and the email contacts of pharmacists who participated in the SPD training were obtained from the national coordinator of the programme. The target sample size for the study was calculated based on an estimated population of about 300 participants who fully completed the training in the two sets, at a 95% confidence level, 5% margin of error, and 50% response distribution using the Raosoft® sample size calculator (<http://www.raosoft.com>). This gave a sample size of 169, while the addition of a 10% non-response rate gave 186 participants.

Data collection instrument

The main instrument for this study was a questionnaire which comprised two sections. Section A captured the demographic and clinical characteristics of respondents; section B was a 33-item question that explored information on the specific impact of SPD training on routine pharmacy practice, the general opinion on the relevance of course contents on current practice, weakness observed in the programme as well as challenges preventing the implementation of knowledge and skills acquired during the training, among other questions. The response options ranged from dichotomous Yes/No, to a 4-point Likert scale phrased in line with the corresponding statements.

Instrument validation

The questionnaire was assessed for content validity among two pharmacists in academia who were not part of the eligible respondents. Feedback from the scholars led to the re-phrasing of some dichotomous response options as a 4-point Likert scale, while a few ambiguous questions were simplified to ensure clarity and ease of comprehension. The final questionnaire was converted to Google Forms for online distribution to eligible respondents.

Sampling and Data collection procedure

A total sampling of all eligible participants was done. The survey questionnaire in Google Form was sent to respondents via individual email contact submitted during the SPD registration procedure, as well as other pharmacist-designated online platforms including the SPD students' WhatsApp platform that the SPD graduates created for sharing relevant information related to the pharmacy profession and practice. Before gaining access to fill out the Google Form, every respondent must sign in to their Gmail account. The first question on the Google Form captured the participant's informed consent to ascertain respondents' willingness to partake in the study. Once the responses have been submitted, such individuals would be denied access at any subsequent attempts. This was done to avert duplicate or multiple filling by any respondent. Google Form redeployment to the WhatsApp platforms was done at monthly intervals. Three reminders were done before the expiration of the 3-month study duration. It usually takes between 10 and 15 minutes to fill out the Google Form.

Data analysis

Data emanated from Google Forms were extracted into Microsoft Excel, and subsequently entered into SPSS version 23.0 for analysis. Descriptive statistics including frequency and percentages were used to summarize the data. Associations between respondents' areas of practice and their responses on key indicators/parameters about the SPD training were evaluated with the Chi-square test. Mann-Whitney-U and Kruskal-Wallis tests were used to determine the differences in the participants' responses on a Likert scale, at $p < 0.05$ considered significant.

Ethical consideration

Ethics approval for the study was obtained from the Social Sciences and Humanities Research and Ethics Committee, University of Ibadan, Ibadan, Oyo state (Assigned number: UI/SSHREC/2023/0028)

RESULTS

Most of the respondents (73; 51.4%) were in the age range of 41-50 years. Males (86; 60.6%) were more than females (56; 39.4%). Sixty (42.7%) had 11-20 years of experience in practice and most (89; 62.7%) had a year of graduation of > 20 years. Fifty-two (36.6%) respondents were from the hospital practice, 46 (32.4%) were from academia, eighty (56.3%) belonged to the 2019-2020

SPD set, and 109 (76.8%) self-sponsored the training. A total of 142 respondents out of the 300 participants who fully completed the SPD training, filled out the online questionnaire at the end of the 3-month study period. This gave a response rate of 47.3%. Details of the respondents' demographic characteristics are shown in Table 1.

Of the arrays of responses on the general impression that the SPD training left on respondents, 115 (47.7%) indicated that the experience gained and the skills acquired (81; 33.3%) have been of valuable use in practice. The use of the title 'Dr' (4; 1.7%) and 'PharmD' (12; 13.3%) were also cited among others (Table 2). The majority of the respondents (133; 93.7%) indicated that the SPD curricular design generally meets their expectations. In a summarized combination, simplicity of reading of the course materials (75; 34.2%), examination flexibility and convenience (60; 27.4%), as well as the reawakening of clinical knowledge and skills (29; 13.2%), were cited as core areas of SPD curricular that met their expectations. Seventy-three (51.4%) of the respondents indicated that their institution had recognized and accepted the PharmD certificate/qualification into the scheme of service, while the remainder (69; 48.6%) had theirs neither recognized nor accepted. Also, almost all the respondents (137; 96.5%) supported the encouragement of all schools of pharmacy to commence a PharmD conversion programme for holders of Bachelor's degrees. Table 2 shows details on the general impression of SPD training and the status of recognition and acceptance of PharmD certificate/qualification in respondents' respective practice institutions.

Table 3 shows the respondents' opinion on the relevance of SPD course contents to current practice and the rating of specific courses taught during the training. The majority (127; 89.4%) found the SPD courses taught generally useful, though some courses such as radiopharmaceuticals (40.0%), were cited to be less useful in current practice. Most respondents agreed that the depth of the courses taught (96; 67.6%), ease of understanding the course content (92; 64.8%), and clinical skills acquisition and exposure (86; 60.6%) were extremely relevant to practice. In ranked order, communication skills (112; 78.9%), drug information (108; 76.1%) and pharmacotherapy (105; 73.9%) were SPD courses taught that were mostly rated as extremely relevant and applicable to current practice. Opinions on weakness observed during the SPD training indicated

that 65 (45.8%) agreed that inadequate exposure to professional practice experience constituted a weakness of the training. Other weaknesses observed by respondents were captured and reported verbatim in Table 4.

Table 5 shows the specific impact of SPD training on routine pharmacy practice. Ninety-nine (69.7%) agreed that the team or collaborative skills had improved, communication skills and interaction with patients enhanced (98; 69.0%), and self-confidence in handling clinical issues (97; 68.3%) has also improved (Table 5). Opinions on challenges preventing the implementation of knowledge and skills gained during SPD training in practice revealed that a substantial number of respondents strongly agreed that administrative bureaucracy (53; 51.5%), absence of established/institutionalized pharmacist-specific ward rounds (53; 50.5%) and absence of established joint physician rounds (55; 52.0%) were some of the identified challenges preventing implementation of knowledge gained in their respective practice sites. The majority (72; 67.3%) strongly disagreed that a lack of self-confidence among pharmacists constitutes a challenge to the implementation of knowledge gained in practice (See details of challenges cited by respondents in Table 6).

There was a significant association between respondents' areas of practice and their responses to skills and knowledge gained during the SPD training. Respondents from the hospital practice (49; 38.3%) mostly reported having acquired additional skills during the training compared to their counterparts from the academia (40; 31.3%), administrative/regulatory (24; 18.8%), community (12; 9.4%) and public health (3; 2.3%), $p = 0.032$ (Table 7). Also, there was a significant association in respect of areas of practice and SPD courses taught that were not found useful in practice. Respondents from the academia most affirmatively cited the SPD courses taught that are not useful (8; 53.3%) compared to those from the community and hospital, 3 (20.0%) each, public health (1; 6.7%) and administrative/regulatory (0; 0.0%), $p = 0.037$ (Table 7).

There was also a significant association between the areas of practice and responses to the rating of courses taught according to relevance and applicability to practice (Table 8). Respondents from the hospital practice rated pharmacotherapy as extremely relevant, with the lowest mean rank (MR) of 61.28 compared to

academia (MR = 74.22), public health (MR = 75.00), community (MR = 78.69) and administrative/regulatory (MR = 83.06), $p = 0.04$. Also, rated as extremely relevant were communication skills with participants from hospital practice had the lowest MR of 60.76, compared to the community (MR = 73.63), academia (MR = 74.66), and public health (MR = 86.27), $p = 0.007$. Details of the association between the areas of practice and response to the core aspects of SPD training are shown in Table 8.

Table 9 shows the association between the two sets of SPD graduates and their responses on the core aspects of the SPD training. The two sets differed strongly in respect of their opinion on the weakness observed during the training, especially in terms of the absence of physical

contact with respective lecturers during the programme ($p = 0.013$). The second set of 2019-2020 had a lower MR of 64.23 suggesting respondents strongly agreed that the absence of physical contact with lecturers during the SPD training constitutes a weakness of the programme. Similarly, a significant association was noted in the response of the two sets regarding challenges preventing the implementation of SPD knowledge in practice. The second set of 2019-2020 had a lower MR of 47.22 versus 60.71 (first set), $p = 0.019$, indicating those who strongly agreed that besides from the SPD training, there is a need for additional clinical skills and experience to achieve a successful implementation of knowledge and skills gained during the SPD training in practice.

Table 1: Demographic and other characteristics of respondents

Variables	Frequency	Percent
Age (years) (n =142)		
20-30	1	0.7
31-40	25	17.6
41-50	73	51.4
51-60	37	26.1
61-70	6	4.2
Gender (n = 142)		
Male	86	60.6
Female	56	39.4
Marital status (n =142)		
Single	5	3.5
Married	132	93.0
Widow	2	1.4
Divorced/separated	3	2.1
Year of experience in practice (n = 142)		
Less than 5 year	5	3.5
5-10	24	16.9
11-20	60	42.3
21-30	34	23.9
31-40	18	12.7
Above 40	1	.7
Year of graduation as a pharmacist (n = 141)		
Before 1990	29	20.6
1990-1999	20	14.2
2000-2009	58	41.1
2010-2019	32	22.7
2020 and above	2	1.4
Area of practice (n =142)		
Hospital	52	36.6
Academia	46	32.4
Administrative/Regulatory	24	16.9
Community	16	11.3
Public health	4	2.8
Year of completion of PharmD programme (n =142)		
First set (2018-2019)	62	43.7
Second set (2019-2020)	80	56.3
Sponsorship of PharmD programme (n = 142)		
Self-sponsored	109	76.8
Institutional sponsored	25	17.6
Partly self and partly institutional sponsored	8	5.6

Table 2: Summary of respondents' general opinion on non-traditional PharmD training

Variables	Frequency	Percent
General impression that the SPD training left on respondents (n = 241)*		
Use of the title Dr	4	1.7
Use of the title PharmD	32	13.3
Experience gained which I found useful in my practice	115	47.7
Skills acquired which I am currently applying in practice	81	33.6
Promotion opportunities in my work career	1	0.4
Prestige and respect in my workplace	8	3.3
SPD curricular design meet expectation as planned (n = 142)	Yes, n (%)	No, n (%)
	133 (93.7)	9 (6.3)
If Yes, indicate in what specific way? (n = 291)*		
Simplicity of reading of the course materials	75 (34.2)	
Examination flexibility and convenience	60 (27.4)	
Duration of completion of the programme	43 (19.6)	
Reawakening of clinical knowledge and skills	29 (13.2)	
Time schedule	6 (2.7)	
Cost flexibility	6 (2.7)	
Institution recognition and acceptance of the PharmD certificate into scheme of service (n = 142)	Yes, n (%)	No, n (%)
	73 (51.4)	69 (48.6)
If Yes, the state of recognition and acceptance (n = 104)		
Fully recognized and accepted	40 (38.5)	
Partially recognized and accepted	27 (26.0)	
Only recognized but not accepted	21 (20.2)	
Neither recognized nor accepted	16 (15.4)	
Encouragement for all schools of pharmacy to commence PharmD conversion for B. Pharm degree holders (n = 142)	Frequency	Percent
Yes	137	96.5
No	5	3.5

*Multiple responses were cited by respondents

Table 3: Respondents' opinion of the relevance of course contents to current practice and the rating of each course taught in non-traditional PharmD training

Variables	Response, n (%)			
Relevance to practice (n =142)	Extremely relevant	Just relevant	Barely relevant	Not relevant
Depth of the courses taught	96 (67.6)	37 (26.1)	7 (4.9)	2 (1.4)
Understanding of the course contents	92 (64.8)	45 (31.7)	3 (2.1)	2 (1.4)
Clinical skills acquisition exposure	86 (60.6)	50 (35.2)	5 (3.5)	1 (0.7)
Applicability of the course contents to practice	82 (57.7)	47 (33.1)	12 (8.5)	1 (0.7)
Delivery of the course contents	78 (54.9)	50 (35.2)	12 (8.5)	2 (1.4)
Rating of each course taught according to relevance and applicability to practice (n = 142)				
Communication skills	112 (78.9)	25 (17.6)	2 (1.4)	3 (2.1)
Drug information	108 (76.1)	26 (18.3)	5 (3.5)	3 (2.1)
Pharmacotherapy	105 (73.9)	32 (22.5)	2 (1.4)	3 (2.1)
Pharmacy management	87 (61.3)	48 (33.8)	4 (2.8)	3 (2.1)
Pharmacokinetics	81 (57.0)	52 (36.6)	8 (5.6)	1 (0.7)
Biopharmaceutics	64 (45.1)	68 (47.9)	7 (4.9)	3 (2.1)
Drug delivery/drug formulation	58 (40.8)	64 (45.1)	16 (11.3)	4 (2.8)
Pharmaceutical microbiology	51 (35.9)	66 (46.5)	21 (14.8)	4 (2.3)
Biotechnology	49 (34.5)	70 (49.3)	20 (14.1)	3 (2.1)
Herbal medicine/Pharmacognosy	42 (29.6)	76 (53.5)	23 (16.2)	1 (0.7)
Pharmaceutical chemistry	39 (27.5)	69 (48.6)	30 (21.1)	4 (2.8)
SPD courses taught that are not useful (n = 142)				
Yes	15 (10.6)			
No	127 (89.4)			
If yes, specific course				
Radiopharmaceutical	6 (40.0)			
Pharmacognosy	3 (20.0)			
Pharmaceutical chemistry	2 (13.3)			
Pharmaceutics	1 (6.7)			
Biotechnology	1 (6.7)			
Herbal medicine	1 (6.7)			
Pharmaceutical microbiology	1 (6.7)			

SPD = Special PharmD

Table 4: Response on the weakness observed during the non-traditional PharmD Training

Variables	Response, n (%)			
	Strongly agree	Agree	Disagree	Strongly disagree
Weakness observed				
Absence of physical contact with respective lecturer	20 (14.1)	38 (26.8)	49 (34.5)	35 (24.6)
Inadequate professional practice exposure	20 (14.1)	65 (45.8)	43 (30.3)	14 (9.9)
Expensive cost of the SPD training	18 (12.7)	44 (31.0)	52 (36.6)	28 (19.7)
Non-flexibility nature of the SPD training	6 (4.2)	26 (18.3)	60 (42.3)	50 (35.2)

Other individual verbatim responses:

- *The lecture portal and the University website need improvement*
- *Groups were too large*
- *Extra charges for late Project Defense*
- *Practice structure & methods, performance appraisal & remuneration are not standard or applicable across board*
- *Inability to do online assessment, thus the cost of transport and other logistics to write exams and project defense*
- *More like a mission to make money rather than impact knowledge*
- *Inadequate clinical training*
- *Student required to be given more clinical exposure with preceptors present*
- *No strict monitoring of the online assignment and no serious invigilation during exams, project not thoroughly supervised*
- *Time a little bit short*
- *Dispute with NUC on course approval strongly discredit and undermined the recognition and value of the certificate obtained. We are not recognized by colleague and especially medical officers for this mess. Graduands that need the certificate for promotion cannot be promoted.*
- *Inadequate accommodation*
- *Zero feedback on most assignments*
- *It appears that all participants passed the examination and were awarded Pharm D*
- *The ASUU strike then and not being able to use UBTH for practicals*
- *Lack of current information on some courses and topics*
- *Attitude of the medics during clerkship unacceptable*
- *For pharmacognosy, I think more practical exposure is necessary. It wasn't covered. Maybe a visit to a biopharmaceutical laboratory or industry would have made the theoretical content easier to understand*
- *There is need for the program to be multi-centered*

Table 5: Specific impact of non-traditional PharmD training on routine pharmacy practice among respondents

Variables	Response, n (%)			
	Totally agree	Moderately agree	Mildly agree	Disagree
Specific impact of SPD training on practice				
Team and collaborative care skills has improved	99 (69.7)	35 (24.6)	7 (4.9)	1 (0.7)
Communication skills/interaction with patients enhanced	98 (69.0)	39 (27.5)	5 (3.5)	0 (0.0)
Self confidence in handling clinical issue is better	97 (68.3)	41 (28.9)	4 (2.8)	0 (0.0)
Self-motivation to inquire for drug -related information is enhanced	99 (69.7)	39 (27.5)	4 (2.8)	0 (0.0)
Interest in research is enhanced	88 (62.0)	43 (30.3)	9 (6.3)	2 (1.4)
Other individual verbatim responses				
<ul style="list-style-type: none"> • <i>My PharmD was equated to a masters' degree with working education services, Canada</i> • <i>Counselling clients on the use of Herbal Medicines has improved</i> • <i>Improved the nature of lecture delivery</i> • <i>Clinical clerkship exposure to foreign specialist</i> • <i>I now have more clinicians as colleagues to work with and not feel odd</i> • <i>I was able to meet new Colleagues that I still maintained their contacts</i> • <i>It has made me to reinvent myself and my practice. I am so grateful for the opportunity</i> • <i>Formation of CPAN, various regional seminars and workshops etc</i> • <i>Improvement in resolution of drug related problems</i> • <i>Pharm D should be made the baseline pharmacy training in Nigeria</i> 				

Table 6: Challenges preventing the implementation of non-traditional PharmD training knowledge and skills in practice

Challenges	Response, n (%)			
	Strongly agree	Agree	Disagree	Strongly disagree
Administrative bureaucracy/bottleneck (n = 103)	53 (51.5)	26 (25.2)	10 (9.7)	14 (13.6)
Unconducive working environment (n =106)	32 (30.2)	35 (33.0)	21 (19.8)	18 (17.0)
Time constraint (n = 105)	20 (19.0)	35 (33.3)	29 (27.6)	21 (20.0)
Uncooperative attitude of other healthcare professionals (n =108)	39 (36.1)	39 (36.1)	14 (13.0)	16 (14.8)
Lack of self-confidence (n = 107)	1 (0.9)	6 (5.6)	28 (26.2)	72 (67.3)
Rivalry among pharmacist colleagues (n = 106)	16 (15.1)	18 (17.0)	36 (34.0)	36 (34.0)
Attempt to work in silos by the pharmacist colleagues (n = 105)	12 (11.4)	27 (25.7)	36 (34.3)	30 (28.6)
Need for more clinical skills and knowledge/experience asides from the PharmD training (n = 105)	30 (28.6)	35 (33.3)	24 (22.9)	16 (15.2)
Access restriction to the patients' wards (n = 107)	25 (23.4)	26 (24.3)	28 (26.2)	28 (26.2)
Absence of established/institutionalized pharmacist-specific ward rounds (n = 105)	53 (50.5)	30 (28.6)	9 (8.6)	13 (12.4)
Absence of established/institutionalized Joint physician-pharmacists rounds (n = 102)	53 (52.0)	26 (25.5)	11 (10.8)	12 (11.8)

Table 7: Association between respondents' area of practice and response on key policy parameters about the PharmD training

Variables Area of practice	Response Did curricular design meet your expectations?		P-value
	Yes, n (%)	No, n (%)	
Community	16 (12.0)	0 (0.0)	0.342*
Hospital	50 (37.6)	2 (22.2)	
Academia	40 (30.1)	6 (56.7)	
Administrative/Regulatory	23 (17.3)	1 (11.1)	
Public health	4 (3.0)	0 (0.0)	
	Did you acquire any special skill during the SPD training?		
Community	12 (9.4)	4 (28.6)	0.032*
Hospital	49 (38.3)	3 (21.4)	
Academia	40 (31.3)	6 (42.9)	
Administrative/Regulatory	24 (18.8)	0 (0.0)	
Public health	3 (2.3)	1 (7.1)	
	Is there any course taught that was not found useful in practice?		
Community	3 (20.0)	13 (10.2)	0.037*
Hospital	3 (20.0)	49 (38.6)	
Academia	8 (53.3)	38 (29.9)	
Administrative/Regulatory	0 (0.0)	24 (18.9)	
Public health	1 (6.7)	3 (2.4)	
	Would you encourage conversion of B. Pharm to PharmD by all schools of pharmacy?		
Community	16 (11.7)	0 (0.0)	1.000*
Hospital	50 (36.5)	2 (40.0)	
Academia	44 (32.1)	2 (40.0)	
Administrative/Regulatory	23 (16.8)	1 (20.0)	
Public health	4 (2.9)	0 (0.0)	
	Any challenge preventing implementation of knowledge gained in practice?		
Community	8 (9.0)	8 (15.1)	0.743*
Hospital	35 (39.3)	17 (32.1)	
Academia	29 (32.6)	17(32.1)	
Administrative/Regulatory	14 (15.7)	10 (18.9)	
Public health	3 (3.4)	1 (1.9)	
Years of experience in practice	Did curricular design meet your expectations?		
	Yes, n (%)	No, n (%)	p-value
≤ 20 years	84 (63.2)	5 (55.6)	0.727*
>20 years	49 (36.8)	4 (44.4)	
	Did you acquire any special skill during the SPD training?		
= 20 years	79 (61.7)	10 (71.4)	0.570^
>20 years	49 (38.3)	4 (28.5)	
	Is there any course taught that was not found useful in practice?		
= 20 years	7 (46.7)	82 (64.6)	0.251^
>20 years	8 (53.3)	45 (35.4)	
	Would you encourage conversion of B. Pharm to PharmD by all schools of pharmacy?		
= 20 years	85 (62.0)	4 (80.0)	0.851*
>20 years	52 (38.0)	1 (20.0)	
	Any challenge preventing implementation of knowledge gained in practice?		
= 20 years	57 (64.0)	32 (60.4)	0.721^
>20 years	32 (36.0)	21 (39.6)	

Level of significance, p < 0.05, * Fischer Exact Test p-value ^ Pearson Chi-square p-value, Significant = Bold p-values

Table 8: Association between respondents' area of practice and their responses on core aspects of the no-traditional PharmD training

Core variables	Area of practice	N	Mean Rank	K-Wp-value
A. Relevance of the programme to practice (n =142)				
Depth of the courses taught	Community	16	73.44	0.079
	Hospital	52	62.22	
	Academia	46	80.77	
	Administrative/regulatory	24	69.92	
	Public health programme	4	87.25	
Delivery of the course content	Community	16	75.38	0.236
	Hospital	52	62.21	
	Academia	46	78.48	
	Administrative/regulatory	24	74.38	
	Public health programme	4	79.25	
Understanding of the course contents	Community	16	72.19	0.172
	Hospital	52	64.64	
	Academia	46	73.30	
	Administrative/regulatory	24	77.04	
	Public health programme	4	103.88	
Applicability of the course contents to practice	Community	16	69.72	0.211
	Hospital	52	62.61	
	Academia	46	76.84	
	Administrative/regulatory	24	80.13	
	Public health programme	4	81.13	
Clinical skills acquisition exposure	Community	16	77.50	0.094
	Hospital	52	61.09	
	Academia	46	74.86	
	Administrative/regulatory	24	82.63	
	Public health programme	4	77.50	
B. Rating of each course taught according to relevance and applicability to practice (n = 142)				
Pharmacotherapy	Community	16	78.69	0.041*
	Hospital	52	61.28	
	Academia	46	74.22	
	Administrative/regulatory	24	83.06	
	Public health programme	4	75.00	
Biopharmaceutics	Community	16	70.19	0.497
	Hospital	52	67.66	
	Academia	46	77.59	
	Administrative/regulatory	24	72.77	
	Public health programme	4	49.00	
Drug information	Community	16	68.03	0.485
	Hospital	52	66.47	
	Academia	46	74.11	
	Administrative/regulatory	24	78.94	
	Public health programme	4	76.13	
Pharmacokinetic	Community	16	79.88	0.282
	Hospital	52	65.88	
	Academia	46	68.33	
	Administrative/regulatory	24	82.48	
	Public health programme	4	81.75	
Pharmacy management	Community	16	65.09	0.103
	Hospital	52	65.34	
	Academia	46	82.38	
	Administrative/regulatory	24	66.00	
	Public health programme	4	85.13	

Relevance of the programme to practice (Extremely relevant =1, Just relevant =2, Barely relevant =3, Not relevant = 4); **Rating of each course according to applicability to practice** (Extremely relevant =1, Just relevant =2, Barely relevant =3, Not relevant = 4); **Weakness observed in the training** (Strongly agree = 1, Agree = 2, Disagree = 3, Strongly disagree = 4); **Specific impact of PharmD training on practice** (Totally agree =1, Moderately agree = 2, Mildly agree = 3, Disagree = 4); **Challenges preventing implementation of knowledge gained in practice** (Strongly agree = 1, Agree = 2, Disagree = 3, Strongly disagree = 4). Lowest mean rank indicates those who found the respective statement mostly relevant or who mostly agreed with the corresponding statement. Level of significance $P < 0.05$. K-W = Kruskal Wallis Test, * = Significant value

Table 8 contd.: Association between respondents' area of practice and their responses on core aspects of the non-traditional PharmD training

Core variables	Area of practice	N	Mean Rank	K-Wp-value
Rating of each course taught according to relevance and applicability to practice contd.				
Communication skills	Community	16	73.63	0.007*
	Hospital	52	60.76	
	Academia	46	74.66	
	Administrative/regulatory	24	86.27	
	Public health programme	4	77.63	
Drug delivery/drug formulation studies	Community	16	78.94	0.227
	Hospital	52	64.85	
	Academia	46	77.96	
	Administrative/regulatory	24	73.04	
	Public health programme	4	44.75	
Pharmaceutical chemistry	Community	16	82.44	0.300
	Hospital	52	65.95	
	Academia	46	76.46	
	Administrative/regulatory	24	70.81	
	Public health programme	4	47.00	
Pharmaceutical microbiology	Community	16	73.44	0.216
	Hospital	52	65.32	
	Academia	46	77.57	
	Administrative/regulatory	24	77.13	
	Public health programme	4	40.63	
Biotechnology	Community	16	70.63	0.434
	Hospital	52	70.99	
	Academia	46	71.22	
	Administrative/regulatory	24	79.00	
	Public health programme	4	39.88	
Herbal Medicine/Pharmacognosy	Community	16	60.88	0.668
	Hospital	52	72.23	
	Academia	46	70.13	
	Administrative/regulatory	24	78.52	
	Public health programme	4	78.13	
C. Weakness observed during the non-traditional PharmD Training (n =142)				
Absence of physical contact with respective lecturer	Community	16	64.50	0.627
	Hospital	52	78.13	
	Academia	46	69.37	
	Administrative/regulatory	24	65.83	
	Public health programme	4	71.75	
Inadequate professional practice exposure	Community	16	64.56	0.351
	Hospital	52	77.63	
	Academia	46	65.08	
	Administrative/regulatory	24	77.77	
	Public health programme	4	55.88	
Expensive cost of the SPD training	Community	16	63.69	0.748
	Hospital	52	74.44	
	Academia	46	72.96	
	Administrative/regulatory	24	70.71	
	Public health programme	4	52.50	
Non-flexibility nature of the training	Community	16	66.25	0.446
	Hospital	52	71.46	
	Academia	46	77.63	
	Administrative/regulatory	24	67.92	
	Public health programme	4	44.00	

Relevance of the programme to practice (Extremely relevant =1, Just relevant =2, Barely relevant =3, Not relevant = 4); **Rating of each course according to applicability to practice** (Extremely relevant =1, Just relevant =2, Barely relevant =3, Not relevant = 4); **Weakness observed in the training** (Strongly agree = 1, Agree = 2, Disagree = 3, Strongly disagree = 4); **Specific impact of PharmD training on practice** (Totally agree =1, Moderately agree = 2, Mildly agree = 3, Disagree = 4); **Challenges preventing implementation of knowledge gained in practice** (Strongly agree = 1, Agree = 2, Disagree = 3, Strongly disagree = 4). Lowest mean rank indicates those who found the respective statement most relevant or who mostly agreed with the corresponding statement. Level of significance $P < 0.05$. K-W = Kruskal Wallis Test, * = Significant value

Table 9: Association between the two sets of SPD graduates and responses on core aspects of the training

Core variables	Year of completion of SPD training	N	50 th Percentile (Median)	Mean Rank	MW-Up-value
A. Relevance of the programme to practice (n =142)					
Depth of the courses taught	First set (2018-2019)	62	1	70.73	0.812
	Second set (2019-2020)	80		72.09	
Delivery of the course contents	First set (2018-2019)	62	1	68.95	0.465
	Second set (2019-2020)	80		73.48	
Understanding of the course contents	First set (2018-2019)	62	1	70.09	0.666
	Second set (2019-2020)	80		72.59	
Applicability of the course contents to practice	First set (2018-2019)	62	1	69.32	0.527
	Second set (2019-2020)	80		73.19	
Clinical skills acquisition exposure	First set (2018-2019)	62	1	70.06	0.667
	Second set (2019-2020)	80		72.62	
B. Rating of each course taught according to relevance and applicability to practice (n = 142)					
Pharmacotherapy	First set (2018-2019)	62	1	72.33	0.782
	Second set (2019-2020)	80		70.86	
Biopharmaceutics	First set (2018-2019)	62	2	74.47	0.397
	Second set (2019-2020)	80		69.20	
Drug information	First set (2018-2019)	62	1	66.89	0.114
	Second set (2019-2020)	80		75.08	
Pharmacokinetic	First set (2018-2019)	62	1	74.04	0.459
	Second set (2019-2020)	80		69.53	
Pharmacy management	First set (2018-2019)	62	1	74.23	0.415
	Second set (2019-2020)	80		69.38	
Communication skills	First set (2018-2019)	62	1	68.87	0.345
	Second set (2019-2020)	80		73.54	
Drug delivery/drug formulation studies	First set (2018-2019)	62	2	75.63	0.250
	Second set (2019-2020)	80		68.30	
Pharmaceutical chemistry	First set (2018-2019)	62	2	78.29	0.061
	Second set (2019-2020)	80		66.24	
Pharmaceutical microbiology	First set (2018-2019)	62	2	77.93	0.075
	Second set (2019-2020)	80		66.52	
Biotechnology	First set (2018-2019)	62	2	73.43	0.591
	Second set (2019-2020)	80		70.01	
Herbal Medicine/Pharmacognosy	First set (2018-2019)	62	2	73.60	0.553
	Second set (2019-2020)	80		69.87	
C. Weakness observed during the non-traditional PharmD (SPD) training (n =142)					
Absence of physical contact with respective lecturer	First set (2018-2019)	62	3	80.88	0.013*
	Second set (2019-2020)	80		64.23	
Inadequate professional practice exposure	First set (2018-2019)	62	2	72.97	0.616
	Second set (2019-2020)	80		70.36	
Expensive cost of the SPD training	First set (2018-2019)	62	3	72.97	0.695
	Second set (2019-2020)	80		70.36	
Non-flexibility nature of the training	First set (2018-2019)	62	3	70.08	0.699
	Second set (2019-2020)	80		72.60	
D. Specific impact of SPD training on practice (n =142)					
Team or collaborative care skills has improved	First set (2018-2019)	62	1	73.31	0.567
	Second set (2019-2020)	80		70.10	
Communication skills/interaction with patients has been enhanced	First set (2018-2019)	62	1	76.33	0.127
	Second set (2019-2020)	80		67.76	
Self confidence in handling clinical issues are better	First set (2018-2019)	62	1	76.80	0.096
	Second set (2019-2020)	80		67.39	
Self-motivation to inquire drug-related information is enhanced	First set (2018-2019)	62	1	77.40	0.060
	Second set (2019-2020)	80		66.93	
Interest in research is enhanced	First set (2018-2019)	62	1	75.63	0.219
	Second set (2019-2020)	80		68.30	

Table 9 contd.: Association between the two sets of non-traditional PharmD graduates and responses on core aspects of the training programme

E. Challenges preventing implementation of non-traditional PharmD training knowledge and skills in practice					
Administrative bureaucracy or bottleneck (n =103)	First set (2018-2019)	44	1	53.57	0.617
	Second set (2019-2020)	59		50.83	
Unconducive working environment (n = 106)	First set (2018-2019)	46	2	55.00	0.647
	Second set (2019-2020)	60		52.35	
Time constraints (n = 105)	First set (2018-2019)	45	2	49.08	0.235
	Second set (2019-2020)	60		55.94	
Uncooperative attitude of other healthcare professionals (n = 108)	First set (2018-2019)	46	2	53.15	0.685
	Second set (2019-2020)	62		55.50	
Lack of self-confidence (n = 107)	First set (2018-2019)	46	4	58.36	0.125
	Second set (2019-2020)	61		50.71	
Rivalry among other pharmacist colleagues (n = 106)	First set (2018-2019)	46	3	55.96	0.451
	Second set (2019-2020)	60		51.62	
Attempt to work in silos by other pharmacist colleagues (n=105)	First set (2018-2019)	46	3	54.66	0.606
	Second set (2019-2020)	59		51.70	
Need for more clinical skills/experience asides from the SPD training (n=105)	First set (2018-2019)	45	2	60.71	0.019*
	Second set (2019-2020)	60		47.22	
Access restriction to patient's ward (n =107)	First set (2018-2019)	46	3	53.82	0.956
	Second set (2019-2020)	61		54.14	
Absence of institutionalized pharmacist-specific ward rounds (n=105)	First set (2018-2019)	46	1	57.46	0.150
	Second set (2019-2020)	59		49.53	
Absence of institutionalized joint physician-pharmacists ward rounds (n=102)	First set (2018-2019)	45	1	53.50	0.508
	Second set (2019-2020)	57		49.92	

Relevance of the programme to practice (Extremely relevant = 1, Just relevant =2, Barely relevant = 3, Nor relevant = 4);

Rating of each course according to applicability to practice (Extremely relevant =1, Just relevant = 2, Barely relevant = 3, Nor relevant = 4);

Weakness observed in the training (Strongly agree = 1, Agree = 2, Disagree = 3, Strongly disagree = 4);

Specific impact of PharmD training on practice (Totally agree = 1, Moderately agree = 2, Mildly agree = 3, Disagree = 4);

Challenges preventing implementation of knowledge gained in practice (Strongly agree = 1, Agree = 2, Disagree = 3, Strongly disagree = 4).

Lower mean rank indicates those who found the respective statement mostly relevant or who mostly agreed with the corresponding statement.

Level of significance $P < 0.05$. MW-U = Mann Whitney-U Test, * = Significant value

DISCUSSION

In this study, male participants were more than females, while participants were mostly in the age range of 41-50 years. Also, there was a near-equal distribution of respondents from the two sets of SPD graduates which may perhaps make the results quite contributive and robust for exploration by relevant stakeholders. Especially, when these graduates are the only two sets that have hitherto enjoyed the opportunity of the SPD conversion programme in the country. Interestingly, more than two-thirds of the participants self-sponsored the training. This may not be quite surprising considering the fact that the PharmD conversion programme is a much-awaited opportunity that many pharmacists have

been yearning for since the NUC approved the PharmD degree as the entry-level qualification to practice as a pharmacist in Nigeria. Thus, the timely institution of the conversion programme for pharmacists with a bachelor's degree might have made many embrace the training, to acquire the additional requisite competence and skills to function efficiently and effectively in healthcare systems. The PharmD conversion was not only an opportunity for registered pharmacists with B. Pharm. to upgrade their knowledge in patient-focused care, but is also expected to create independent thinkers and problem solvers who are knowledgeable in all aspects of drug therapy and who can communicate and counsel health care professionals and patients.¹² Studies from countries that have fully

implemented PharmD programmes have demonstrated that PharmD holders make significant contributions and interventions to reduce medication errors and adverse drug events as well as positively influenced the pharmacy educational institutions.⁷⁻¹¹

The overwhelming majority of respondents in this study support the encouragement of all schools of pharmacy in Nigeria to commence the Bachelor of Pharmacy upgrade or the conversion programme, besides from the 6-year PharmD programme. Thus, with the encouraging response obtained from participants in this first-ever instituted conversion training programme. It may perhaps be better indicated that interested pharmacists should not be denied the needed additional skills that the PharmD training will afford, to further enhance patient-centred pharmacy practice. Faculties of Pharmacy in various institutions should therefore consider the commencement of a short-term (12-18 months) non-traditional PharmD degree programme comprising a hybrid of online and physical contacts for B. Pharm. holders, alongside the conventional 6-year PharmD degree, to fill the practice gaps.

The specific impact of SPD training on practice as cited by respondents includes improvement in team and collaborative care, enhancement of communication skills to interact with patients and other healthcare teams, as well as improved self-confidence and self-motivation in handling clinical issues and medicine-related problems. These are core additional skills that may be largely deficient in the B. Pharm. programme but which PharmD training will afford the participants. In essence, the 21st century PharmD graduates should specifically be 'practice ready' to be able to contribute directly to patient care, and also be 'team ready' to be able to work in collaboration with other healthcare teams.¹³ A study has revealed that many pharmacists in Nigeria are not comfortable in actively providing "patient-focused care" partly due to a lack of self-confidence and possibly because they are not too willing to adapt to changes or do not wish to be held responsible for their actions.¹² However, many developed countries that have fully migrated to PharmD degree programmes have rolled out the benefits of PharmD in clinical care to include increased participation in physicians' joint rounds as well as making significant interventions and positive contributions to reduce medication errors in clinical practice.^{3,7,10,14}

Several challenges preventing the implementation of knowledge and skills gained from the SPD training in

practice were raised by respondents. These include administrative bureaucracy as well as the absence of institutionalized pharmacist-specific rounds or joint physician-pharmacist rounds in their respective hospitals. These observations by respondents have always been part of the consistent obstacles to pharmacists' proactive engagement in patient-oriented pharmaceutical care services in Nigeria. It is therefore imperative for all the stakeholders concerned in pharmacy education and the pharmacy profession generally including the PCN, Pharmaceutical Society of Nigeria, and Ministry of Health, to be proactive and begin to think ahead of how to practically and holistically tackle these challenges head-on, if there is going to be a continuous success with PharmD programme in Nigeria. The Pharmacy department/unit of the hospital may need to summon the courage to commence pharmacist-specific rounds in their respective hospital. Perhaps, interested pharmacists in every hospital should start with a few wards where they may have clinical strength as well as the cooperation of other healthcare professionals, and as they begin to demonstrate positive contributions by providing value-added pharmaceutical services to patient care, their contribution will be gradually felt and subsequently embraced. It is therefore pertinent to begin to see how to unify and sustain this approach nationally so that it would no longer be alien to the future generation of pharmacists. The PharmD programme cannot thrive in isolation in the face of the identified challenges and uncertainties, thus it is critical for stakeholders in the pharmacy profession and the pharmacists generally to be forward-thinking with flexible vision while appreciating the roles that other healthcare professionals play in the evolution and sustainable implementation of PharmD training programme.¹²

It is noteworthy to mention that, a substantial number of respondents cited the uncooperative attitude of other members of the healthcare team as part of the challenges preventing the implementation of skills and knowledge gained from SPD training in practice. Perhaps gradual acceptance of the value-added contribution of pharmacists by other members of the healthcare team especially physicians may suffice for now until pharmacists begin to genuinely appreciate the need to improve their clinical skills and competence in patient-centred care, thereby regaining and securing their professional role in the healthcare space. Thus, stakeholders in the pharmacy profession and pharmacists generally irrespective of their practice area need to embrace PharmD evolution as a dynamic change that should be encouraged and supported by all.

It is of note to mention that nearly 50% and one-third of the respondents, respectively cited experience gained and skills acquired, as the vastly positive impression that the SPD training left on them. However, less than one-sixth and less than 2% cited the use of the title 'PharmD' and 'Dr' respectively, as the general impression that the SPD training has on them. This finding seems to be in contrast to a study by Erah (2011)¹² since the majority of respondents in our study cited knowledge gained and skills acquired during the SPD training rather than the use of the title 'Dr' or 'PharmD' as the most valuable impression that the PharmD training has left on them. Although a holder of a PharmD degree is entitled to use the prefix designation 'Dr' or PharmD as a suffix title. It is, however, important to state that a PharmD degree holder should be more concerned about the skills and competence that he/she possesses in rendering value-added pharmaceutical care services rather than focusing on the title. More especially, it is the value-added services rendered that should build the requisite self-confidence, as well as drive the necessary prestige that accompanied or accorded the PharmD degree. This should be the cardinal focus of both the present and future PharmD degree holders in order to sustain the continued relevance of the programme to practice.

A point of concern was the response among most respondents that the PharmD conversion certificate has not been fully recognized and accepted into the scheme of service by their establishments. Though, about half of the respondents reported that the SPD qualification has been recognized and accepted into the scheme of service in their institutions. This may imply that there is a need for concerned stakeholders in the pharmacy profession to further engage in advocacy to relevant government agencies to consider this predicament, thereby continuing to stimulate the interest of the SPD graduates to contribute effectively and efficiently to patient care.

Interestingly, a large number of respondents reported that most of the courses taught during the SPD training were found to be useful in their current practice. Pharmacotherapy, communication skills, and drug information were topmost of the courses that were found relevant and applicable to practice. This may be expected because PharmD training is more of a clinical practice orientation. Thus, the identified relevant courses by the respondents are core courses that are necessary to develop the clinical competence of pharmacists. Pharmacotherapy knowledge will increase understanding of diseases and medication(s) to be used, communication skills will enhance interaction skills as

well as an understanding of the appropriate approach to interact with patients and other healthcare teams, while drug information is necessary for the appropriate handling and answering of drug-related information request.

The weakness observed during the SPD training as reported by respondents was largely related to inadequate professional practice experience/exposure (PPE). The short duration of the conversion programme might have accounted for this observation. Thus, institutions that may want to embark on a conversion programme of this kind should take cognizance of increasing the duration of community and hospital practice experiential learning and exposure for the participants, so that they can have adequate time to 'learn by doing' during the PharmD conversion training. The PPE component of the PharmD training programme seems to be key to developing the much-needed skills and competence required to enhance the value-added services of pharmacists in practice. Therefore, more time should be allocated to professional practice exposure whenever an institution is designing the PharmD conversion programme.

In this study, there were more participants from the hospital practice and academia compared to other areas of pharmacy practice. This might have possibly tilted the response towards clinical orientation. Notwithstanding, for PharmD training to be most effective, the duo of pharmacy teachers and the clinical clerkship preceptors should be the main drivers of the programme. Moreover, the SPD conversion programme was mounted by the PCN for the pharmacists in the academia and their institution's accredited preceptors from the hospital and community pharmacy practice. Expectedly, hospital pharmacist participants reported having acquired additional skills from the training compared to their counterparts from other areas of pharmacy practice. Hospital pharmacists, by virtue of their practice area, are usually in consistent contact with patients who may have diverse and sometimes complex disease conditions, as well as contact with varied healthcare teams and specialties. Thus, they need to be equipped with appropriate communication skills and clinical competencies as well as be versed in pharmacotherapy knowledge, to effectively and efficiently render pharmaceutical care services in their respective domains amidst other healthcare teams. Although moving forward, hospital pharmacists' collaboration with academic clinical pharmacists within the respective hospital domain could be necessary to build or reinforce

the self-confidence and clinical skills competence of both parties generally. This can be achieved through the identified specific clinical activities such as pharmacist-specific rounds or with other healthcare members that involved teamwork or collaborative care. This suggestion is a point to note as the implementation of the PharmD programme is about to be widely commenced in various institutions in the country.

Despite the valuable information provided by our study, it is limited by a low response rate. Although, in relation to the representative sample size of 169 calculated for the study, a total of 142 respondents out of 169 gave 84.0%, which may be considered a reasonable proportion. A low response rate to online data collection has also been reported in a previous study,¹⁵ with reason partly adduced to factors such as the lukewarm attitude of people generally to the online survey. Also, in this study, there may be a possibility of memory bias which is an inherent limitation of a self-report study. However, the comprehensiveness of the content of the questionnaire might have led to robust and elaborate responses from the study participants, while complete avoidance of duplicate responses among respondents might have improved the integrity of the data collected. Nonetheless, the study findings should be considered in line with the identified gaps.

CONCLUSION

It can be concluded that the impact of the training on practice among the two sets of SPD graduates in Nigeria is vast. Improved team and collaborative care, communication skills, and self-confidence in handling clinical issues which may be deficient in the B. Pharm. programme, were identified as core additional skills gained from the training. Nearly 50% and one-third, respectively cited the experience gained and the skills acquired, as the vastly positive impression that the training has on them. This is corroborated by the overwhelming majority who supported the encouragement of all schools of pharmacy in Nigeria to commence the PharmD conversion programme. Nevertheless, the challenges reported as well as the weaknesses observed during the training need to be closely addressed by institutions that may want to commence the SPD programme for improved output.

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