

RESEARCH ARTICLE

# Continuing professional development needs of pharmacy professionals in Zambia: Findings and future directions

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## Keywords

Continuing education  
Continuing professional development  
Needs assessment  
Pharmacist  
Zambia

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## Abstract

**Background:** Despite continuing professional development (CPD) becoming a key strategy for improving health outcomes by enhancing the quality of pharmaceutical care services, the CPD needs of the pharmaceutical practitioners in Zambia remained unknown prior to this study. **Aim:** To determine the CPD needs and preferences among pharmaceutical practitioners in Zambia. **Methods:** This descriptive cross-sectional study involved administering a structured self-administered online questionnaire to collect data from 111 pharmaceutical practitioners registered in Zambia. **Results:** The majority of the participants (80%) were Pharmacists with less than 10-years post-registration experience. Several respondents (84.8%) indicated they were engaged in more than one sector of pharmaceutical practice, with hospital and community (retail) pharmacy sectors together having the highest proportion of practitioners. The highly preferred modes of undertaking CPD activities were conferences, seminars, symposia, and workshops (81.7%) followed by hands-on interactive skills activities (79.2%), and short courses (74.4%). CPD involving skills development (95.3%) was highly preferred followed by knowledge impartation (89.9%), behavioural enhancement (77.8%), and lastly attitude inculcation (74.1%). Specific high priority CPD programmes identified included: supply chain management, antimicrobial stewardship, medicine use review, rational use of medicines, and chronic care (non-communicable diseases) management, among several others. **Conclusion:** Pharmaceutical practitioners interviewed in this study seem to be in need of contextually relevant CPD programmes. Blended learning approaches involving face-to-face and online learning coupled with hands-on interactive sessions in knowledge impartation, behavioural enhancement, and skills development were preferred. These findings suggest an opportunity in Zambia to develop and upgrade relevant CPD for pharmaceutical practitioners.

## Introduction

Continuing Professional Development (CPD) has been defined as the systematic maintenance, improvement and broadening of knowledge and skills, and the development of personal qualities necessary for the execution of professional and technical duties throughout one's professional working life (Waterfield, 2008; FIP, 2014). CPD is recognised as an important means by which professionals continually improve and maintain their competencies and fitness to practice (Sihota, 2014; Wheeler & Chisholm-Burns, 2018; O'Loan, 2019). In their joint publication on good pharmacy practice, the International Pharmaceutical Federation (FIP) and the World Health Organization (WHO) recommend that one of the main roles of

pharmacists is to maintain and improve professional performance (FIP, 2014; WHO, 2011). According to the FIP, several studies addressing pharmacists' attitudes and perceptions towards CPD and Continuing Education (CE) in general indicated that pharmacists generally support and value CPD and CE for professional growth, development and maintaining licensure to practice the profession.

Countries around the world have implemented a variety of systems in place for CE, spanning from traditional continuing education requirements to full implementation of the more structured and extensive CPD approaches for different professionals and their scopes of practice. In Pharmacy, several formats and methods of facilitating learning are used to deliver CE

(Khamis *et al.*, 2020). These typically range from face-to-face lectures, workshops, or independent written home-study materials, including virtual and online learning (Khamis *et al.*, 2020). Some of these pedagogical methods, such as virtual and online learning, have gained prominence during crises such as the recent COVID-19 pandemic because teaching and learning can still continue (Ismail *et al.*, 2021; Perry *et al.*, 2021). Thus, many activities can be done virtually or online using modern Information and Communications Technology (ICT) without physically going to work or school (Chan *et al.*, 2020). Potential barriers such as time constraints, lack of resources (particularly in low resources countries), lack of motivation and interest, lack of accreditation system, system and technical problems, facilitation and support issues, and poor understanding of the CPD process have been listed (FIP, 2014).

Across the regulated health professions in several countries, there is increasing pressure to ensure that CPD is not only made mandatory but that the educational approaches used to deliver it will improve practice (O'Loan, 2019). Therefore, investing in the capacity, education and training of the health workforce is key to improving global health goals and access to safe and effective medicines and health services (Bader *et al.*, 2019). In Zambia, pharmaceutical practitioners are required by law to register with the Health Professions Council of Zambia (HPCZ) - the regulatory body established by legislation, under which there is the mandate for regulating CPD and training health practitioners (National Assembly of Zambia, 2009). In addition to being regulated to practice by HPCZ, pharmaceutical practitioners are also expected to be active members of their relevant professional associations. The Pharmaceutical Society of Zambia (PSZ) is the registered professional association for pharmacists and pharmacy technologists in Zambia whose membership spans various sectors of professional pharmacy practice in the country. All health practitioners registered with HPCZ, including pharmaceutical practitioners, are required to engage in CPD activities individually and collectively through the professional association. Accordingly, the HPCZ regulates CPD programmes for health practitioners in collaboration with respective professional associations such as the Pharmaceutical Society of Zambia (PSZ), which have in place generic guidelines for would-be CPD providers (HPCZ, 2018). The CPD-provider guidelines contain standards to be adhered to by CPD-providers in Zambia. The standards cover four areas, namely: (i) Approval and Governance, (ii) CPD programme, (iii) Training resources, and (iv) Records management and reporting system. CPD-providers are

therefore required to satisfactorily meet each standard (HPCZ, 2018).

Whereas the local CPD guidelines by HPCZ are generically aimed at all health practitioners registered with the regulator, there are currently no CPD guidelines specific to pharmaceutical practitioners in Zambia. There is, therefore, room to address the specific CPD needs of pharmaceutical practitioners, pharmaceutical practice and pharmaceutical care services generally in Zambia. From a global and regional (Sub-Saharan Africa) perspective, as gleaned from a scan of the literature on CPD for pharmaceutical practitioners, it is evident that there has been a trend toward systematic, needs-driven CPD programmes that address individual pharmaceutical practitioners to update, develop and maintain their competences and fitness to practice. This is the premise on which the application of the FIP CPD cycle has been endorsed (Tran *et al.*, 2014; Meštrović & Rouse, 2015; Bader *et al.*, 2019; Micallef & Kayyali, 2019).

As of 2019, there were about 895 practising pharmacists on the professional register of the HPCZ (HPCZ, 2019), out of which only about 380 were actively subscribed members of the PSZ – the professional association for pharmacy practitioners and tasked with the provision of CPD programmes for its members in Zambia. This study, therefore, determined the specific CPD needs of pharmaceutical practitioners in Zambia. Specifically, the study explored levels of preferences for CPD activities, the nature and model of CPD training, and the priority types of CPD programmes for the various pharmaceutical roles and functions. Findings from this baseline assessment were premised to inform targeted CPD programme development to address the professional practice gaps as Zambia embarks on setting up CE systems for pharmaceutical practitioners.

## Methods

### *Study design, study population and sampling*

This was a descriptive cross-sectional survey. The population of interest were the practising pharmaceutical practitioners (pharmacists and pharmacy technologists) registered with the HPCZ and PSZ, respectively, in Zambia. Pharmaceutical practitioners that participated in this study were drawn from the 2019 membership register kept by the PSZ. The register consisted of the particulars and email addresses of pharmacists and pharmacy technologists. The register was first de-identified, and only email addresses were used for the selection of participants.

The Raosoft sample size calculator was used to compute the sample size using the following parameters: 5% margin of error, 95% confidence level, 380 as the population size of registered members of the PSZ, and 50% response distribution. The calculated target sample size was 192 pharmaceutical practitioners. A systematic sampling of every 2nd pharmaceutical practitioner's email address on the register was selected and emailed the online questionnaire to complete and return accordingly. A total of 111 pharmaceutical practitioners participated in the survey, representing a 60% response rate.

### **Data collection tool and procedures**

An online CPD survey questionnaire comprising structured questions and some open-ended response questions was uploaded using Google forms, and a URL link to the self-administered questionnaire was sent out to pre-determined group email addresses for the registered practising pharmacists who are members of the PSZ in Zambia. The online survey was programmed to only accept one submitted response per participant. The online link to the survey was kept active with follow-up reminders for 12-weeks. Data were collected from July to September 2019.

Specifically, the survey questionnaire was composed of the following seven main sections as follows: Demographics section, which requested demographic details about professional level, years of experience post-registration to practise, gender, age range, and branch of pharmaceutical practice; level of preference for categories of CPD activities was measured using a five-point Likert scale where 5 = very strongly preferred, 4 = strongly preferred, 3 = moderately preferred, 2 = modestly preferred, and 1 = lowly preferred. Six categories of CPD activities for which levels of preference were requested were stated as (i) Conferences, Seminars, Symposia and Workshops, (ii) Special lectures, (iii) Hands-on and interactive skill development activities, (iv) Short-courses, (v) Attachment to Centers of Excellence, and (vi) Professional upgrade studies, respectively. Similarly, participants were requested to indicate their levels of preference for the nature of CPD as follows: (i) Knowledge impartment, (ii) Attitude inculcation, (iii) Behavioral enhancement, and (vi) Skills training. Regarding models of CPD preferred, participants were requested to indicate their levels of preference on a scale of 1 to 5 (as explained above) for the following three models of CPD delivery: (i) Institutional (traditional), (ii) Online (virtual), and (iii) Blended (hybrid) learning programmes, respectively. To determine the priority types of CPD activities participants would consider undertaking, this study proposed possible CPD activities based on the FIP/WHO

Good Pharmacy Practice (GPP) recommendations (WHO, 2011) for pharmaceutical roles and functions beneficial to the contemporary practice of pharmaceutical care. The questionnaire also asked participants to indicate the extent to which they supported the introduction of specific indicative CPD short courses in various aspects of contemporary pharmaceutical practice areas.

Lastly, the participants were asked to state succinctly any other areas of their interest or concern and their views regarding the CPD programmes being set up in Zambia.

### **Data analysis**

Quantitative data collected was collated and checked for completeness before being compiled onto a dataset in Microsoft Excel software. Questionnaires with largely incomplete responses in the objective categories assessed were excluded from the analysis. Scores for Likert-scale responses were summed and grouped into categories. Descriptive statistics such as frequencies and proportions were used to describe the data.

### **Ethical Considerations**

A detailed information sheet was provided to each participant, upon which informed consent was thereafter obtained. All responses were anonymous and confidentially kept. Ethical approval was granted by the University of Zambia Health Sciences Research Ethics Committee (IRB no. 00011000, IORG no. 0009227).

### **Results**

A total of 111 pharmaceutical practitioners responded to the survey questionnaire. Table I shows the demographic characteristics of the participants.

The majority of the participants (80%) were Pharmacists, out of which slightly more than 60% were fully registered at HPCZ. Slightly over a fifth of the participants were pharmacy technologists. The majority (85%) of respondents had a post-registration experience of less than 10 years, and three-quarters of respondents were male. About two-thirds of respondents were in the age range below 39 years. Several respondents indicated that they were engaged in more than one branch or sector of pharmaceutical practice, with hospital pharmacy and community (retail) pharmacy sectors together having the highest proportion of practitioners who participated in this survey.

**Table I: Demographic data of participants**

Variable	Proportion	Frequency
<b>Gender</b>		
▪ Female	23.6%	26/110
▪ Male	76.4%	84/110
<b>Age</b>		
▪ 18 to 29 years	43.7%	48/110
▪ 30 to 39 years	48.2%	53/110
▪ 40 to 49 years	7.3%	8/110
▪ 50 to 59 years	0.9%	1/110
<b>Years of professional experience post-registration</b>		
▪ 0 to 9 years	85.2%	92/108
▪ 10 to 19 years	13.9%	15/108
▪ More than 20 years	0.9%	1/108
<b>Professional registration status</b>		
▪ Pharmacist on the specialist register of the Health Professions Council of Zambia	8.1%	9/111
▪ Pharmacist on the full register of the Health Professions Council of Zambia	63.1%	70/111
▪ Pharmacists on provisional or temporal register of the Health Professions Council of Zambia	9.0%	10/111
▪ Pharmacy technologist registered by the Health Professions Council of Zambia	19.8%	22/111
<b>Branch of pharmaceutical service where currently practising</b>		
▪ Hospital pharmacy	52.3%	
▪ Community (Retail) pharmacy	32.5%	
▪ Pharmaceutical administration/management practice	15.3%	
▪ Academic pharmacy	11.7%	
▪ Public health pharmacy	5.4%	
▪ Pharmaceutical manufacturing industry	2.7%	
▪ Wholesale-Import pharmacy	1.8%	
▪ Pharmaceutical research	1.8%	
▪ Pharmaceutical/Health-related non-state multilateral organisations	0.9%	
▪ Other sectors	0.9%	

**Preferred mode and content of CPD activities**

Participants were asked to indicate the mode and nature of CPD activities they preferred to undertake. Table II shows the proportions of responses for the

preferred mode and content nature of CPD activities derived from the grouped Likert responses on a scale of 1 to 5, with 1 being "lowly preferred" and 5 being "very strongly preferred".

**Table II: Participants' preference for the mode and content of CPD activities**

Categories	Preference levels and frequency				
	Very strongly preferred	Strongly preferred	Moderately preferred	Modestly preferred	Lowly preferred
<b>Mode of CPD activities</b>					
• Conferences, Seminars, Symposia and Workshops (n = 109)	45%	36.7%	11%	3.7%	3.7%
• Special Lectures (n = 106)	21.7%	31.1%	24.5%	8.5%	14.2%
• Hands-on and Interactive skills workshops (n = 106)	52.8%	26.4%	13.2%	2.8%	4.7%
• Short Courses (n = 109)	44%	30.4%	12.8%	9.2%	3.7%
• Attachment to Centers of Excellence (n = 105)	34.3%	27.6%	17.1%	6.7%	14.3%
• Professional upgrade studies (n = 107)	37.4%	29.9%	15.9%	10.3%	6.5%
<b>Nature of CPD content preferred</b>					
• Knowledge impartation (n = 108)	63%	26.9%	8.3%	0%	1.9%
• Attitude inculcation (n = 108)	39.8%	34.3%	19.4%	1.9%	4.6%
• Behavioral enhancement (n = 108)	41.7%	36.1%	15.7%	1.9%	4.6%
• Skills development (n = 106)	69.8%	25.5%	1.9%	0%	2.8%
<b>Delivery model of CPD</b>					
• Face-to-face (Institutional/ Traditional) learning platform (n = 109)	15.6%	32.1%	15.6%	20.2%	16.5%
• Online (virtual) learning platform (n = 109)	37.6%	24.8%	18.3%	9.2%	10.1%
• Blended (hybrid) learning platform (n = 109)	39.4%	29.5%	19.4%	7.3%	8.3%

Taking proportions for “*very strongly preferred*” and “*strongly preferred*” response categories together, the preferences for modes of CPD activities in the descending order of preference were conferences, seminars, symposia and workshops (81.7%), followed by hands-on interactive skills workshops (79.2%), then short courses (74.4%), followed by professional upgrade studies (67.3%), attachment or placements at centres of excellence (61.9%), and lastly special lectures (52.8%).

Regarding the nature of CPD content preference; taking proportions for “*very strongly preferred*” and “*strongly preferred*” response categories together, the content nature of CPD activities in order of preference was as follows: skills development (95.3%) was highly

preferred, followed by knowledge impartation (89.9%), followed by behavioural enhancement (77.8%), and lastly attitude inculcation (74.1%). The delivery mode preferred by the majority was blended learning (68.9%), followed by online (virtual) learning (62.4%). Traditional face-to-face learning was the least preferred (47.7%).

#### **Specific CPD programmes of interest**

Table III shows the extent to which participants supported the introduction of the specific CPD short-course programmes for pharmaceutical practitioners in Zambia.

**Table III: Extent of participants’ support for specific proposed CPD short-courses**

Specific programme/Short-course	Levels and frequency of support				
	Very strongly supported	Strongly supported	Moderately supported	Modestly supported	Lowly supported
Pharmaceutical supply chain management (n = 109)	76.1%	17.4%	2.8%	0.9%	2.8%
Antimicrobial stewardship (n = 109)	76.1%	15.6%	4.6%	0.9%	2.8%
Medicines use review (n = 108)	75.9%	16.7%	4.6%	0%	2.8%
Rational use of medicines (n = 109)	81.7%	11.9%	3.7%	0%	2.8%
Medicine formularies and guidelines (n = 108)	75%	17.6%	4.6%	0%	2.1%
Responding to symptoms in the pharmacy (n = 110)	77.3%	16.4%	2.7%	0.9%	2.7%
Concordance and adherence (n = 109)	68.8%	21.1%	7.3%	0.9%	1.9%
Clinical governance (n = 108)	70.4%	19.4%	6.5%	0.9%	2.8%
Cold and flu; first stop (n = 108)	53.7%	26.9%	12%	3.7%	3.7%
Natural well-being and healthcare (n = 107)	56.1%	30.8%	9.3%	1.9%	1.9%
Advising on malaria (n = 108)	60.2%	25.9%	8.3%	2.8%	2.8%
Management of asthma (n = 108)	67%	21.1%	9.2%	0.9%	1.8%
Veterinary pharmacy (n = 108)	54.6%	23.1%	13%	5.6%	3.7%
Erectile dysfunction (n = 108)	57.4%	23.1%	15.7%	0.9%	2.8%
Hypertension and healthcare behaviours (n = 109)	75.2%	15.6%	6.4%	0%	2.8%
Health checks and diabetes (n = 108)	69.4%	18.5%	8.3%	0.9%	2.8%
Working with general practitioners (n = 108)	66.6%	19.4%	10.2%	1.9%	1.9%
Being a pre-registration tutor/preceptor (n = 108)	74.1%	10.2%	11.1%	0.9%	3.7%
Interventions in cardiovascular diseases (n = 106)	73.6%	18.9%	3.8%	0.9%	2.8%
Common eye conditions (n = 107)	60.7%	24.3%	10.3%	1.9%	2.8%
Immunisation services in community pharmacy (n = 107)	72%	18.7%	2.8%	3.7%	2.8%
Actinic keratosis and skin cancer (n = 108)	57.4%	21.3%	11.1%	4.6%	5.6%
Osteoarthritis and Rheumatoid arthritis (n = 105)	58.1%	26.7%	8.6%	3.8%	2.9%
Supporting patients with Chronic Obstructive Pulmonary Disease (COPD) (n = 107)	58.9%	25.2%	10.3%	2.8%	2.8%
Common disorders of the outer and middle ear (n = 106)	54.7%	30.2%	8.5%	3.8%	2.8%
Common disorders of the inner ear (n = 106)	51.9%	26.4%	13.2%	4.7%	3.8%
Pancreatic cancer (n = 107)	44.9%	24.3%	16.8%	8.4%	5.6%

The majority of respondents indicated high levels of support for the introduction of the specific CPD programmes proposed in the questionnaire. When asked to suggest other CPD areas not listed in the questionnaire that participants felt would add value to their competency development as pharmaceutical practitioners, the

following CPD topics were suggested for consideration: Management and leadership, Maternal health and medicine use in special populations, Total Parenteral Nutrition (TPN), HIV/AIDS management, Pharmacovigilance, Business entrepreneurship, Pharmacogenetics, Research skills, Toxicity management, Regulatory affairs, Cosmetology,

Herbal medicine use & safety, Emergency care, Paediatric pharmacy, Healthcare administration, Pharmacoeconomics, Pharmacoepidemiology, Academic writing, and Sexually Transmitted Infections (STI) management in the pharmacy, respectively. There was a call to broaden the scope and coverage of CPD and CE for pharmaceutical practitioners in Zambia.

### Other concerns and perceptions regarding CPD Programmes

More than fifty statements were recorded from the participants regarding other areas of interest or concern and views of respondents regarding the CPD program being set up. Table IV shows some representative statements.

**Table IV: Participants' other concerns and perceptions regarding CPD programmes**

Theme	Representative statements
General Support for the Intended CPD programme	(a) CPD should focus on courses that will improve professional pharmacy practice (b) The move is timely and cardinal, as pharmacy personnel are life-long learners (c) It is a very good idea worth supporting (d) I would be glad to see this programme implemented as it will add value to patient care and improved health outcomes (e) The CPD is most welcome for we will be equipped to manage our clients better (f) Appreciate the introduction of the CPD programme (g) It's a welcome move (h) It is a good way of monitoring and upgrading skills relevant to modern pharmacy practice (g) Everything stated (h) The programme should be practical when implemented; (i) It is a good programme (j) The initiative to set-up a CPD programme is a step in the right direction. This will help us to grow professionally as it will impart us with needed skills to carry out specific duties in our respective areas of practice (k) Lovely survey (l) The survey is exhaustive (m) It's a good move
Reiteration of Support for some short-courses/CPD activities already mentioned in the survey questionnaire:	(a) Responding to minor illnesses (b) Supporting patients with Chronic Obstructive Diseases (c) Pharmaceutical supply chain management (d) Pharmaceutical management and policy (e) Pharmacy practice (f) Online learning with case studies and writing tests with open book (g) Immunisation, Responding to symptoms, Skin cancer (h) Management of diabetes for out-patients, when and how to follow up patient referral;
Suggestions/Calls for more short-courses/CPD activities/courses not already mentioned in the survey questionnaire	(a) Management skills in pharmacy practice (b) Pharm.D. programme being distance learning (c) Would like a course in public relations & management, maternal health, and medicines in special age groups (d) Total Parenteral Nutrition (e) I am specifically concerned in HIV/AIDS management (f) Pharmacovigilance (g) Business Entrepreneurship, Management & Leadership courses, and so on are needed for pharmacists (h) Pharmacogenetics (i) Research department needs to look into this area seriously. We need to have proper supervision in this area (j) Cervical cancer and Palliative care (k) Pediatric and toxicology management (l) Entrepreneurship in pharmacy (m) Regulatory pharmacy (n) Cosmetology (o) Herbal medicines use and safety (p) Emergency Medicine, Intensive care unit/pharmacy (q) Cardiac surgery pharmacy, Theatre pharmacy (r) Pediatric pharmacy, Pharmacy for special patients- e.g. epileptic patients, sickle cell patients, geriatric patients, Neonatal pharmacy (s) Health administration pharmacy, pharmaco-economics, epidemiology, Pharmacists medical writing pharmacy that allows a pharmacist to write effective articles to drive a message to public effectively (u) Management of chemical toxicity (v) Consider CPD on management of sexually transmitted diseases in retail pharmacy (w) Mental health (CNS Diseases)
Call for systems strengthening	(a) Should also consider strengthening the poorly implemented and practised roles of pharmacists in hospitals, especially on the wards. In-patients are in great need of the presence and services of pharmacists on the wards in all hospital, not just the University Teaching Hospital (U.T.H.) (b) Strengthening of pharmaceutical clinical practice in first level hospitals (c) Legal frame work of pharmacy practice in Zambia is undefined (d) CPD should focus on courses that will improve professional pharmacy practice

From the more than fifty responses, (i) General support for the (intended) CPD programmes, (ii) Reiteration of support for some short-courses/CPD activities already mentioned in the survey questionnaire, (iii) Calls for other short-courses not mentioned in the survey questionnaire, and (iv) Calls for systems strengthening could be recognised as key perceptions from the participants.

## Discussion

This paper presents the findings of the first nationwide survey of the CPD needs of pharmaceutical practitioners in Zambia. Specifically, the study determined the most preferred CPD activities, nature, delivery mode and priority types of CPD activities required for enhancing competencies in their various pharmaceutical roles and functions. Among the sampled respondents, there were relatively fewer highly specialised practitioners, while the majority (63%) were general pharmaceutical practitioners (Table I). This was consistent with national statistics that showed that Zambia continued to have comparatively few highly specialised pharmaceutical practitioners on the specialist register kept at the HPCZ (HPCZ, 2019).

According to the HPCZ prescribed requirements for specialist registration, one must possess a primary qualification in pharmacy and be fully registered by the HPCZ, in addition to possessing and practising with a postgraduate (secondary) qualification in a pharmacy-related field, to be eligible for specialist registration (National Assembly of Zambia, 2009). In principle, specialist registration for pharmaceutical practitioners requires higher competence levels and CE addresses this requirement. The implication is that by identifying CPD needs and educational gaps, the findings can guide the relevant pharmaceutical education providers and the wider professional stakeholders to consider developing and introducing tailor-made CPD programmes for the majority of general pharmaceutical practitioners. By undertaking CPD and CE in specialised fields of pharmacy, practitioners can then go on to fulfil the HPCZ requirements, for not only continued placement on the respective registers of pharmaceutical practitioners but attain requisite competence to become highly specialised pharmaceutical practitioners that will serve clients better.

This study found that the distribution of respondents according to the sectors or branches of pharmaceutical practice in Zambia was indicative that the majority (52.3%) of pharmaceutical practitioners surveyed were

engaged in hospital pharmacy practice followed by community (retail) pharmacy (32.1%) and administrative pharmacy (15.6%) sectors. This was inconsistent with findings by O'Lean who found that among pharmacists in Ireland, the highest proportion was in community pharmacy practice followed by hospital pharmacy, and primary care pharmacy, respectively (O'Lean, 2019). Results from this study showed that a relatively much smaller proportion of pharmacists practising in the pharmaceutical manufacturing industry and other branches of pharmacy practice was, however, similar to the findings in Ireland by O'Lean. Interestingly, this study also revealed that several pharmaceutical practitioners in Zambia engaged in more than one sector or branch of pharmaceutical practice. Multi-sector practice and identity among pharmaceutical practitioners are also common in other settings (Elvey, Hassell, & Hall, 2013; Scahill, Atif, & Babar, 2017).

Several scholars agree that the wide scope of pharmaceutical practice and market availability of professional practice opportunities makes pharmacy an attractive career option. Few scholars, however, seem to suggest that the relatively high number of practice identities may reflect some degree of role ambiguity and lack of clear direction and ownership of what makes pharmacists unique. Overall, there is convergence on the agreement that this multiplicity of skills of pharmacy professionals also suggests a flexible view of their roles (Elvey *et al.*, 2013).

From an academic and policy perspective, the roles of pharmacists and their unique contributions to healthcare are immense especially to the attainment of the universal health coverage agenda. Authors argue that, regardless of policy-makers aspirations for pharmacy in Zambia, evidence derived from this study suggests that pharmacists do have multiple contributions to healthcare and their professional development dimensions are robust. These encompass competencies in areas such as drug discovery and development, alternative and complementary therapies, medicine manufacturing and utilisation, supply chain management, clinical care and governance, health system administration and much more than the '*hard earned*' primary bachelor degree in pharmacy bestows on the pharmacist graduate (Kalungia *et al.*, 2019). Notwithstanding, maintaining a high degree and level of competence to perform their roles and functions to the expected standard requires contextually relevant, targeted and priority CPD programming in the national pipeline of pharmaceutical sector development of the country to ensure pharmaceutical practitioners remain contextually fit for purpose across multiple sectors, settings and contexts.

Acceptable affirmative levels of preference for the six CPD activities assessed in this survey showed that the first preference for delivery included conferences, seminars and symposia (81.7%) while the second preference was for hands-on interactive skills workshops (79.2%). In Ethiopia, Gelayee and colleagues (2018) found that the majority (74%) of community pharmacists preferred interactive workshops mode of CPD as first preference whereas internet-based CPD was least preferred by 15.2% of respondents (Gelayee, Mekonnen, & Birarra, 2018). Similarly in Zambia, healthcare workers are somewhat accustomed to participating in workshops as one of the main modes of CPD undertaken. In this study, the least preferred (52.8%) was CPD delivered in form of special didactic lectures. In several other settings, CPD has been traditionally and primarily delivered in the form of conferences and workshops (Wallace & May, 2016). Similarly in Zambia, these activities support supplementary learning within an input-based system and typically require participating practitioners to record the time spent doing a CPD activity, or the number of points or credits accrued by way of attendance at CPD events. As described by Friedman & Woodhead (2007), input-based CPD schemes such as symposia, conferences and workshops have historically been regarded as cost-effective and provide an easily quantifiable method of measuring individual CPD activity (Friedman & Woodhead, 2007; Wallace & May, 2016). Although these methods of delivery are widely preferred, there is evidence that these commonly used type of long-established CPD activities, such as conferences, workshops and symposia, tend to have a limited effect on improving practitioner competence and performance, and no significant effect on patient health outcomes (Wallace & May, 2016). Wallace & May (2016) further argued that the impact of many CPD activities delivered in form of conferences and symposia is reduced when they are undertaken in isolation outside of a defined structure of directed learning.

In contrast, authors agree with other scholars that advocate that CPD activities that are interactive, encourage reflection on practice, provide opportunities to practice skills, involve multiple exposures, help practitioners to identify between current performance and a standard to be achieved, and are focused on outcomes, can be effective at improving practice and patient health outcomes (Wallace & May, 2016). However, the current constraints and challenges exacerbated by the COVID-19 pandemic hard hitting resource-limited settings especially low-middle income countries of Sub-Saharan Africa (Ogunleye *et al.*, 2020) resulting in lockdown restrictions on physical gatherings, travel and imposed infection prevention

guidelines introduced major restrictions on traditional face-to-face contact-based learning methods for CPD. In Zambia, similar to other countries in Africa affected by the COVID-19 pandemic restrictions, the pandemic inspired the rise to prominence of live online (virtual) and blended learning modes of offering health professions education, including CPD programmes which was previously largely uncommon (Ethando *et al.*, 2021). Coupled by the modern advancements in educational media technologies, the advent of online (virtual internet-based) self-directed learning platforms are poised to shift paradigms in CPD delivery going into the future. This is despite its current low acceptability and challenges of access in resource-limited settings of Sub-Saharan Africa, particularly in rural areas (Feldacker *et al.*, 2017; Feldacker *et al.*, 2017; Gelayee *et al.*, 2018; Ethando *et al.*, 2021).

With CPD programming for pharmaceutical practitioners still in its infancy in Zambia and other similar settings in Sub-Saharan Africa, this study established a high level of support for the introduction of specific contextually relevant proposed CPD programmes (Table III) suggested by the majority of participants to enhance their contemporary professional practice needs. These findings agree with previously identified pharmaceutical knowledge, skills and practice gaps, including CPD interests in areas such as antimicrobial stewardship in public hospitals (Kalungia *et al.*, 2019) and community pharmacies (Mudenda *et al.*, 2020), antimicrobial resistance and pharmacogenetics (Mufwambi *et al.*, 2021), public health pharmacy, health promotion and disease prevention (Law *et al.*, 2019), pharmaceutical manufacturing including supply chain management (Kachali, Chimusoro, & Karodia, 2014), HIV and non-communicable diseases management (Mutale *et al.*, 2018; Mukanu *et al.*, 2017) among many other relevant areas. Although this study did not do a subgroup analysis of CPD preference, there was existing evidence showing that preferences and choice of CPD programmes differed among subgroups of pharmaceutical practitioners by gender, age, level and practice experience, including branch or sector of professional practice (Gelayee *et al.*, 2018).

Authors are cognizant of the fact the development and implementation of CPD programmes can be challenging or face potential barriers, especially in low-resource settings. Top on the list of potential barriers limiting pharmacists' participation and engagement in CPD activities as reported by previous studies include the lack of relevant CPD programmes offered, cost, unavailability of learning opportunities, inaccessibility due to geographical location (e.g., rural areas) and distance from CPD sites, lack of interest (negative attitude towards CE), insufficient time and resources to



invest in achieving the CPD goals (Laaksonen, Duggan, & Bates, 2009; Marriott, Duncan, & Namara, 2007; Aziz, Jet, & Rahman, 2013). Developing strategies to overcome these barriers beforehand can enhance uptake, access and benefit of CPD among pharmaceutical practitioners. In a multistage cross-section survey, involving clustered, randomly sampled pharmaceutical practitioners from 47 counties across Kenya, aimed at obtaining national baseline data on the status of CPD programmes implementation in that country, the Kenyan Pharmacy and Poisons Board (PPB), in collaboration with Management Sciences for Health (MSH) in 2013 found that most pharmacy practitioners had the perception that they undertook CPD and that they derived some benefit – with a variety of CPD activities undertaken (Kenya Pharmacy & Poisons Board, 2013). The Kenyan study also found that pharmacy practitioners in Kenya faced several challenges that constrained their CPD.

The study concluded that the implementation of CPD programmes for pharmacy practitioners in Kenya required strengthening and made several recommendations for further development and enhancement of CPD programmes for pharmacy practitioners in Kenya (Kenya Pharmacy & Poisons Board, 2013). Similarly, in Zambia, this study establishes a baseline for considering developing contextually relevant CPD programmes with guiding principles and key priority activities, modes and models of training facilitation accordingly. As the pharmaceutical roles and scope of professional practice of pharmacists continue to evolve nationally and globally, mainstreaming CPD programming will be an important avenue to ensure pharmaceutical practitioners strive to further develop, refresh and maintain their competence to deliver the best pharmaceutical service with high-quality standards.

### Limitations

The authors acknowledge that the study sample was only derived from the membership of PSZ in Zambia. Although the monocentric nature of the study may affect generalisability, authors remain confident that the ecological validity of the study findings was demonstrated and provides PSZ (being the main accredited provider of CPD for its professional membership in Zambia) including other relevant stakeholders involved in CE development in the pharmaceutical sector within and beyond Zambia a basis for advancing CPD growth. The study relied on self-report responses on Likert-scale measurements. Other methods should be considered in future studies.

### Conclusion

As the healthcare and pharmaceutical service sectors, in general, undergo rapid transformation, there is a great need to develop CPD programmes for pharmaceutical practitioners in Zambia. Pharmaceutical practitioners interviewed in this study seem to be in need of contextually relevant CPD programmes. Blended learning approaches involving either face-to-face or online learning coupled with hands-on interactive sessions in knowledge impartation, behavioural enhancement and skills development were preferred. These findings suggest the existence of an opportunity in Zambia to develop and upgrade study modes of CDP for better learning outcomes.

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