

Needs assessment of global pharmaceutical development goals: an explanatory mixed-methods study of 21 countries

Farah Aqqad¹, Sherly Meilianti^{1,*} , Christopher John¹, Diala Koudmani², Marwan Akel¹, Ian Bates²

¹International Pharmaceutical Federation, Andries Bickerweg 5, 2517 JP The Hague, The Netherlands

²Department of Practice and Policy, UCL School of Pharmacy, 29-39 Brunswick Square, London, WC1N 1AX, United Kingdom

*Correspondence: International Pharmaceutical Federation, Andries Bickerweg 5, 2517 JP The Hague, The Netherlands. E-mail: sherly@fip.org

Abstract

Objectives Investment in the development of the pharmacy workforce has been recognized as crucial for achieving universal health coverage. The 21 International Pharmaceutical Federation (FIP) Development Goals (DGs) have been used when conducting national needs assessments in several countries to provide evidence-based policy on workforce development. This study aimed to explore factors contributing to education and training in a FIP sample of mainly low- to middle-income countries (LMICs), and current national policy initiatives and priorities, mapped against the FIP DGs.

Methods The study employed a mixed-methods approach, including an online survey questionnaire and interviews with representatives from 26 national professional organizations from 21 countries. A Multiple Correspondence Analysis (MCA), descriptive analysis, and thematic analysis were carried out to analyse the data.

Key findings A total of 26 national professional organizations from 21 countries participated in this study. The quantitative MCA results indicated categorical correlations with variables related to the maintenance of licensed pharmacy practice and mechanisms for personal career development and advancement, such as the availability of competency development frameworks. Six themes emerged from the qualitative analysis of ongoing national programmes in the sampled countries: strengthening initial education and training, competency and career development programmes, initiatives related to pharmacists' role in patient safety, communicable diseases, and antimicrobial stewardship, pharmaceutical care and medicines access, strengthening research to improve pharmacists' impact, and outcomes and policy review and development.

Conclusion This study provided an evidence-based needs assessment exploring factors contributing to workforce development and identifying pharmaceutical development priorities mapped to the FIP DGs across a cohort of nations.

Keywords: continuing professional development; International Pharmaceutical Federation; needs assessment; competency development; FIP Development Goals

Introduction

Shortages and imbalances in the workforce across countries have contributed to the global health challenge of achieving universal health coverage (UHC) [1]. A vital part of UHC is access to essential medicines and appropriate use of medicines [2], which require a competent, adaptable, and adequate pharmacy workforce as medicines experts [3]. Many countries worldwide encounter pharmacy workforce capacity challenges in meeting national health requirements [4, 5]. Investment in education and training has been identified as one of the key elements for the sustainable development of the health workforce capacity, including the pharmacy workforce [1].

The International Pharmaceutical Federation (FIP), a global professional leadership body, supports the advancement of pharmacy by engaging with stakeholders in collating high-quality pharmacy workforce data in several areas and undertaking comprehensive analyses [6]. Through its Global Pharmaceutical Observatory, FIP conducted a Multinational

Education and Training needs assessment project to explore priorities and challenges across nations related to the education and training systems for their workforce. FIP Development Goals (DGs), a key resource for transforming pharmacy profession over the next decade [7], were used as a systematic framework to map the challenges, ongoing priorities, and national programmes related to education and training systems for the pharmacy workforce. The FIP DGs have been used in conducting national needs assessments in several countries worldwide [8–13].

Many low and lower-middle-income countries (LMICs) face a further challenge of lower numbers of pharmacists [4, 5], as well as a limited capacity and experience to develop pharmacy education and training in the countries [14, 15]. There is a need, therefore, to address workforce capacity, workforce development, needs-based education, quality assurance, and advocacy challenges in these countries. This study aimed to explore (i) factors contributing to competency and career development in the nations; (ii) national priorities

mapped against global development goals; and (iii) ongoing national initiatives, programmes, and needs across sampled countries.

Methods

An explanatory cross-sectional mixed-methods study was conducted, comprising an online survey of national professional bodies followed up with structured qualitative interviews with senior representatives (such as Chief Executives, Presidents, or Policy Directors). The sampling process was focussed on LMICs, with a targeted sample of five to six countries from each of five of the World Health Organization (WHO) regions. The European WHO Region was excluded from this study due to the low prevalence of LMICs and over-representation of high-income countries in this region. A purposive sample, stratified by region, was determined in order to align available resources and enhance the generalizability of outcomes.

Invitation emails were sent to the known leaders of 35 professional organizations, and agencies across 28 countries, outlining the project aim, project description, and seeking consent to participate. The responding organizations were not only invited to complete an online questionnaire but also given the opportunity to participate in subsequent interviews. Follow-up emails were sent to initial non-responders. Data were collected between February and June 2021. All data collection tools, including the online questionnaire, were available in translated versions (Arabic, French, Japanese, Portuguese, and Spanish) to facilitate data retrieval.

The online quantitative survey questionnaire ([Supplementary Material 1](#)) comprised demographic items and 35 categorical questions focussing on national pharmacy workforce capacity and trends, national systems for pharmacy education, training, and workforce development. In addition, the recruited national leadership organizations ('participants') were also asked to map their ongoing policy programmes to the 21 FIP DGs (which comprise practice, workforce/education, and science elements) and to indicate a national priority list of the FIP DGs.

The regional and national liaison personnel piloted the questionnaire to establish face validity. Information and guidance documents were available to facilitate the completion. A topic guide ([Supplementary Material 2](#)) was developed for the interviews to collect more in-depth insights from the professional organization based on their initial online survey completion. These insights probed ongoing progress and strategies regarding the current and future needs for pharmacy workforce education, training, and development. The interview questions were adapted based on initial survey responses and were structured according to the FIP DG priorities highlighted by participants. Ten interviewers conducted video conference interviews in the participants' preferred language. All interviewers were pharmacists and recruited to assist in conducting interviews in a preferred language of participants, clarify bilingual communications, and facilitate cross-cultural and language comprehension. The interviews were transcribed, summarized, and translated into English (if needed). Questionnaire responses and interview transcriptions were returned to the organizational representatives/interviewees for verification and validation.

Both quantitative and qualitative analysis were employed to gain a comprehensive understanding of the topic.

Initially, a Multiple Correspondence Analysis (MCA) was used to analyse the quantitative categorical questionnaire data. MCA was used to explore the factors contributing to competency and career development in the nations by statistical mapping of associations and patterns of the variables across the sampled countries. To address multiple responses from a country, the data from multiple organizations were merged and verified with the organizations involved.

In addition, a descriptive analysis was performed to highlight priorities related to the FIP DGs. The nationally determined FIP DGs were ranked; the averaged ranks of the DGs were displayed as a heat map. For the analysis of priorities related to FIP DGs, the data from the separate organizations were treated as separate cases.

Concurrently, a codebook thematic analysis [16] approach was conducted to analyse the qualitative interview data, identifying ongoing national initiatives, programmes, and needs across the sampled countries. The interviews were coded by two researchers independently using NVivo version 12. After conducting the initial coding, codes were categorized into themes and reviewed for credibility. All coded interviews were collated to generate a thematic map that related the themes with the study objectives.

To provide a comprehensive overview of the findings, the results of both the survey and interviews were integrated. The MCA results and the prioritization of global development goals obtained from the survey were presented independently in the results section. Furthermore, valuable insights into themes and subthemes, including ongoing national initiatives and programs and identified needs across organizations, were derived from the interviews. To enhance understanding, the survey results, with a specific focus on the 'Continuing Professional Development (CPD) for pharmacists' section, were included within the 'competency and career development programmes' theme.

Ethical considerations

Formal ethical approval was not required as the data were neither confidential nor commercially sensitive in the national domains. Instead, ethical oversight and approval were gained from the FIP Executive and Board structures and are on record. Participation in the survey was voluntary with no incentives, and sampled organizations were free to choose not to provide data. All interview recordings were deleted after seven days of the interview.

Results

Sample demographics

Out of 28 targeted countries, a total of 26 professional organizations and agencies from 21 countries across five World Health Organization (WHO) regions participated in the survey and the interviews. The participants were drawn from the Eastern Mediterranean (six countries; 28%), followed by Western Pacific and South America, each representing five countries; 24%). There are three countries from Africa (14%) and two from South East Asia (10%) ([Table 1](#)). Of these 21 countries, 62% of them are categorized as low- and middle-income countries according to the World Bank country classification. These countries covered about 2.3 million pharmacists globally. All survey respondents consented to

Table 1. Sample demographics for both surveys and interviews.

Characteristics	Professional organizations (<i>n</i> = 26)	Countries (<i>n</i> = 21)
Region		
• Africa	3 (11.5%)	3 (14.4%)
• Americas	5 (19.3%)	5 (23.8%)
• Eastern Mediterranean	8 (30.8%)	6 (28.6%)
• South East Asia	3 (11.5%)	2 (9.4%)
• Western Pacific	7 (26.9%)	5 (23.8%)
Gender		
• Male	18 (69.2%)	15 (71.4%)
• Female	8 (30.8%)	6 (28.6%)
Role		
• CEO	1 (3.9%)	1 (4.8%)
• General secretary	3 (11.5%)	3 (14.3%)
• President	10 (38.5%)	8 (38.1%)
• Other	12 (46.1%)	9 (42.8%)

interviews, with 26 interviewees participating. The interviews lasted from 30 to 90 min.

The MCA outcomes suggest a model accounting for 50.5% of the total variance (Dimension 1 accounting for 27.5% and Dimension 2 accounting for 23.0%). [Figure 1](#) shows the discrimination measures plot of variables included in the proposed MCA model. Variables with greater weighting towards dimension 1 have an identity related to maintenance or registration of practice, such as systems related to mandatory CPD, links with license renewal, and the availability of a national ‘scope of practice’ description or document related to practicing in the country. Dimension 2 identity is related to personal career development and advancement mechanisms, such as the availability of competency development frameworks, access to professional recognition systems, and the availability of institutions, agencies, or associations that directly support specialization development or programmes.

[Figure 2](#) shows the joint plot of category points of the proposed MCA model. Examining this joint plot, with reference to the discrimination plot ([Fig. 1](#)), dimension 1 (the horizontal axis) tends to discriminate CPD systems in the maintenance of licensed pharmacy practice, with an axis clustering of country-level systems with mandatory CPD, license renewal linked with formal CPD, and/or license renewal based on gaining CPD ‘credits’ or ‘points’; countries without these associations form the alternative axis-cluster (green circles 1 and 2, respectively). Associative discrimination is also seen with those variables related to national infrastructures, such as access to accredited education for specializations and the presence of accreditation agencies. This dimensional axis clustering (blue circles 1 and 2) also indicates an association of variables linked with a defined ‘scope of practice’ documentation, including competency development frameworks. Dimension 2, the vertical axis (red circles 1 and 2), shows associations with variables connected with attributes of career development, such as access to professional recognition systems, availability of advanced practice frameworks, and CPD linked with practice portfolio development.

Priorities associated with global DGs across the sample

[Figure 3](#) provides information on the rank order of each DG within regions as a heatmap using the average rank of priorities of the sampled organizations showing trends of the higher priority goals indicated by the sample, where academic capacity, CPD strategies, and competency development were the most common selected top DG priorities. Advancing integrated services, communicable diseases, antimicrobial stewardship, equity, and equality were lowered down the priority listing of the sampled countries (See [Supplementary Material 3](#) for descriptive frequencies of FIP DGs priorities section).

Ongoing national initiatives, programmes, and needs across sampled organizations

Current national initiatives and programmes were highlighted by sampled organizations, which were categorized into six themes described below. The subthemes of organizations’ initiatives and needs can be seen in [Table 2](#).

Strengthening initial education and training

Several organizations highlighted their national initiatives and programmes and their need to strengthen initial education and training. The identified needs include curriculum reform to address national requirements, an increase in scientists and researchers in science and clinical settings, and the facilitation of collaboration with healthcare professionals through interprofessional education.

Competency and career development programmes

Most ongoing national programmes in CPD were related to the delivery of conventions, seminars, webinars, and workshops across topic areas of practice. The higher education sector was the most common provider of CPD, followed by the private sector and the professional leadership body. The least common principal providers of CPD were regulators and the Ministry of Health. The majority of CPD delivery modes across sampled organizations were class-based provisions (such as lectures or workshops in a classroom setting or through online platforms), with or without CPD credits. Workplace education models and professional portfolios were not common in the sampled countries (See [Supplementary Material 3](#) for descriptive frequencies of CPD for pharmacists section).

While most sampled countries (*n* = 15; 71.4%) have the scope of practice defined, many did not have competency development frameworks in place. One-third of sampled countries (*n* = 7; 33.3%) had a competency framework for early career pharmacists. Moreover, less than a quarter (*n* = 4; 19%) of the sampled countries have an advanced competency development framework in place. Only eight countries (38.1%) have established professional recognition systems in their countries. Specific to specialization, a majority of countries have a membership body focussed on supporting specialization (*n* = 17; 81%) and have university-based formal education for specialization (*n* = 18; 85.7%) in place (See [Supplementary Material 3](#) for descriptive frequencies of CPD for pharmacists section).

Pharmacy organizations emphasize the need for competency development to advance the pharmacy workforce and deliver quality pharmaceutical services, and addressing concerns about cultures that prioritize profits over high-quality care. Additionally, competency framework development is seen as

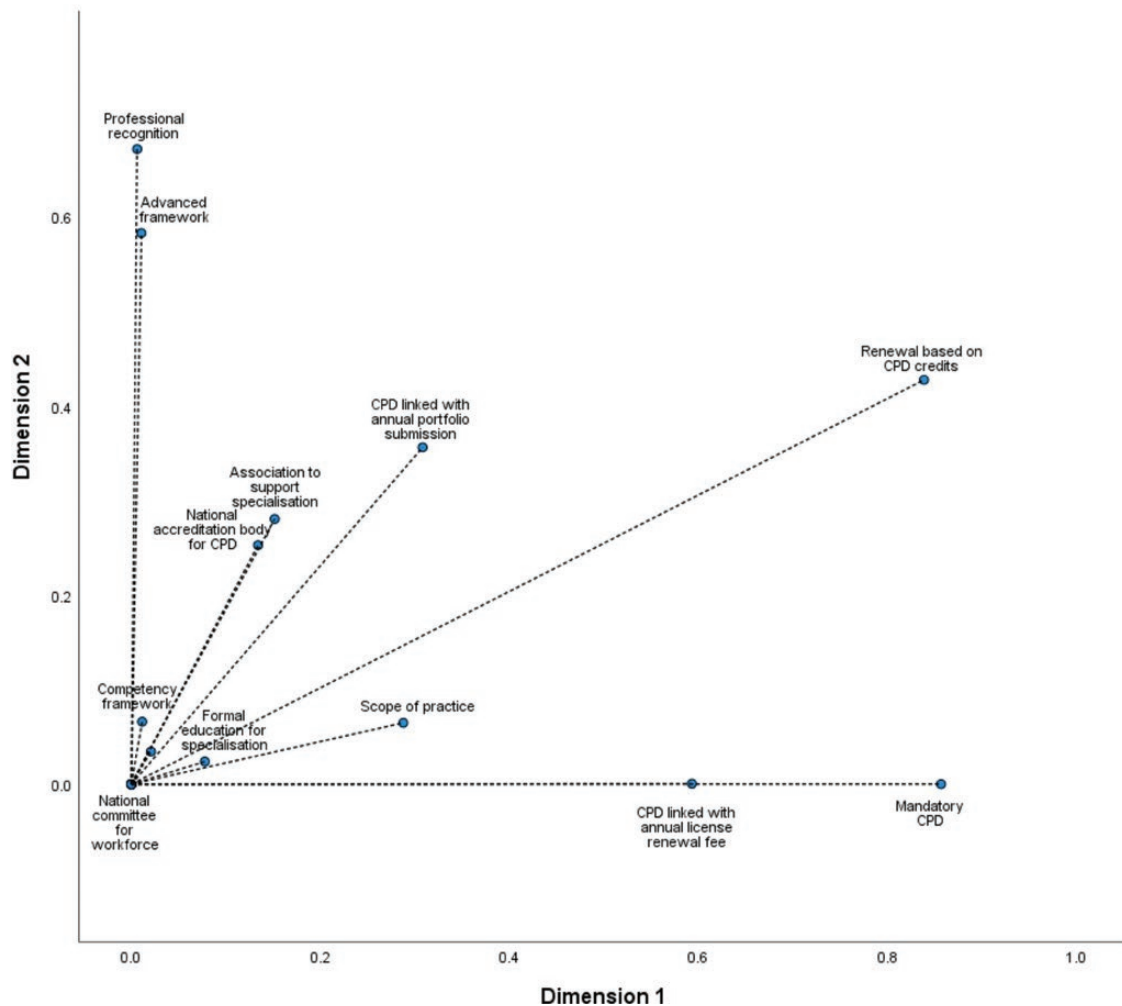


Figure 1. Discrimination measures plot.

crucial for guiding career progression, motivating early career pharmacists, and providing opportunities throughout their practitioner journeys.

Initiatives related to pharmacists' role in patient safety, communicable diseases, and antimicrobial stewardship

Patient safety was highlighted as a priority for the organizations across all sampled organizations emphasizing the role of pharmacists in this area. Sampled organizations further described their ongoing policies and programmes related to the inclusion of patient safety in pharmacy education and training, collaboration with or involvement of organizations and individual pharmacists in the national committee for patient safety, and national policies and programmes related to patient safety. While there have been many ongoing initiatives, some organizations also highlighted needs and gaps to further strengthen pharmacists' roles in this area.

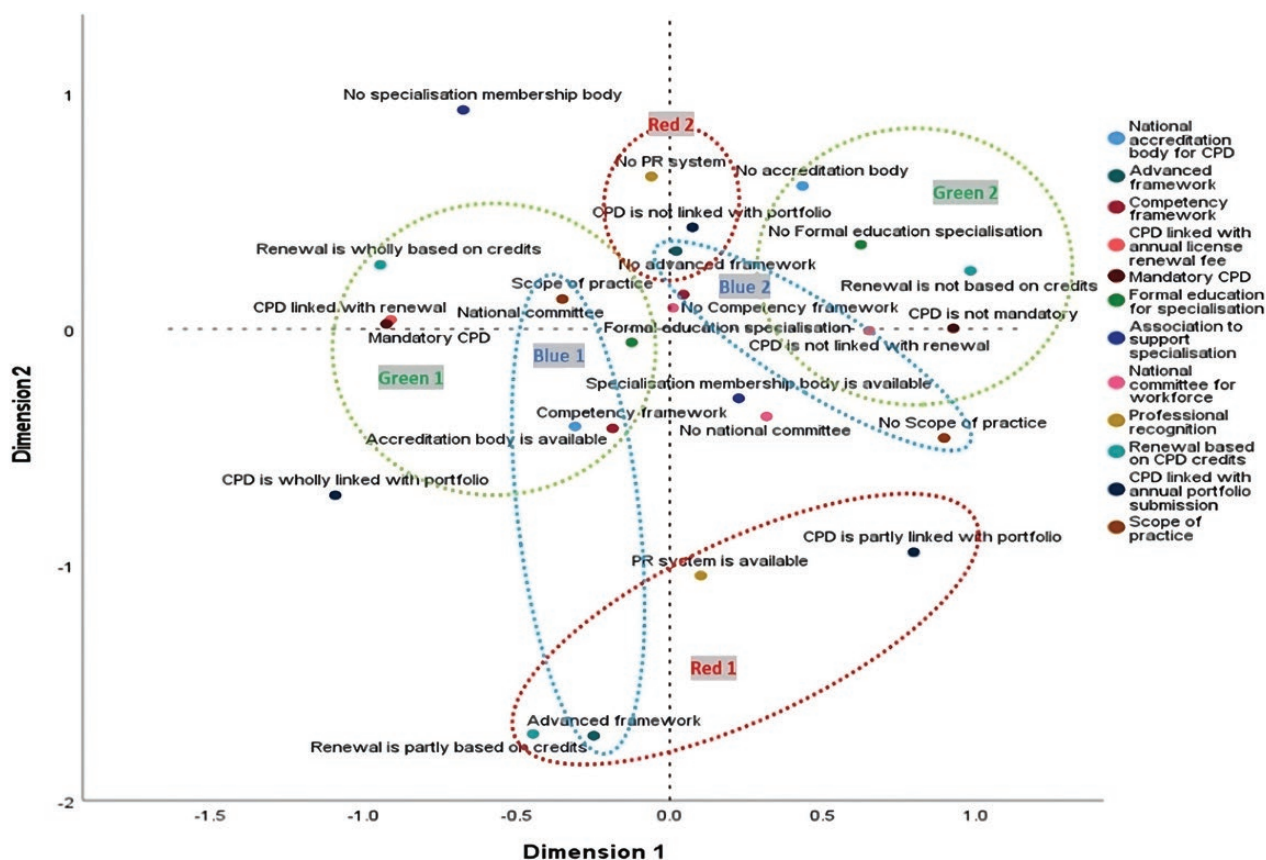
Related to pharmacists' role in communicable diseases, sampled organizations focussed on vaccination authority and administration. Thirteen sampled organizations informed that pharmacists were not allowed to administer vaccines, and the involvement of pharmacists as vaccinators was not a priority. Vaccination training programmes were

developed in some countries. Some organizations reported that pharmacists could have played a much more active and supportive role in a national emergency, particularly pharmacist involvement in immunization and vaccine pharmacovigilance processes.

Despite campaigns and awareness efforts on the proper use of antibiotics by certain organizations, poor implementation of regulations on dispensing antibiotics without prescription and prescribing practices was observed, along with reported misuse of antibiotics in agriculture and animals.

Improving pharmaceutical care and medicines access and ensuring equity and equality

Access to medicines, devices, and services was among the most frequent priorities selected by organizations across regions. However, fewer countries mapped their ongoing programmes in these areas. Many pharmacy organizations indicated this area as one of their priorities because they believed in the importance of having pharmaceutical care services accessible to the population. Equity and equality were the lowest priorities selected by member organizations, and only one organization mapped this goal to their programme. Many organizations highlighted that there might be some initiatives nationally in this area, and the initiatives were not specific to pharmacists.



*PR: Professional recognition; CPD: Continuing Professional Development

Figure 2. Joint plot of category points.

Strengthening research to improve pharmacists' impact and outcomes

While some organizations described their national programmes on impact and outcomes as research or surveys to evaluate pharmacists' impact on the population, many pharmacy organizations still highlighted no indicators available to measure pharmacists' impact and performance in their countries.

Policy review and development

Although there were ongoing policy reviews and developments on many topics, these were highlighted as a need by eight sampled organizations. Sixteen sampled organizations stressed a need to advocate the scope of practice for pharmacists and pharmacy technicians in the health system. Variations in the scope of practice and pharmacists' recognition within countries were highlighted by some countries.

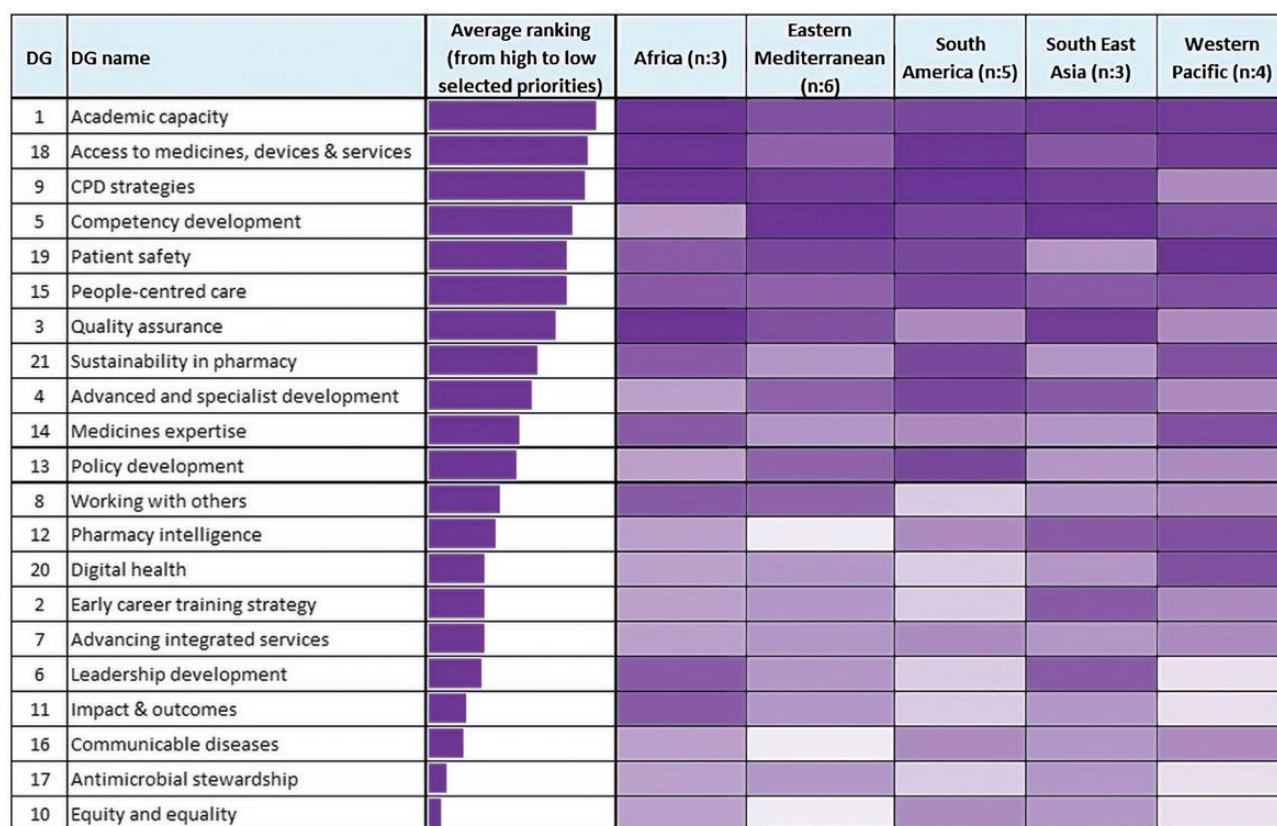
Discussion

This study is the first to report a needs assessment conducted by national pharmacy organizations across a cohort of nations, utilizing the FIP DGs and uncovering variations in their prioritization. It also explores factors affecting competency and career development, highlighting the need for infrastructure, data, and intelligence to inform policies and plans. Additionally, the study emphasizes the importance of competency frameworks, professional recognition, access to

training opportunities, and improving access to medicines and pharmaceutical services while shedding light on ongoing initiatives, programmes, and needs across the sampled countries.

Several limitations to this study may impact generalizability. Firstly, the nature of the sampling: the organizations who participated may not have provided a full national perspective on priorities. This will depend on the mission and strategic objectives of the organization, its links with the Ministry of Health, and its ability to influence national policy. It is also possible that the FIP DGs were interpreted differently across participants. The study relied on an understanding of the details of the elements of each development goal. Perspectives and priorities will also differ across different sectors of the profession and the relative proportions of these sectors that the professional leadership organizations represent and advocate for. Participants' responses may have also been affected by the number of interviewers involved and their seniority and/or association with areas of work. In addition, the nature of purposive sampling utilized in this study may introduce selection bias. However, some key findings have been supported by the published literature [11, 13, 17]. Obtaining views from other stakeholders such as patients, other non-government and government organizations, health care providers, and other professions may provide a more in-depth view and enhance the findings.

The 21 FIP DGs were used as a framing device in a systematic way to identify national priorities—with a focus on



Key: The lengthier the bar, the higher priority of the DG selection. The darker the colour, the higher priority of the rank of DG in the region.

Figure 3. Bar chart of average ranking of sampled organizations and Heatmap of the rank order of each DG within regions.

workforce development. Prioritization is essential to help countries be more effective and efficient in transforming their pharmaceutical services and the associated workforce [17]. There was variation in the prioritization of DGs across sampled countries. National professional leadership and other organizations are relatively early in their journey of progressing towards the DGs, and countries require a level of infrastructure to advance. This includes systems to provide relevant data and intelligence to establish a baseline of the current status of each DG and to inform future policies and plans. There is a risk that individual DGs may have been prioritized without consideration of the potential interdependencies between DGs [18].

The MCA results identified that the national competency development systems ranged from practice registration, licensed maintenance, and practice advancement. Practice registration is associated with the availability of the scope of practice document, while license maintenance and practice advancement are associated with the competency development and advancement framework. These results align with utilizing competency development frameworks to ensure practice consistency, promote ongoing professional development, and support practice advancement [19–21]. Moreover, national infrastructures to support practice advancement relate to CPD linked with portfolio, systems for professional recognition, and access to formal education for specialization. There was also a clear need and gap in the Advanced and specialist development in the sampled countries. These results match those observed in an earlier study on the accelerated

advancement of the pharmacy workforce globally [22]. This study has also provided further evidence that in some nations, a professional recognition or credentialing system for pharmacists is needed. Credentialed practitioners have been shown to provide higher-quality care and deliver better patient outcomes than non-credentialed practitioners [23–25]. This will contribute to meeting patient demand, building public trust in pharmacists' role in delivering clinical services, and providing a mechanism to support pharmacists with their career progression [17].

There is a need for professional organizations and/or CPD providers to develop CPD programmes and work-based education, including developing a portfolio for a CPD system that supports competency-based education and training approach. A competency-based approach is valuable in identifying the requisite competencies, which can support the improving practice as well as providing the opportunity to describe the skills, knowledge, and behaviours required to deliver services that meet changing patient demand [26, 27]. In some of the sample countries, this will require a combination of approaches, including national policy drivers, resourcing of educational programmes/infrastructure, and cultural change management for the profession.

The factors identified in the study relating to academic shortages in countries may indicate a gap between national policies and needs that may require better workforce intelligence and planning of the workforce. In addition, the need for strengthening the pharmacist's role in patient safety and many initiatives in this area across the cohort of nations

Table 2. Themes and subthemes of organizations' ongoing programme initiatives and needs.

Themes	Ongoing programme initiatives	Needs
Strengthening initial education and training	<ul style="list-style-type: none"> Benchmarking curriculum towards a global framework and pharmacy curriculum review involving all pharmacy school deans. National programmes supporting experiential training for pharmacy students to observe real-life practice and preceptor programmes development. An accreditation system was developed to ensure having sufficient academic capacity. 	<ul style="list-style-type: none"> Need for curriculum reformation to adapt to national needs. Need for more academicians and researchers in science and clinical settings. Some factors related to the academic shortage was highlighted included lack of remuneration, increasingly unfavourable working environments and employment expectations and qualifications to become academic pharmacists. Need to facilitate collaboration with other healthcare professionals from initial education and training and a need for guidance and a system for interprofessional education.
Competency and career development programmes	<ul style="list-style-type: none"> Delivery of conventions, seminars, webinars and workshops across topic areas of practice by organizations to support the education and training of pharmacists and their members. Developing competency frameworks for early career and advanced practitioners to support the career stages for pharmacists. Ongoing programmes on pharmacy specialization and advancement in the country and ongoing pathway development for pharmacy workforce advancement. Specialist recognition was available for pharmacy prescribers, vaccinators and other specializations. A foundation training was implemented for early careers and those who had career breaks and a mentorship programme for early-career pharmacists and early career support through young pharmacists group networks. 	<ul style="list-style-type: none"> Need to have a mandatory CPD, linking CPD with annual license and promotion and linking CPD with annual portfolio type submission and recertification system. Need to support pharmacists' advocacy and recognition system, including the remuneration system. Need to advance the pharmacy workforce to deliver quality pharmaceutical services to society. Need for generalized advanced clinical training to develop an adaptable pharmacy workforce facing healthcare challenges, such as the ageing population and complex comorbidities. Need for fostering a culture of advancing pharmacy practice rather than focusing on minimum standards Need for specialist programmes development to meet national needs, such as in biosimilars, critical care and poison prevention programmes. Specific to the early career training strategy, a clear need for structured training for early career practitioners were highlighted by some organizations.
Initiatives related to pharmacists' role in patient safety, communicable diseases and antimicrobial stewardship	<ul style="list-style-type: none"> Inclusion of patient safety in pharmacy education and training, such as training for trainers programme and training in patient safety, harm reduction and pharmacovigilance. Collaboration with or involvement of organizations and individual pharmacists in the national committee for patient safety. Some examples of advanced services and programmes by pharmacists such as medicines reconciliation, adherence clinics, and medication therapeutic management services. National policies and programmes related to patient safety, such as the implementation of national pharmacovigilance and technovigilance policy; national regulation for verification of medicines prior to entering the market; regulation related to recall and counterfeit medicines and medical devices, and campaigns to advocate the role of pharmacists in patient safety. National programmes related to communicable diseases, such as vaccination training for pharmacists, pharmacists' involvement in tuberculosis management and the national malaria programme and AIDS control. National programmes related to antimicrobial stewardship, such as the availability of national guidelines and involvement of pharmacists in the national committee for AMS. 	<ul style="list-style-type: none"> There were no specific programmes for patient safety, so the inclusion of this topic in the training and academic lectures was recommended. Need to introduce training/awareness/programmes that highlight the fact that pharmacists deliver potentially hazardous medicines and enhance the role of pharmacists in this area.
Improving pharmaceutical care and medicines access and ensuring equity and equality	<ul style="list-style-type: none"> Advocacy and programmes to increase pharmaceutical care and medicines access, such as strengthening the presence of pharmacists and increasing pharmacy capacity in the country and expanding pharmacists' authority, including the generic substitution policy by pharmacists. National policies related to health system insurance and medicine distribution such as national insurance policies to support vulnerable groups to cover all citizens; availability of an essential drug list in the country, and a centralized system procurement to support medicines access. Promoting equity and equality has been advocated nationally, including equal opportunities in employment and leadership positions. 	<ul style="list-style-type: none"> Need to improve access to medicines, devices and services by improving pharmacists' access to the population.

Table 2. Continued

Themes	Ongoing programme initiatives	Needs
Strengthening research to improve pharmacists' impact and outcomes	<ul style="list-style-type: none"> • Ongoing project to build a community pharmacy system to evaluate pharmaceutical care to patients and measure pharmacists' economic outcomes. • Encouragement to their members to disseminate pharmacists' impact projects or findings in a journal or report. 	<ul style="list-style-type: none"> • Need to develop indicator to measure pharmacists' impact and performance in their countries to support their advocacy of pharmacists' role in the economic outcomes.
Policy review and development	<ul style="list-style-type: none"> • Engagement and involvement of pharmacists and institutions in policy, strategies and guideline development. • Ongoing policy review in the country and ongoing advocacy for the scope of practice and remuneration of pharmacists. • Campaign to increase branding and acceptability of pharmacists. 	<ul style="list-style-type: none"> • Need for policy review and development and addressing gaps in regulation related to policy transparency and implementation of good pharmacy practices. • Need for the regulation of telepharmacy and the use of digital health for patient services. • Need to separate dispensing and prescribing. • Need to advocate the scope of practice for pharmacists and pharmacy technicians in the health system.

indicates this would be a necessary part of existing or future initial education and training and competency frameworks across career stages. The same can be argued for antimicrobial resistance.

The huge task of vaccinating a high enough proportion of a nation's population to reduce the public health threat of COVID-19 and other communicable diseases has meant that across many countries, pharmacists have played an important role in the supply and administration of various vaccines, thereby contributing to increased vaccination coverage in the nation's population [28]. However, some national participants in this study reported that allowing pharmacists to administer vaccines was not a priority. This could relate to several barriers reported in the literature, including limited access to training opportunities by pharmacists. Enabling the pharmacist's role in vaccinations and antimicrobial stewardship has been reported as best supported by legislation and other measures such as training [28].

The fact that access to medicines and pharmaceutical services was cited frequently by those involved in the study and yet few had related programmes underway suggests that nations are still yet to reach Universal Health Coverage. Countries in this cohort likely continue encountering pharmacy workforce capacity challenges in meeting national health requirements. Of course, other measures also need to be in place to deliver access to medicines, including availability, affordability, accessibility, acceptability, and quality [29]. Nations need to consider a range of initiatives, including financial incentives, legislation, and approaches that optimize the use of medicines [30].

Several nations may benefit from developing unified policies and strategies for pharmaceutical services, the scope of practice, and the associated workforce [8]. Implementation plans are an important next step to realize these policies and strategies. Those development goals that were at the lower end of the ranked priorities of nations, e.g. DG10 Equity and Equality, may reflect a lack of awareness and/or intelligence and/or policy in those areas. Furthermore, evidence of the impact of the pharmacy workforce on health outcomes is lacking, and this study bore this out.

Conclusions

This study identifies factors related to competency development and presents an evidence-based needs assessment for determining pharmaceutical development priorities across

a cohort of nations, primarily focusing on LMICs, utilizing a combination of quantitative and qualitative methods. The findings highlight the significance of goal prioritization in enhancing the effectiveness and efficiency of transforming pharmaceutical services, practice, and the workforce. They emphasize the need for infrastructure, data, intelligence, competency frameworks, professional recognition, training opportunities, and improved accessibility to medicines. The study fills a critical knowledge gap and advances the field by raising awareness of effective goal alignment and ongoing initiatives. Further research is warranted to gain a deeper understanding of specific national needs, guiding interventions and strategies for advancing pharmaceutical services and supporting pharmacist career progression. Future research should focus on exploring and establishing national needs in more detail.

Supplementary material

Supplementary data are available at *International journal of Pharmacy Practice* online.

Acknowledgements

This study was led by the International Pharmaceutical Federation (FIP). The authors would like to acknowledge Dr Catherine Duggan, FIP Chief Executive Officer and Carola van der Hoeft, FIP Chief Operating Officer for their support of this study. The authors would like to thank all organizations contributing to the survey and all regional liaisons and translators who supported the data collection. The study was funded by an unrestricted grant from Pfizer Limited. The authors would like to thank Gudrun Hubinger, Roopa Menon, and Caitriona Scott for their support.

Author contributions

Farah Aqqad (Conceptualization, Methodology, Validation, Investigation, Data curation, Visualization, Writing – Original Draft), Sherly Meilanti (Conceptualization, Methodology, Validation, Analysis, Investigation, Data curation, Visualization, Writing – Original Draft), Christopher John (Conceptualization, Methodology, Validation, Analysis, Writing – Original Draft), Diala Koudmani (Methodology, Validation, Analysis, Investigation, Data

curation, Visualization, Writing – Original Draft), Marwan Akel (Data curation, Writing – Review and editing), Ian Bates (Conceptualization, Methodology, Validation, Analysis, Visualization, Writing – Review and editing, Supervision)

Funding

This study was funded by an unrestricted grant from Pfizer Ltd.

Conflict of interest

None declared.

Data availability

The data underlying this article will be shared on reasonable request to the corresponding author. The employee of the International Pharmaceutical Federation have complete access to the study data.

References

- Uzman N, Williams AE, Altieri RJ *et al.* Implementing FIP's global pharmaceutical education transformation vision in Sub-Saharan African countries. *Res Social Adm Pharm* 2020;16:1131–5. <https://doi.org/10.1016/j.sapharm.2019.12.011>
- World Health Organization (WHO). Universal health coverage (UHC) Geneva: World Health Organization; 2021. [https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-\(uhc\)](https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc)) (6 May 2022, date last accessed).
- Duggan C. Advancing the workforce to meet the Primary Health Care Agenda: pharmacy's contribution to universal health coverage. *Int J Pharm Pract* 2020;28:118–20. <https://doi.org/10.1111/ijpp.12579>
- International Pharmaceutical Federation (FIP). *Pharmacy Workforce Intelligence: Global Trends Report*. The Netherlands: International Pharmaceutical Federation; 2018. <https://www.fip.org/file/2077>.
- Bates I, John C, Seegobin P *et al.* An analysis of the global pharmacy workforce capacity trends from 2006 to 2012. *Hum Resour Health* 2018;16:3. <https://doi.org/10.1186/s12960-018-0267-y>
- International Pharmaceutical Federation (FIP). *Global Pharmaceutical Observatory* The Hague: International Pharmaceutical Federation; 2022. <https://www.fip.org/global-pharmaceutical-observatory> (7 May 2022, date last accessed).
- International Pharmaceutical Federation (FIP). *FIP Development Goals* The Hague: International Pharmaceutical Federation; 2020. <https://www.fip.org/fip-development-goals> (29 September 2020, date last accessed).
- International Pharmaceutical Federation (FIP). *Research, development and evaluation strategies for pharmaceutical education and the workforce: A global report*. The Hague: International Pharmaceutical Federation, 2017.
- Bader L, Bates I, John C. From workforce intelligence to workforce development: advancing the Eastern Mediterranean pharmaceutical workforce for better health outcomes. *Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallab al-sibbiyah li-sbarq al-mutawassit* 2018;24:899–904. <https://doi.org/10.26719/2018.24.9.899>
- Workforce development in the commonwealth: progress, challenges and needs. 10th Biennial Monash Pharmacy Education Symposium 2019; 2019; Prato. Pharmacy education.
- Bader L, Mukhalalati B, Awaisu A *et al.* Using a global framework for health workforce development: national case studies on continuing professional development in pharmacy. *MedEdPublish* 2019;8:44. <https://doi.org/10.15694/mep.2019.000044.1>
- Mukhalalati BA, Ibrahim M, Al Alawneh MO *et al.* National assessment of pharmaceutical workforce and education using the International Pharmaceutical Federation's global development goals: a case study of Qatar. *J Pharm Policy Pract* 2021;14:22. <https://doi.org/10.1186/s40545-021-00305-y>
- Almaghaslah D, Alsayari A. Using a global systematic framework tool to identify pharmacy workforce development needs: a national case study on Saudi Arabia. *Risk Manag Healthc Policy* 2021;14:3233–45. <https://doi.org/10.2147/RMHP.S322577>
- Ikhile I, Anderson C, McGrath S *et al.* Is the global pharmacy workforce issue all about numbers? *Am J Pharm Educ* 2018;82:6818. <https://doi.org/10.5688/ajpe6818>
- Chan A, Darwish R, Shamim S *et al.* Chapter 9 - Pharmacy practice and continuing professional development in low and middle income countries (LMICs). In: Babar Z-U-D, ed. *Pharmacy Practice Research Case Studies*: Academic Press 2021:187–205.
- Braun V, Clarke V. Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health* 2019;11:589–97. <https://doi.org/10.1080/2159676x.2019.1628806>
- Meilanti S, Smith F, Ernawati DK *et al.* A country-level national needs assessment of the Indonesian pharmacy workforce. *Res Social Adm Pharm* 2021;17:1989–96. <https://doi.org/10.1016/j.sapharm.2021.03.003>
- Morton S, Pencheon D, Squires N. Sustainable Development Goals (SDGs), and their implementation: a national global framework for health, development and equity needs a systems approach at every level. *Br Med Bull* 2017;124:81–90. <https://doi.org/10.1093/bmb/ldx031>
- Udoh A, Bruno-Tome A, Ernawati DK *et al.* The development, validity and applicability to practice of pharmacy-related competency frameworks: a systematic review. *Res Social Adm Pharm* 2021;17:1697–718. <https://doi.org/10.1016/j.sapharm.2021.02.014>
- Mills E, Bates I, Farmer D *et al.* The General Level Framework: use in primary care and community pharmacy to support professional development. *International Journal of Pharmacy Practice* 2008;16:325–31. <https://doi.org/10.1211/ijpp.16.5.0008>
- Coombes I, Bates I, Duggan C *et al.* Developing and recognising advanced practitioners in Australia: an opportunity for a maturing profession? *J Pharm Pract Res* 2015;41:17–9. <https://doi.org/10.1002/j.2055-2335.2011.tb00057.x>
- Bates I, Meilanti S, Bader L *et al.* Strengthening primary health-care through accelerated advancement of the global pharmacy workforce: a cross-sectional survey of 88 countries. *BMJ Open* 2022;12:e061860. <https://doi.org/10.1136/bmjopen-2022-061860>
- United Kingdom Clinical Pharmacy Association critical care group. Developing a process for credentialing advanced level practice in the pharmacy profession using a multi-source evaluation tool. *The Pharmaceutical Journal* 2011. <https://pharmaceutical-journal.com/article/research/developing-a-process-for-credentialing-advanced-level-practice-in-the-pharmacy-profession-using-a-multi-source-evaluation-tool>.
- Joint Partners Credentialing Task Group (JPCT). Professional recognition and professional advancement: for our practitioners, for our profession and for our patients. 2013. <https://www.rpharms.com/Portals/0/RPS%20document%20library/Open%20access/Development/Roadmap%20to%20Advanced%20Practice/Professional%20Recognition%20and%20Professional%20Advancement%20-%20JPCT%20Report.pdf>.
- Council on Credentialing in Pharmacy. Credentialing and privileging of pharmacists: a resource paper from the council on credentialing in pharmacy. *Am J Health Syst Pharm* 2014;71:1891–900. <https://doi.org/10.2146/ajhp140420>
- Wright K, Rowitz L, Merkle A *et al.* Competency development in public health leadership. *Am J Public Health* 2000;90:1202–7. <https://doi.org/10.2105/ajph.90.8.1202>

27. Battel-Kirk B, Barry MM, Taub A *et al.* A review of the international literature on health promotion competencies: identifying frameworks and core competencies. *Glob Health Promot* 2009;16:12–20. <https://doi.org/10.1177/1757975909104100>
28. International Pharmaceutical Federation (FIP). *Advocating expansion of the pharmacist's role in immunisation*. The Hague: International Pharmaceutical Federation, 2022.
29. Wirtz VJ, Hogerzeil HV, Gray AL *et al.* Essential medicines for universal health coverage. *Lancet* 2017;389:403–76. [https://doi.org/10.1016/S0140-6736\(16\)31599-9](https://doi.org/10.1016/S0140-6736(16)31599-9)
30. Ozawa S, Shankar R, Leopold C *et al.* Access to medicines through health systems in low- and middle-income countries. *Health Policy Plan* 2019;34(Supplement_3): iii1–3. <https://doi.org/10.1093/heapol/czz119>