The development of a Foundation-level Pharmacy Competency Framework: An analysis of country-level applicability of the Global Competency Framework

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Abstract

Background

The importance and usefulness of competency frameworks (CFs) in pharmacy professional development is recognised globally. However, there is no national CF for pharmacists in Japan yet.

Objective

This study was conducted to measure the level of relevance of behavioural statements of the International Pharmaceutical Federation (FIP) Global Competency Framework (GbCF) to Japanese foundation-level pharmacy practice, aiming for developing a national framework for foundation-level pharmacists in Japan.

Methods

A cross-sectional, anonymous, online self-completed survey was conducted during June and July 2018 in Japan. The questionnaire was adopted from the GbCF, translated into Japanese. A snowballing sampling approach was used. The relevance levels of the GbCF items were assessed by using 4-point Likert scales, and analysed by descriptive and inferential methods.

Results

A total 604 usable responses were included in analyses. High levels of relevance levels were found in two clusters ('pharmaceutical public health' and 'pharmaceutical care'), while the other two clusters ('organisation and management' and 'professional/personal') showed significantly low relevance (relevance=89.6%, 82.5%, 59.6%, and 67.9%, respectively). The study found little engagement of academic sector with framework, while industry sector showed the relevance to all clusters evenly.

Regarding years working in sectors, the study found there is no progression of relevance in 'organisation and management' and 'professional/personal' competencies during foundation years, which is a worry in terms of the ability of pharmacists taking the management role transitioning towards advanced level, as well as very little professional/personal development.

Conclusions

The study pointed out specific competencies and behaviours which require modifications to adapt the GbCF into Japanese pharmacy practice environment. This is a key step towards development of a national framework, illustrating current Japanese foundation-level pharmacy practice compared with global standards. The findings will be used as a base for developing a framework for foundation-level pharmacists in Japan.

Keywords

Competency Framework, FIP, GbCF, Continuing Professional Development, CPD, Pharmacy

Introduction

At an era of rapid demographic and epidemiological transitions as well as accelerated medical and technological evolution, healthcare environments continuously change and increase the complexity.[1, 2] Lifelong learning is essential for pharmacists to attain and maintain essential competencies so as to ensure the quality of patient care delivery for safe and appropriate use of medicines in patients and improved public health. Considering such situation across nations, there is a greater attention to education and training of healthcare professional workforce globally.[2-4]

Since the concept of competency was introduced in 1960s, competencies are receiving a growing attention in healthcare professional development.[5, 6] The importance and usefulness of competency has been spread in pharmacy globally. This can be identified from works by the International Pharmaceutical Federation (FIP) including: the development of the Global Competency Framework (GbCF) in 2012,[7] the publication of the Pharmacy Workforce Development Goals in 2016 addressing the competency development as one of the thirteen goals,[8] and declaring the Nanjing Statements on Pharmacy and Pharmaceutical Sciences Education in 2017, describing that pharmacists in all sectors and pharmaceutical scientists need competence to respond to the needs of the public.[9]

A competency is defined as '*an underlying characteristic of an individual that is causally related to effective performance*'.[10] Competencies embrace knowledge, skills, attitude and behaviours in order for an individual professional to support their effective and persistent performance.[7] Each competency is accompanied by behavioural statements which describe measurable behaviours that would be observed when the individual demonstrates the competency.[10]

A competency framework (CF) therefore is described as a complete set of competencies and associated behavioural statements that are essential to effective performance in the area of work and practice.[11] A CF can be used as a mapping tool for education development.[7] The educational development using a competency framework is called as competency-based education[12], and now globally accepted and endorsed for education of health professions.[13]

The development of pharmacy CFs nationally across all sectors is a key to clear and consistent training and professional development of pharmacist.[14] The World Health Organization (WHO) addresses that '*the failure to adopt or develop national competencies has a significant impact on regulators' ability to ensure meaningful systems of accreditation, licensure and CPD*'.[15] Many countries around the world made endeavours to develop CFs for pharmacists, adopting the FIP GbCF based on their pharmaceutical needs and responsibilities.[16]

The FIP GbCF was developed by synthesising documents across nations related to capabilities and competencies of foundation level pharmacy practice.[17] Foundation practice is considered as early years practice from entry level of licensing.[7] In the United Kingdom, the foundation practice is usually within the first 1,000 days of registered practice, and requires competencies essential across all sectors and settings.[18] A lifelong learning system provided by the Japanese Pharmaceutical Association, a professional body for pharmacists in Japan, indicates the foundation level practice aiming to be a generalist takes at least 4 years.[19]

In Japan, there are 301,323 pharmacists in 2016, working in community pharmacy (57.1%), healthcare institutions (19.3%), academia (1.7%), industry (13.9%), and public health (2.3%) and others (5.7%).[20] Pharmacists in Japan require completing an accredited 6-year initial pharmacy education programme at one of the Higher Education Institutions in Japan awarded with Bachelor of Pharmacy degree, and pass a national examination to practice as a qualified pharmacist. The 6-year pharmacy programme is structured upon 10 'professional competencies for pharmacists,' defined by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the Pharmaceutical Society of Japan.[21] The 10 professional competencies for pharmacists includes (1) professionalism, (2) patient-oriented attitude, (3) communication skills, (4) interprofessional team-care, (5) basic sciences, (6) medication therapy management, (7) community health and medical care, (8) research, (9) lifelong learning, and (10) education and training.

However, there is no national CF for pharmacists currently in Japan. Although 10 competencies are addressed in pharmacy education core curriculum as a guidance of undergraduate pharmacy education,

no behavioural statement was accompanied with these competencies.[22] Furthermore, there is no mandate continuing professional development (CPD) system for pharmacists in Japan to continue their practice.[23] This would cause undesirable variety of the quality of pharmaceutical care delivery by pharmacists due to a lack of effective professional development. There is an urgent need of developing CFs for pharmacists in Japan, for providing a set of competencies required to be a pharmacist and delivering better opportunities for individual pharmacists to identify learning gaps in the effective professional development journey. This will assist improved delivery of pharmaceutical care for patients and national wellbeing.

Therefore, this study aimed to investigate the applicability of GbCF in a Japanese pharmacy practice environment as a first step towards developing a national CF for foundation-level pharmacists. Objectives were to measure the level of relevance of behavioural statements of the GbCF to a Japanese foundation-level pharmacy practice.

Methods

The study was approved by the Research Ethics Committee Preliminary Review of the Faculty of Pharmaceutical Sciences, Josai International University, Japan. The objectives were fulfilled by conducting a cross-sectional anonymous online questionnaire survey between June and July in 2018.

The questionnaire was adopted from the GbCF consisting of 100 behavioural statements in total under twenty competencies over four clusters, including: (1) Pharmaceutical Public Health (PPH); (2) Pharmaceutical Care (PC); (3) Organisation and Management (OM); and (4) Professional/Personal (PP). A forward-back translation process[24] was adopted to translate original GbCF into Japanese in order to keep the validity of the framework.

A web questionnaire survey was developed, using the Qualtrics (Qualtrics XM). The web questionnaire also included a cover page explaining the background and purpose of the study, electronic consent form, and seven demographic information of respondents.

A snowballing sampling approach was used to gather data. This method is a nonprobability sampling technique, and also known as chain-referral method.[25] Contact persons identified by researchers will recruit further eligible participants within their network. In this study, an invitation letter and a web address of the questionnaire were emailed to contact persons within the networks of the project team members (NA and SY). To recruit pharmacists from all sectors, selected contact persons work across sectors including community pharmacy, hospital, university, public body, and industry. Inclusion criteria of the sample were (a) registered pharmacists in Japan who have worked in one practice area from day 1 up to 5 years (including those who does not work in patient-facing practice areas), and (b) registered pharmacists in Japan who have returned from career break or have changed their practice area within 5 years.

Anonymity was promised in the cover letter without any personal information collected. Only respondents who agreed with participation on an electronic consent form was directed to the web questionnaire.

Data were directly downloaded into the Statistical Package for Social Science (SPSS) version 25 (IBM) for quantitative analysis using descriptive and inferential statistics. All data were cleaned manually in the database with input error and accuracy validated with a random selection of 10% of cases to ensure input error rates within acceptable limits. The perceived relevance of each item related to the respondent's own scope of practice was rated by four-point Likert scale, which were converted to dichotomous data (i.e., 'Not relevant' and 'Relevant') in order to analyse the relevance of each item. A probability level of $p < .05$ was used to identify the significance in analysis.

Results

Demographics

698 respondents agreed with participation. Of those 698 agreed, 534 fully finished the survey, and 70 partially responded. In total, 604 usable responses were included in analyses. The background characteristics of the respondents included in analyses were summarised in Table 1.

[Table 1: respondents' demographics.]

Relevance rating – overall

The levels of relevance differ between clusters (Figure 1). Cluster 1 (PPH) and cluster 2 (PC) had relatively high levels of relevance of items to foundation-level practice in Japan (PPH 'relevant'=89.6%; and PC 'relevant'=82.5%). Cluster 3 (OM) and cluster 4 (PP) showed the significant low relevance of clusters (OM 'relevant'=59.6%; and PP 'relevant'=67.9%).

[Figure 1: Relevance rating – overall between clusters.]

Analyses of each item expressed which competencies and behavioural statements were less relevant to foundation-level practice in Japan, and need modifications for adapting into a Japanese practice environment (Annex 1 - 4).

Under cluster 2 (PC), an item (2.6(a): patient consultation and diagnosis) was rated more towards 'not relevant', although there was not significant difference between two groups ('relevant'=45.5%, 'not relevant'=54.5%, p=.035). Three items (2.2(b): compounding medicines, 2.5(a): monitor medicines therapy, and 2.6(c): patient consultation and diagnosis) were rated relatively as low relevant, despite of their statistically significant relevance (2.2(b): 'relevant'=66.2%, p<.0001; 2.5(a): 'relevant'=64.0%, p<.0001; 2.6(c): 'relevant'=67.3%, p<.0001).

Data also highlighted the low relevance of cluster 3 (OM) in a foundation-level Japanese pharmacy practice. Out of six competencies, only one competency (3.5: supply chain and management) was rated relatively high relevance (cluster average 'relevant'=75.7%, all items p<.0001). Three items in competency

3.2 (human resources management) and three in competency 3.4 (procurement) were statistically non-relevant, ranging from 55.4% to 75.6% in 'not relevant'.

Some items in cluster 4 (PP) were rated as 'not relevant' to a foundation-level practice in Japan. For example, 4.2(a) is about documenting CPD activities, which are recommended practice in Japan, but these are not mandate ('not relevant'=60.3%, p<.0001). More than a half of items in competency 4.5 (quality assurance and research in work place) expressed the tendency towards non-relevance (4.5(a): 'not relevant'=52.7%, 4.5(c): 'not relevant'=59.7%, 4.5(d): 'not relevant'=62.1%, 4.5(g): 'not relevant'=62.9%, 4.5(i): 'not relevant'=59.1%).

Relevance rating – core area of practice

The characteristics of practice between sectors illustrate varying degrees of relevance of competency clusters (Figure 2). Community and Hospital/Clinics settings have more patient-facing roles compared to the other sectors, which were shown as high relevance in cluster 1 (PP) (community: 'relevant'=91.0%, hospital/clinics: 'relevant'=89.8%) and cluster 2 (PC) (community: 'relevant'=84.5%, hospital/clinics: 'relevant'=82.9%). Figure 2 also shows very low relevance of cluster 3 (OM) in foundation practices in a hospital/clinics setting ('relevant'=39.8%).

Furthermore, results express that an academic sector has little engagement in competency framework (PPH 'relevant'=61.8%, PC 'relevant'=49.6%, OM 'relevant'=44.8%, PP 'relevant'=61.5%). On the contrary, industry sector is seemed to be related to all clusters evenly (PPH 'relevant'=88.9%, PC 'relevant'=71.6%, OM 'relevant'=80.1%, PP 'relevant'=86.2%).

[Figure 2: Heat map on relevance ratings between sectors]

Relevance rating – Years working in current core area of practice

Figure 3 presents a comparison between years working in current core area of practice with each competency cluster. A category of 'more than 6 years working in current core area of practice' includes pharmacists who had a career break or child care break within 5 years and came back to practice again. Within the first 5 years of foundation practice, data shows slight but gradual increase in the degree of relevance in cluster 1 (PPH) (<1 year to 5 years 'relevant'=85.5%, 90.2%, 90.3%, 90.9%, 90.9%, 96.4%,

respectively) and cluster 2 (PC) (<1 year to 5 years 'relevant'=73.4%, 84.7%, 83.9%, 84.4%, 85.6%, 91.7%, respectively), but no significant increases in cluster 3 (OM) (<1 year to 5 years 'relevant'=55.2%, 57.4%, 55.5%, 619%, 66.2%, 58.6%, respectively) and cluster 4 (PP) (<1 year to 5 years 'relevant'=64.0%, 68.2%, 66.7%, 68.7%, 69.8%, 67.7%, respectively).

[Figure 3: Heat map on relevance ratings between the numbers of years working in current core areas of practice.]

Relevance rating – Years qualified

Comparing the degrees of relevance of clusters between the numbers of years qualified as pharmacist (Figure 4), the data illustrates that older respondents engage less in cluster 2 (PC) (0-5 years 'relevant'=83.6%; 6-10 years 'relevant'=64.9%; 11-20 years 'relevant'=82.9%; 21-30 years 'relevant'=68.6%; and >31 years 'relevant'=46.0%).

[Figure 4: Heat map on relevance ratings between the numbers of years qualified as pharmacist]

Discussion

This is the first study investigated the applicability of the GbCF in a Japanese pharmacy practice environment.

The study showed the low levels of relevance of organisation and management competencies in a foundation pharmacy practice in Japan. Foundation-level pharmacists in Japan are unlikely to engage with the human resources management, and not often get any support for gaining these competencies at foundation level. Figure 3 also illustrates that there is no increase in the degree of relevance of practice related to organisation and management during the foundation practice period, indicating that pharmacists unable to appreciate practical opportunities to develop organisation and management competencies. This causes a worry for their career paths when they are promoted or apply for the management role. At advanced level of practice, pharmacy practitioners increasingly contribute to management, along with leadership, education and training, research and progressing working relationships.[26] This has been featured in the advanced level competency frameworks developed in Great

Britain[27] and Australia[28]. For seamless transition from foundation to advanced level practice, these organisation and management competencies require being instilled at foundation level. Support and training for developing these competencies will be essential to advance their career paths.

The study also revealed that some aspects of procurements related to costing of products were not relevant to a foundation level practice in Japan. These are often carried out by the advanced level practitioners or at a company/hospital level in Japan, which is consistent with the present results. One item in the procurements competency, an item 3.4(c) related to linkage between procurement to formulary was indicated as non-relevance significantly. The Japanese government is now encouraging to develop local formularies for safer, more radical and cost-effective use of medicines.[29] Therefore, the item needs to be considered for future development.

The low level of relevance in cluster 4 (professional/personal) illustrates more works to be done for on-going professional development during foundation-level practice in Japan. There is no mandate CPD to keep registration as a pharmacist in Japan,[23] which led to the low level of documentation of CPD activities in this study. Documenting CPD activities is a key part of CPD reflective cycle, which needs to be instilled and developed during undergraduate education and foundation-level practice. Figure 3 also showed no progression of relevance in cluster 4 during their foundation-level practice years. This is also consistent with the need of structured CPD system using competency framework showing their clear career paths.

Foundation-level pharmacists expressed the low engagement with many aspects of quality assurance and research in work place. This raises a worry related to research skills of foundation-level pharmacists, as well as continuous improvement and advancement of practice. Enquiry-driven and evidence-based practice is a key to providing safe and effective pharmaceutical care.

Figure 2 illustrates different levels of engagement with the GbCF between sectors. Academic sectors have little relevance to the framework, while the industry sector engages with the framework across all clusters evenly. Working conditions of academic pharmacy workforce in Japan could have affected the results. Academics in pharmacy in Japan mostly work exclusively in a university, not sharing their working time in other clinical positions. This might cause disconnection with clinical competencies such as

pharmaceutical public health and pharmaceutical care competencies. This indicates that wording may need slight changes so that pharmacists in academic sectors would be able to relate themselves in the use of framework.

Figure 4 pointed out that people qualified as pharmacist more than 31 years very little engagement in pharmaceutical care compared with the others. It may indicate that concept of pharmaceutical care was not introduced well in this population. The concept of pharmaceutical care is first developed in hospital sector in Japan and now grown popular in community sector. Developing and maintaining pharmaceutical care competencies as pharmacist at the foundation-level practice, when coming back to practice after career break, or changing sectors. Identifying learning gaps through competency framework is helpful step to reflect their practice and improve them.

Methods that this study undertook are relevant to all countries where have not developed their own national CFs for pharmacists. Considering the importance and usefulness of CFs for pharmacy professional development as well as resources available, it is reasonable and thoughtful to adapt and adopt the GbCF for their development. A key for the successful development of the CF for individual country should be consideration of country level practice based on their health needs. For this, the methods that the present study undertook can be a first step for country level CFs for pharmacists.

It is important to note limitations of the study, including generalisability, sample size and self-completed questionnaire use. Findings of the study may not be generalizable due to the use of snowballing sampling methods. Further, sample size is not big enough to express explicit sector- and other categorical levels comparisons. In addition, the use of self-completed questionnaire is often limited for actual behavioural measurement. Therefore, there is a need of caution to interpret the results of the study.

Future works include the consensus development panel for developing a daft framework for foundation-level pharmacists in Japan from the results of the study, then validation of the draft framework, which will be quality assured by expert panel at the end. Lastly, for advancing pharmacy profession globally, the review and updates of the GbCF[7] would be another work to be considered as the roles and responsibilities of pharmacists have been advanced and evolved in many countries.

Conclusions

This is the first study that investigated the applicability of the GbCF in a Japanese pharmacy practice environment. The study allowed to point out specific competencies and behavioural statements which needs modification to adapt the GbCF into Japanese specific pharmacy practice, through investigating the levels of relevance of items in the framework. The study was a key first step towards development of competency framework for a foundation-level pharmacists in Japan. Findings of the study illustrate current foundation-level pharmacy practice in Japan compared with global standards. Further, these findings will be used as a base for developing framework, which will assist improving national health of Japanese population through helping improve and advance professional development of pharmacists with evidence-based tool.

Declarations

Ethics approval and consent to participate

The study was approved by the Research Ethics Committee Preliminary Review of the Faculty of Pharmaceutical Sciences, Josai International University, Japan.

Availability of data and materials

The datasets generated and/or analysed during the current study are available from the corresponding author or reasonable request.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

NA prepared and conducted the study, analysed and interpreted collected data, and wrote a manuscript. SY assisted the survey distributions and ethical applications. CA assisted the study development and study arrangement in the organisation. IB assisted data analysis and interpretation of collected data, and contributed to the study preparation. All authors read and approved the final manuscript.

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Tables

Table 1: Respondents' demographics

Gender	Male	304 (50.3%)
	Female	277 (45.9%)
	Don't want to answer	23 (3.8%)
Age		Mean 28.53 yo (SD: 5.18, range: 21 – 74)
Years qualified		Mean 3.64 years (SD: 5.00, range: 0 – 43)
Years working in current core area of practice		Mean 2.68 years (SD: 3.25, range: 0 – 35)
Current core area of practice	Community	480 (79.5%)
	Hospital/Clinics	74 (12.3%)
	Education & research	18 (3.0%)
	Industry	9 (1.5%)
	Others*	23 (3.8%)
Previous work experience in other practice area		89 (14.7%)

*Note: Others includes regulatory and public health organisations, pharmaceutical journalist, and no-clarifications.

Tables

Figures

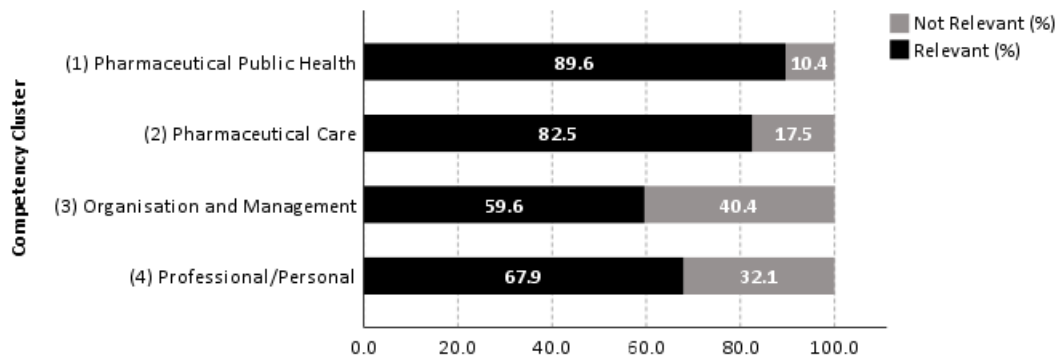*Figure 1: Relevance rating – overall between clusters*

Figure 2: Heat map on relevance ratings between sectors [Using colour for the figure]
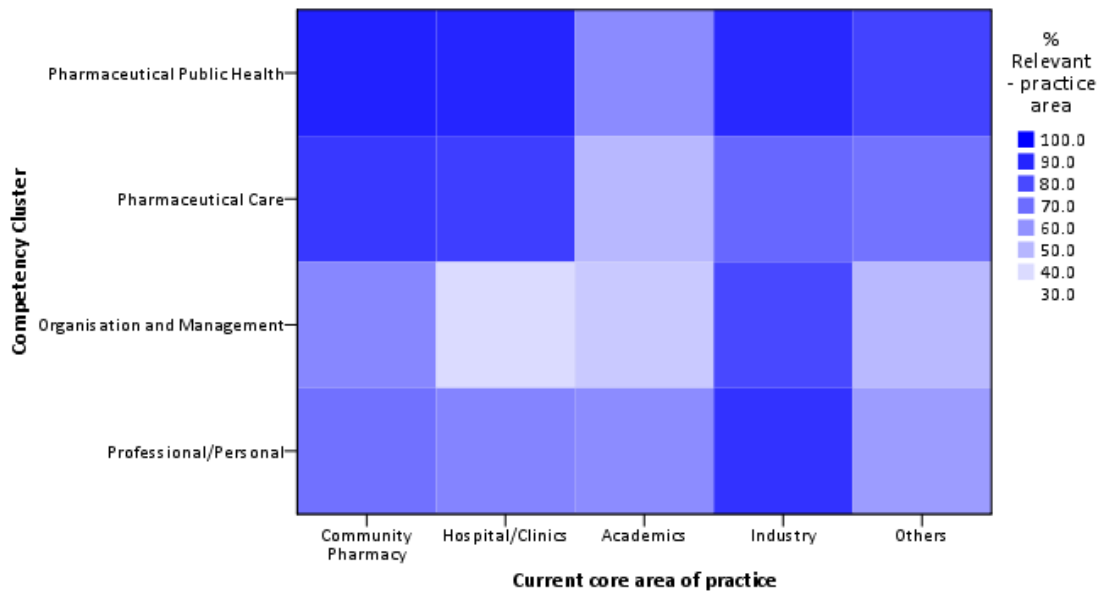
Figure 3: Heat map on relevance ratings between the numbers of years working in current core areas of practice [Using colour for the figure]
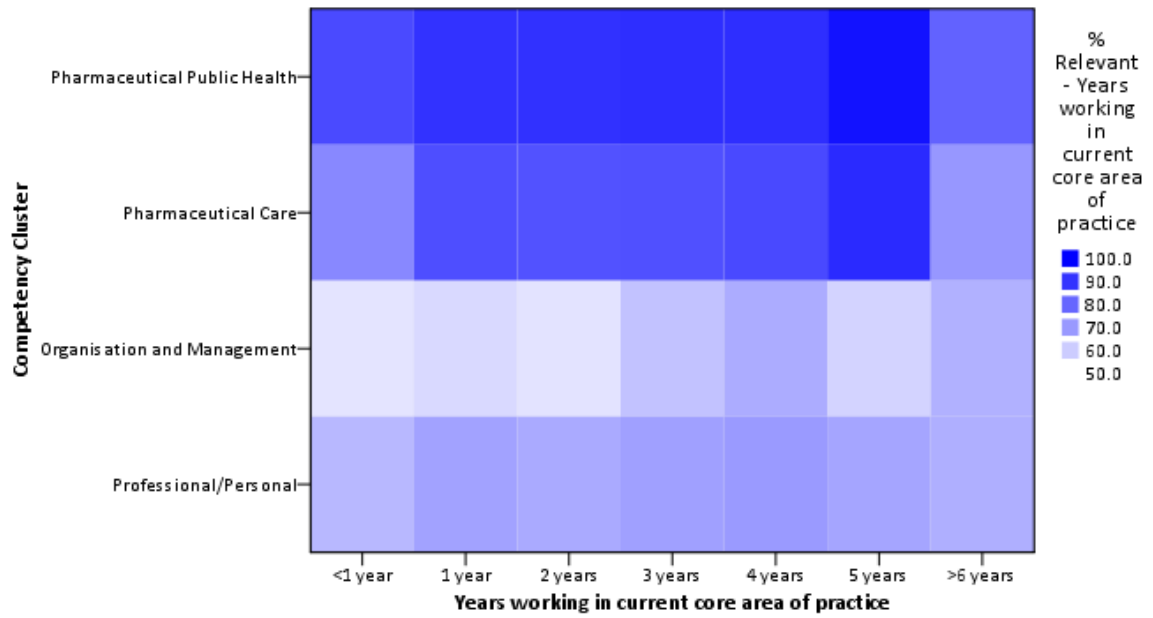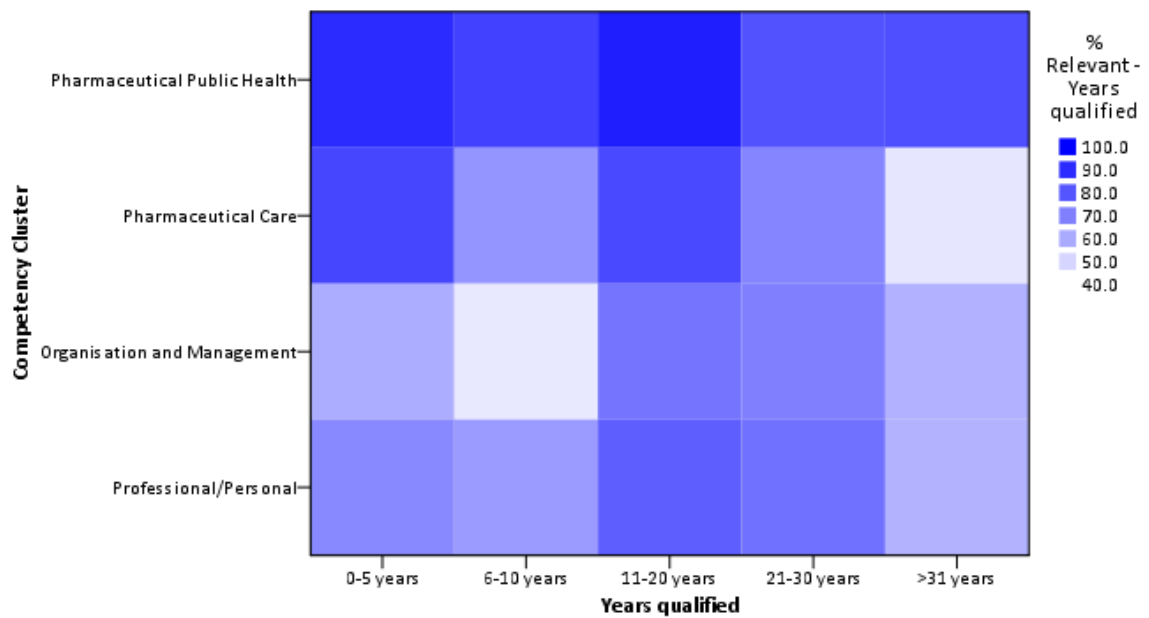

Figure 4: Heat map on relevance ratings between the numbers of years qualified as pharmacist [Using colour for the figure]

Appendices

Annex 1: Relevance ratings – cluster 1 pharmaceutical public health

Cluster	Competency	Behavioural statements	Total N	Not relevant		Relevant		p
				Count	%	Count	%	
Cluster 1: Pharmaceutical Public Health	1.1 Health promotion	(a) Assess the primary healthcare needs (taking into account the cultural and social setting of the patient)	599	107	17.9	492	81.5	<.0001
		(b) Advise on health promotion, disease prevention and control, and healthy lifestyle	600	56	9.3	544	90.7	<.0001
		Average	1199	163	13.6	1036	86.4	
	1.2 Medicines Information and advice	(a) Counsel population on the safe and rational use of medicines and devices (including the selection, use, contraindications, storage, and side effects of non-prescription and prescription medicines)	602	26	4.3	576	95.7	<.0001
		(b) Identify sources, retrieve, evaluate, organise, assess and disseminate relevant medicines information according to the needs of patients and clients and provide appropriate information	602	61	10.1	541	89.9	<.0001
		Average	1204	87	7.2	1117	92.8	
	Cluster Average		2403	250	10.4	2153	89.6	

Annex 2: Relevance ratings – cluster 2 pharmaceutical care

Cluster	Competency	Behavioural statements	Total N	Not relevant		Relevant		p
				Count	%	Count	%	
Cluster 2: Pharmaceutical Care	2.1 Assessment of medicines	(a) Appropriately select medicines (e.g. according to the patient, hospital, government policy, etc.)	569	51	9.0	518	91.0	<.0001
		(b) Identify, prioritise and act upon medicine-medicine interactions; medicine-disease interactions; medicine-patient interactions; medicines-food interactions	569	36	6.3	533	93.7	<.0001
		Average	1138	87	7.6	1051	92.4	
	2.2 Compounding medicines	(a) Prepare pharmaceutical medicines (e.g. extemporaneous, cytotoxic medicines), determine the requirements for preparation (calculations, appropriate formulation, procedures, raw materials, equipment etc.)	569	115	20.2	454	79.8	<.0001
		(b) Compound under the good manufacturing practice for pharmaceutical (GMP) medicines	568	192	33.8	376	66.2	<.0001
		Average	1137	307	27.0	830	73.0	
	2.3 Dispensing	(a) Accurately dispense medicines for prescribed and/or minor ailments and monitor the dispense (re-checking the medicines)	568	24	4.2	544	95.8	<.0001
		(b) Accurately report defective or substandard medicines to the appropriate authorities	569	154	27.1	415	72.9	<.0001
		(c) Appropriately validate prescriptions, ensuring that prescriptions are correctly interpreted and legal	567	31	5.5	536	94.5	<.0001
		(d) Dispense devices (e.g. inhaler or a blood glucose meter)	567	146	25.7	421	74.3	<.0001

		N	n	%	n	%	p
	(e) Document and act upon dispensing errors	568	64	11.3	504	88.7	<.0001
	(f) Implement and maintain a dispensing error reporting system and a 'near misses' reporting system	568	87	14.4	481	79.6	<.0001
	(g) Label the medicines (with the required and appropriate information)	568	31	5.5	537	94.5	<.0001
	(h) Learn from and act upon previous 'near misses' and 'dispensing errors'	568	29	5.1	539	94.9	<.0001
	Average	4543	566	12.5	3977	87.5	
2.4 Medicines	(a) Advise patients on proper storage conditions of the medicines and ensure that medicines are stored appropriately (e.g. humidity, temperature, expiry date, etc.)	567	29	5.1	538	94.9	<.0001
2.4 Medicines	(b) Appropriately select medicine formulation and concentration for minor ailments (e.g. diarrhoea, constipation, cough, hay fever, insect bites, etc.)	567	127	22.4	440	77.6	<.0001
2.4 Medicines	(c) Ensure appropriate medicines, route, time, dose, documentation, action, form and response for individual patients	567	74	13.1	493	86.9	<.0001
2.4 Medicines	(d) Package medicines to optimise safety (ensuring appropriate re-packaging and labelling of the medicines)	567	95	16.8	472	83.2	<.0001
2.4 Medicines	Average	2268	325	14.3	1943	85.7	
2.5 Monitor medicines therapy	(a) Apply guidelines, medicines formulary system, protocols and treatment pathways	564	203	36.0	361	64.0	<.0001
2.5 Monitor medicines therapy	(b) Ensure therapeutic medicines monitoring, impact and outcomes (including objective and subjective measures)	564	139	24.6	425	75.4	<.0001
2.5 Monitor medicines therapy	(c) Identify, prioritise and resolve medicines management problems (including errors)	564	113	20.0	451	80.0	<.0001
2.5 Monitor medicines therapy	Average	1692	455	26.9	1237	73.1	
2.6 Patient consultation and diagnosis	(a) Apply first aid and act upon arranging follow-up care	565	308	54.5	257	45.5	0.035
2.6 Patient consultation and diagnosis	(b) Appropriately refer	566	79	14.0	487	86.0	<.0001
2.6 Patient consultation and diagnosis	(c) Assess and diagnose based on objective and subjective measures	565	185	32.7	380	67.3	<.0001
2.6 Patient consultation and diagnosis	(d) Discuss and agree with the patients the appropriate use of medicines, taking into account patients' preferences	566	93	16.4	473	83.6	<.0001
2.6 Patient consultation and diagnosis	(e) Document any intervention (e.g. document allergies, medicines and food, in patient medicines history)	566	35	6.2	531	93.8	<.0001
2.6 Patient consultation and diagnosis	(f) Obtain, reconcile, review, maintain and update relevant patient medication and diseases history	566	38	6.7	528	93.3	<.0001
2.6 Patient consultation and diagnosis	Average	3394	738	21.7	2656	78.3	
Cluster average		14172	2478	17.5	11694	82.5	

Annex 3: Relevance ratings – cluster 3 organisation and management

Cluster	Competency	Behavioural statements	Total N	Not relevant		Relevant		p
				Count	%	Count	%	
Cluster 3: Organisation and Management	3.1 Budget and reimbursement	(a) Acknowledge the organisational structure	549	184	33.5	365	66.5	<.0001
		(b) Effectively set and apply budgets	549	308	56.1	241	43.9	0.005
		(c) Ensure appropriate claim for the reimbursement	548	193	35.2	355	64.8	<.0001
		(d) Ensure financial transparency	548	308	56.2	240	43.8	0.004
		(e) Ensure proper reference sources for service reimbursement	549	283	52.1	263	47.9	0.348
		Average	2743	1276	46.5	1464	53.4	
	3.2 Human Resources management	(a) Demonstrate organisational and management skills (e.g. know, understand and lead on medicines management, risk management, self management, time management, people management, project management, policy management)	549	252	45.9	297	54.1	0.06
		(b) Identify and manage human resources and staffing issues	549	324	59.0	225	41.0	<.0001
		(c) Participate, collaborate, advise in therapeutic decision-making and use appropriate referral in a multi-disciplinary team	549	247	45.0	302	55.0	0.021
		(d) Recognise and manage the potential of each member of the staff and utilise systems for performance management (e.g. carry out staff appraisals)	549	313	57.0	236	43.0	0.001
		(e) Recognise the value of the pharmacy team and of a multidisciplinary team	549	244	44.4	305	55.6	0.01
		(f) Support and facilitate staff training and continuing professional development	549	323	58.8	226	41.2	<.0001
		Average	3294	1703	51.7	1591	48.3	
	3.3 Improvement of service	(a) Identify and implement new services (according to local needs)	549	244	44.4	305	55.6	0.01
		(b) Resolve, follow up and prevent medicines related problems	549	160	29.1	389	70.9	<.0001
		Average	1098	404	36.8	694	63.2	
	3.4 Procurement	(a) Access reliable information and ensure the most cost-effective medicines in the right quantities with the appropriate quality	549	156	28.4	393	71.6	<.0001
		(b) Develop and implement contingency plan for shortages	549	156	28.4	393	71.6	<.0001
		(c) Efficiently link procurement to formulary, to push/pull system (supply chain management) and payment mechanisms	549	304	55.4	245	44.6	0.013
		(d) Ensure there is no conflict of interest	549	187	34.1	362	65.9	<.0001
		(e) Select reliable supplies of high-quality products (including appropriate selection process, cost effectiveness, timely delivery)	549	225	41.0	324	59.0	<.0001
		(f) Supervise procurement activities	549	320	58.3	229	41.7	<.0001
		(g) Understand the tendering methods and evaluation of tender bids	549	415	75.6	134	24.4	<.0001
		Average	3843	1763	45.9	2080	54.1	
	3.5 Supply chain and management	(a) Demonstrate knowledge in store medicines to minimise errors and maximise accuracy	549	88	16.0	461	84.0	<.0001
		(b) Ensure accurate verification of rolling	549	62	11.3	487	88.7	<.0001

		stocks					
		(c) Ensure effective stock management and running of service with the dispensary	549	64	11.7	485	88.3	<.0001
		(d) Ensure logistics of delivery and storage	549	191	34.8	358	65.2	<.0001
		(e) Implement a system for documentation and record keeping	549	184	33.5	365	66.5	<.0001
		(f) Take responsibility for quantification of forecasting	549	210	38.3	339	61.7	<.0001
		Average	3294	799	24.3	2495	75.7	
	3.6 Workplace management	(a) Address and manage day to day management issues	549	179	32.6	370	67.4	<.0001
		(b) Demonstrate the ability to take accurate and timely decisions and make appropriate judgements	549	156	28.4	393	71.6	<.0001
		(c) Ensure the production schedules are appropriately planned and managed	549	187	34.1	362	65.9	<.0001
		(d) Ensure the work time is appropriately planned and managed	549	186	33.9	363	66.1	<.0001
		(e) Improve and manage the provision of pharmaceutical services	549	186	33.9	363	66.1	<.0001
		(f) Recognise and manage pharmacy resources (e.g. financial, infrastructure)	549	261	47.5	288	52.5	0.267
		Average	3294	1155	35.1	2139	64.9	
	Cluster average		17566	7100	40.4	10463	59.6	

Annex 4: Relevance ratings – cluster 4 professional/personal

Cluster	Competency	Behavioural statements	Total N	Not relevant		Relevant		p
				Count	%	Count	%	
Cluster 4: Professional/Personal	4.1 Communication skills	(a) Communicate clearly, precisely and appropriately while being a mentor or tutor	537	113	21.0	424	79.0	<.0001
		(b) Communicate effectively with health and social care staff, support staff, patients, carer, family relatives and clients/customers, using lay terms and checking understanding	535	66	12.3	469	87.7	<.0001
		(c) Demonstrate cultural awareness and sensitivity	536	184	34.3	352	65.7	<.0001
		(d) Tailor communications to patient needs	536	33	6.2	503	93.8	<.0001
		(e) Use appropriate communication skills to build, report and engage with patients, health and social care staff and voluntary services (e.g. verbal and non-verbal)	537	85	15.8	452	84.2	<.0001
		Average	2681	481	17.9	2200	82.1	
	4.2 Continuing Professional Development (CPD)	(a) Document CPD activities	537	324	60.3	213	39.7	<.0001
		(b) Engage with students/interns/residents	537	243	45.3	294	54.7	0.031
		(c) Evaluate currency of knowledge and skills	537	224	41.7	313	58.3	<.0001
		(d) Evaluate learning	536	219	40.9	317	59.1	<.0001
		(e) Identify if expertise needed outside the scope of knowledge	535	239	44.7	296	55.3	0.015
		(f) Identify learning needs	536	218	40.7	318	59.3	<.0001
		(g) Recognise own limitations and act upon them	536	113	21.1	423	78.9	<.0001
		(h) Reflect on performance	536	103	19.2	433	80.8	<.0001
		Average	4290	1683	39.2	2607	60.8	
	4.3 Legal and regulatory practice	(a) Apply and understand regulatory affairs and the key aspects of pharmaceutical registration and legislation	537	121	22.5	416	77.5	<.0001
		(b) Apply knowledge in relation to the principals of business economics and intellectual property rights including the basics of patent interpretation	537	253	47.1	284	52.9	0.195
		(c) Be aware of and identify the new medicines coming to the market	536	133	24.8	403	75.2	<.0001
		(d) Comply with legislation for drugs with the potential for abuse	536	57	10.6	479	89.4	<.0001
		(e) Demonstrate knowledge in marketing and sales	536	284	53.0	252	47.0	0.181
		(f) Engage with health and medicines policies	535	178	33.3	357	66.7	<.0001
		(g) Understand the steps needed to bring a medicinal product to the market including the safety, quality, efficacy and pharmacoeconomic assessments of the product	536	186	34.7	350	65.3	<.0001
		Average	3753	1212	32.3	2541	67.7	
	4.4 Professional and ethical practice	(a) Demonstrate awareness of local /national codes of ethics	536	200	37.3	336	62.7	<.0001
		(b) Ensure confidentiality (with the patient and other healthcare professionals)	535	20	3.7	515	96.3	<.0001
		(c) Obtain patient consent (it can be implicit on occasion)	536	36	6.7	500	93.3	<.0001
		(d) Recognise own professional limitations	537	37	6.9	500	93.1	<.0001
		(e) Take responsibility for own action and for patient care	536	31	5.8	505	94.2	<.0001
		Average	2680	324	12.1	2356	87.9	
	4.5 Quality assurance and research in work place	(a) Apply research findings and understand the benefit risk (e.g. pre-clinical, clinical trials, experimental clinical-pharmacological research and risk management)	535	282	52.7	253	47.3	0.226

		(b) Audit quality of service (ensure that they meet local and national standards and specifications)	535	234	43.7	301	56.3	0.004
		(c) Develop and implement Standing Operating Procedures (SOPs)	534	319	59.7	215	40.3	<.0001
		(d) Ensure appropriate quality control tests are performed and managed appropriately	535	332	62.1	203	37.9	<.0001
		(e) Ensure medicines are not counterfeit and quality standards	536	237	44.2	299	55.8	0.008
		(f) Identify and evaluate evidence-base to improve the use of medicines and services	536	228	42.5	308	57.5	0.001
		(g) Identify, investigate, conduct, supervise and support research at workplace (enquiry-driven practice)	536	337	62.9	199	37.1	<.0001
		(h) Implement, conduct and maintain a reporting system of pharmacovigilance (e.g. report Adverse Drug Reactions)	533	215	40.3	318	59.7	<.0001
		(i) Initiate and implement audit and research activities	535	316	59.1	219	40.9	<.0001
		Average	4815	2500	51.9	2315	48.1	
	4.6 Self-management	(a) Apply assertiveness skills (inspire confidence)	535	102	19.1	433	80.9	<.0001
		(b) Demonstrate leadership and practice management skills, initiative and efficiency	535	179	33.5	356	66.5	<.0001
		(c) Document risk management (e.g. critical incidents)	535	117	21.9	418	78.1	<.0001
		(d) Ensure punctuality	535	10	1.9	525	98.1	<.0001
		(e) Prioritise work and implement innovative ideas	535	92	17.2	443	82.8	<.0001
		Average	2675	500	18.7	2175	81.3	
Cluster average			20894	6700	32.1	14194	67.9	