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Research Paper

Developing pharmacists' competencies in Saudi Arabia: A proposed national competency framework to support initial education and professional development

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ABSTRACT

Introduction: With the currently accelerating changes in pharmacists' roles in Saudi Arabia, evidence-based developmental tools are required to guide initial pharmacy education and define competencies for early career (foundation level) pharmacists' progression. This study aimed to develop a profession-wide competency framework for foundation level pharmacists in Saudi Arabia using the International Pharmaceutical Federation (FIP) Global Competency Framework (GbCF) as the source framework.

Methods: An online nominal group technique was used to develop consensus on a profession-wide national competency framework in Saudi Arabia. Purposive sampling was used to recruit experts from local various pharmacy sectors. A combination of self-administered surveys and online meetings was used to measure and develop consensus. The survey items were adopted from the FIP GbCF version 2.

Results: Nine pharmacy experts participated in five iterative rounds of consensus measurement and development between July and November 2021. Consensus was achieved on appropriateness to Saudi pharmacy practice for all the behaviours in the "Pharmaceutical Public Health," "Pharmaceutical Care," and "Professional/Personal" clusters. The "Organisation and Management" cluster caused most differences of opinion. The final consensus generated a list of 125 behavioural statements for inclusion in the national competency framework.

Conclusion: This study proposes the first competency framework for foundation level pharmacists in Saudi Arabia. The developed framework represents a consensus on competencies for foundation level pharmacists working across all pharmacy sectors and is eligible for supporting further improvement of initial pharmacy education and support excellence in pharmacists' performance to address the country's needs from pharmaceutical services.

Introduction

In many countries, the expanded patient-centred roles for pharmacists have been realised through a range of policy changes and healthcare system reforms.[1] This expansion of pharmacist roles requires an adaptable competent workforce to commit and deliver the

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range of current and new pharmaceutical services, as appropriate to their country's needs. A basic prerequisite to support pharmacists' professional development in the ever-changing demands of modernised health systems is the implementation of pharmacy competencies.[2,3]

Competency-based developmental frameworks are common professional development tools that define competencies for career progression and guide education and training development.[4] Competency pertains to a subset of outcomes, including knowledge, skills, attitudes, and behaviours that relate to professional performance, affect the responsibilities or roles of individuals, and undergo improvement through training and development.[5,6] Competencies are accompanied by behavioural statements that describe how a specific competency can be measured or observed in practice.[7] Therefore, competency frameworks typically include an assembly of core competencies and behavioural statements required to support practitioners to evaluate their capabilities and learning needs.[3] Published research demonstrates that the use of competency frameworks alongside standards of practice can support pharmacists' development and contribute to effective and sustainable performance.[8–11]

The significance of competencies in professional development has prompted the International Pharmaceutical Federation (FIP) to develop an evidence-based global competency framework (GbCF) to support the professional development of early career pharmacists' (foundation level) worldwide.[12] The GbCF comprises a set of core competencies that can be used to develop a country-specific framework based on local pharmaceutical needs. Its aim is to support pharmacists' seamless progression from initial education through foundation level, i.e. beyond day one of registration, and up to one to two years of practice, depending on the country's practice environment. The focus of the FIP on foundation level competencies was due to the importance for pharmacists globally to demonstrate appropriate foundation practice competencies to progress to advanced or specialised practice.[13,14] In 2020, the FIP published a revised and updated second version of the FIP GbCF, which includes new competencies to reflect pharmacists' evolving roles as well as technological and therapeutic advances.[15]

In Saudi Arabia, the concept of pharmaceutical care is relatively well established, yet broadly focused on inpatient hospital services.[16–18] In community pharmacy, pharmacists perform the traditional roles of medication dispensing and counselling, whereas in hospitals, pharmacists perform a broader range of activities such as medication compounding, storage and supply, as well as provision of drug information.[17] Advanced specialised clinical services such as ambulatory care and therapeutic drug monitoring are only provided in tertiary care hospitals located in main cities.[18]

In 2016, the Saudi government launched the Future Vision 2030, which recognises "enhancing the quality of therapeutic health services," "promoting preventive care," and "activating primary care services as the first port of call into the healthcare system" as pillars to modernise the health sector.[19] To align with the government plans for the health sector, the Ministry of Health (MOH) projected a strategic plan to transform the model of pharmacy practice from the traditional in-patient model of pharmaceutical care services to ambulatory pharmaceutical care services provided in community pharmacies.[20] This involves a range of new responsibilities including medication therapy management, minor illness care, and vaccination.[21]

With the recent policy transformation to expand pharmacy services from what has been the norm for years, it is crucial to upgrade pharmacy education programmes and training activities to satisfy the government plans and support pharmacists develop their competencies to fulfil expected roles. Currently, no national competency framework exists for pharmacists in any sector or stage of practice in Saudi Arabia. The absence of a national competency framework to inform pharmacy education assessment and development raises questions about quality and outcomes of the educational programmes in terms of students' achieving competencies and professional development.[22,23] Research has demonstrated that local experts and stakeholders hold the view that current pharmacy education outcomes require development at the national level to reflect the country's needs and priorities.[17,22]

Given the fundamental role of pharmacy education and continuing professional development (CPD) in preparing and developing competent pharmacists, there is a need to develop a national competency framework for pharmacists in Saudi Arabia.[24,25] A comprehensive set of national competencies required for effective professional performance could lay the foundations for bridging the gap between traditional pharmacy education and the ever-changing demands of a modern health system.[26] It will also help to inform the development of a competency-based undergraduate education curriculum, assess the difference between the established and desired performance of pharmacists and design quality CPD and continuing education strategies to support practising pharmacists in their professional development in accordance with the current pharmaceutical needs.[25]

A key step in developing a national framework to support pharmacists in all sectors requires a profession-wide consensus from the major stakeholders in practice and education. Therefore, the purpose of this study was to acquire this by using the FIP GbCF as a basis to develop the first profession-wide competency framework for foundation level pharmacists in Saudi Arabia. This will enable to support further development and improvement of initial pharmacy education in Saudi Arabia.

Methods

Study design

A nominal group technique (NGT),[27] also known as an expert panel,[28] was utilised as a consensus method to develop the competency framework. This technique aimed to assess the extent to which pharmacy experts agree on the appropriateness of items on the suggested list of competencies and behavioural statements to be included in the national framework. This study was approved by the University of Nottingham's School of Pharmacy Research Ethics Committee (Ref. 011–2019).

NGT typically consists of multiple rounds in which experts rate, discuss, and re-rate a list of items to determine the extent of their agreement (measure consensus) and resolve disagreements (develop consensus) on the proposed list.[28] Repeated cycles lead to a gradual narrowing of the distribution of the responses eventually resulting in a consensus. In this study, NGT was chosen over other

consensus methods, such as the Delphi Technique, due to its demonstrated validity, adaptability, time efficiency, and cost effectiveness as well as the desire to involve direct interaction and discussion among experts to enhance consensus, rather than relying on purely statistical feedback as in the Delphi technique.[29]

The classic NGT has key four stages: silent-generation, round-robin, clarification, and ranking.[29] In this study, a variation from the classic NGT was applied to the silent-generation stage. Instead of generating ideas about the required competencies and behavioural statements for foundation level pharmacists in Saudi Arabia, a comprehensive set of competencies and behavioural statements for the experts to rank were adopted from the FIP GbCF version 2 (v2)[15] and from the previous phase of this research.[30] This approach is known as a modified NGT.[29] It comprises three key stages: ranking (in Round 1), clarification (in Rounds 2 and 4), and re-ranking (in Rounds 3 and 5) (see Fig. 1).[27] The approach enabled this study to obtain greater consultation on the relevance and the appropriateness of the suggested list of competencies and behavioural statements to the Saudi pharmacy practice from the pharmacists (in the previous phase of this research) as well as pharmacy experts (in this study). Further details on the development of the suggested list of competencies and the process of conducting the modified NGT in this study are described in the following sections.

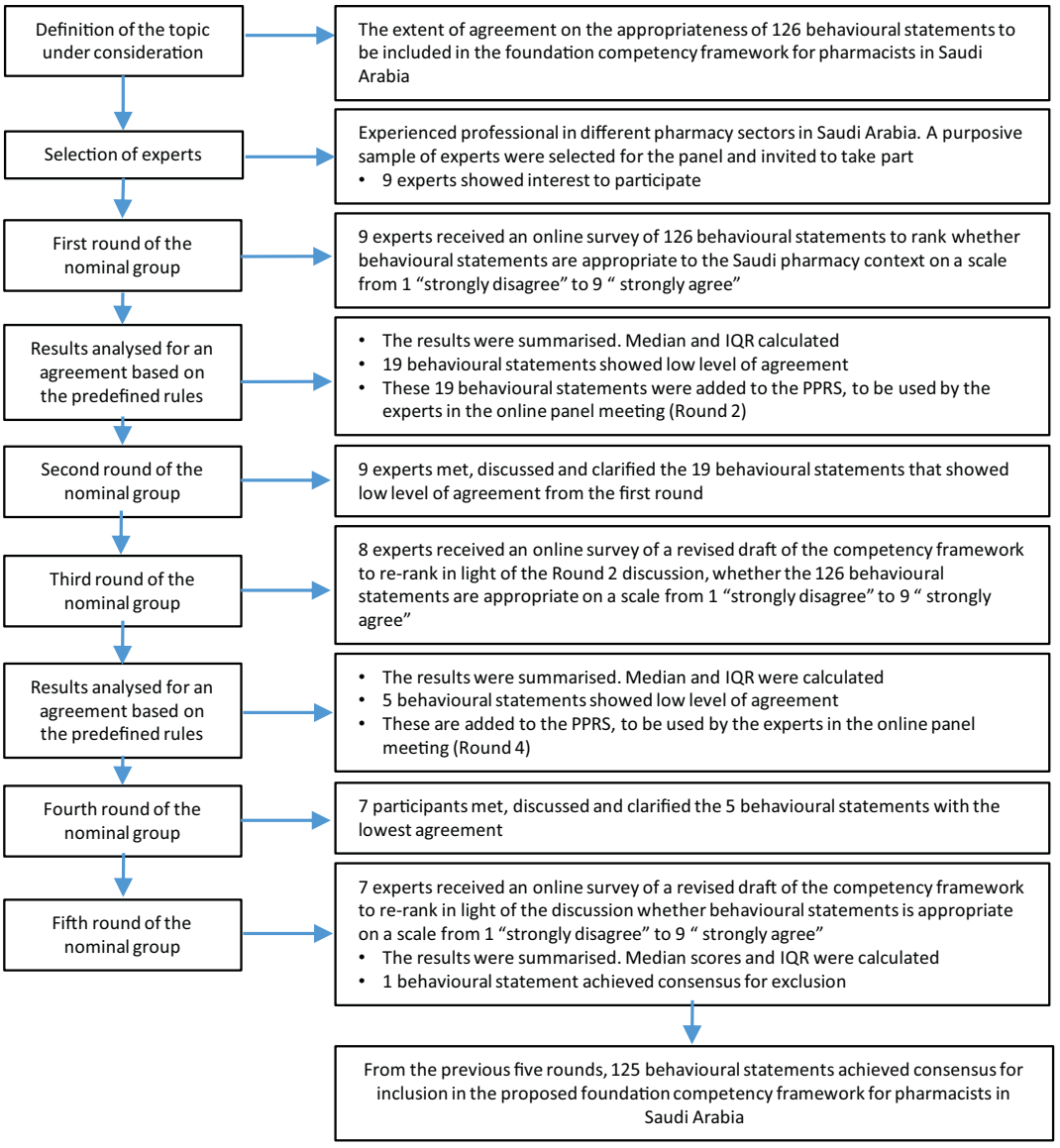

Fig. 1. Process and composition of expert panel rounds in this study.
PPRS = personalised panellist rating sheet.

The suggested list of competencies and behavioural statements

The initial suggested items of the foundation competency framework comprised 126 behavioural statements, of which,124 were fully adopted from the FIP GbCF v2 and two were from the previous phase of this research, namely: "provide point of care testing for patients and communities (e.g., blood sugar [BS], blood pressure [BP], international normalized ratio [INR])" and "discuss and agree with the patients about the appropriate generic substitution of medicines according to patients' preference and/or budget."[30] To facilitate ranking and analysis, a Qualtrics, version November 2021 (Qualtrics[XM]) survey was used to develop a self-administered online questionnaire. The online questionnaire included a cover page providing participants with background information and the purpose of the study, followed by the 126 behavioural statements with competencies. The presentation of the statements followed the FIP GbCF v2 structure of 23 competency groups under four clusters: Pharmaceutical Public Health (PPH), Pharmaceutical care (PC), Organisation and Management (OM), and Professional/Personal (PP). The two suggested behaviours were included separately and added to the survey. At the end of each cluster, open-ended questions were included for the experts to offer any additional comments or behaviours that they thought were useful or relevant. All of the questionnaire items were written in English, which is the common language for health professionals in Saudi Arabia.

Selection of panel members

Given that the group size in NGT typically comprises eight to 12 members,[27–29] a purposive sampling method was employed to recruit a group of nine experts. The selection of panel members was guided by several experts in Saudi Arabia based on the recognition of their expertise in different pharmacy sectors in Saudi Arabia. Participants were asked to provide their consent to be part of the study, including audio-recording of the panel discussion.

Data collection

The first stage of the study, consensus measurement, used electronic correspondence to enable rating and re-rating of the list of competencies and behavioural statements of the initial suggested competency framework. The second stage, consensus development, consisted of panel meetings to enable experts to clarify and discuss behavioural statements with the lowest agreement. Details of data collection process is described in the following sections.

Consensus measurement procedure

One month before the panel meeting, the online survey was emailed to the experts for them to privately rank the list of behavioural statements. Experts were asked to rate the appropriateness of each statement to the Saudi pharmacy practice context using a nine-point Likert scale ranging from strongly disagree (value = 1) to strongly agree (value = 9). Respondents were asked to base their answer on current and future pharmacy practice needs rather than current practice needs only. They were also instructed to provide their reason for any disagreement responses to facilitate the discussion and clarification in the panel meeting. The experts were given two weeks to complete the survey so that results could be viewed and analysed ahead of the panel meeting.

The findings from the consensus measurement rounds (Rounds 1 and 3) were analysed and used to prepare a unique personalised panellist rating sheet (PPRS) for each expert as a basis for discussion in the following panel meeting rounds (Round 2 and 4).[31] The PPRS enabled the experts to consider their initial ratings in relation to other panellists. Each PPRS involved a tabulated summary of the expert ranking of each behavioural statement plus the extent of agreement within the group members. The PPRS documents were fed back to the experts two days before the panel meeting.

Consensus development procedure

The purpose of the panel meeting was to enable panel members to clarify and explain their logic for their rating behavioural statements with the lowest agreement provided in the PPRS. This enabled the experts to discuss how their decisions about ranking were informed and provided them the opportunity to change their views through discussion with other experts.

Due to the social restrictions of COVID-19 pandemic as well as the diverse geographical locations of the facilitator and the experts at the time of the panel meetings, the panel meetings were conducted online using Microsoft Teams (Microsoft Corp.) video conferencing platform. The structure of the first meeting was as follows. The facilitator first presented the introductory information about the project, previous phases of this research, the role and importance of competency frameworks in professional development, and an explanation of the expert panel discussion process. Then, the behavioural statements with the lowest agreement along with the median scores and interquartile ranges (IQRs)were presented in a similar order to the PPRS for participants to clarify the logic behind the ranking for each statement. Panel discussion was facilitated by the researcher (SA), whose role was to present findings from the previous research phases, explain the discussion process, allow all statements with the lowest agreement sufficient time for discussion and ensure that all panellists had the opportunity to contribute and express their views. A maximum of five minutes per statement was allowed for comments and discussion. No ranking of the statements was permitted at the meeting. Following the panel discussion, a revised list of the proposed framework was sent to the experts in the following day to re-rate their agreement with the revised framework. The second meeting was conducted two months after the first meeting and followed a similar structure.

The panel discussion in the first meeting lasted two hours while the second lasted one hour. In both meetings, panel discussions

were audio-recorded, with technical assistance and note taking provided by a non-participant observer.

Data analysis

Survey data were downloaded into the Statistical Package for Social Sciences (SPSS), version 27 (IBM, Corp.) for quantitative analysis using descriptive statistics. The responses were obtained using a nine-point Likert scale where the numerical value of 1 to 3 indicated disagreement, 4 to 6 indicated neither agreement nor disagreement, and 7 to 9 indicated agreement. For each behavioural statement, the agreement about the appropriateness to be included in the proposed national competency framework was assessed along with the extent to which experts agreed or disagreed. The median score was calculated to indicate the group's overall agreement with the behavioural statements and the IQR to indicate the extent of consensus within the group. The level of agreement or disagreement was classified based on the dispersion of the individual ratings. Consensus on either agreement or disagreement was defined a priori, as all ratings fell within any three-point region in the nine-point Likert scale. The statement was deemed as having the disagreement if it had an overall median score ≤ 6, a wide IQR of >3, or one rating or more in the 1 to 3 range. When the item fell into the disagreement criteria, the item was moved to the next round of panel discussion to discuss the amendment or removal from the framework. When the item fell into the agreement criteria, the item was considered appropriate for inclusion in the framework. With each consensus measurement round survey, the same a priori criteria for consensus were used.

Results

Five iterative rounds of consensus measurement (Rounds 1, 3 and 5) and development (Rounds 2 and 4) were conducted between July and November 2021. Of the 16 individuals invited to the panel, nine participated with expertise in community pharmacy ($n = 1$), hospitals ($n = 2$), academia (n = 1), pharmaceutical industry (n = 1), pharmaceutical marketing (n = 1), regulatory authorities (n = 1), and professional bodies (n = 2). All participants were in middle or senior management positions (e.g., sector representative, pharmacy director, business owner) with some of them holding several positions (e.g., part-time academic and representative of pharmaceutical sector). Invitees who expressed interest but did not return responses to the panel included one from pharmaceutical industries in Round 3 and one from pharmaceutical marketing in Round 4. Table 1 lists the demographic characteristics of the panellists.

Consensus measurement

Out of the 126 behavioural statements, 107 met the predefined definition of consensus on appropriateness from the group in the first round. The median scores and IQR ratings for all 107 statements were within the three-point region of the agreement category. This included all behaviours (100%) in PPH, 23 (82.1%) in PC, 24 (72.7%) in OM, 50 (90.9%) in PP and both new behaviours

Table 1
Demographic characteristics of the experts ($N = 9$).

Characteristics	n
Gender	
Male	8
Female	1
Nationality	
Saudi	8
Non-Saudi	1
Age	
$\leq$ 40 years	1
41–50 years	4
$\geq$ 51 years	4
Education	
PharmD degree	2
Master's degree	2
PhD degree	5
Pharmacy sector	
Community pharmacy	1
Hospital	2
Academia	1
Pharmaceutical industry	1
Pharmaceutical marketing	1
Regulatory authorities	1
Professional bodies	2
Years of experience	
6 to 10 years	2
11 to 20 years	4
21 to 30 years	3

PharmD = doctor of pharmacy; PhD = doctor of philosophy.

suggested from the previous phase of this research. Of the 19 statements with the lowest agreement, behaviour 5.2 "Compound under the good manufacturing practice for pharmaceutical (GMP) medicines" had a median of 6, behaviour 6.6 "Implement and maintain a dispensing error reporting system and a 'near misses' reporting system" had a wide IQR of >3, while the remaining behaviours had at least one rating of disagreement (6.3, 9.3, 9.6, 10.1, 10.2, 10.3, 10.4, 10.5, 11.1, 13.3, 13.4, 13.8, 21.2, 21.5, 21.7, 23.2, 23.3) (Table 2). These 19 behaviours were mainly related to "compounding medicines," "dispensing," "patient consultation and diagnosis," "budget and reimbursement," "human resources management," "procurement," "legal and regulatory practice," and "quality assurance and research in workplace" competency groups.

The re-rating of the revised draft competency framework in Rounds 3 and 5 showed an increased agreement on the appropriateness for inclusion compared to Round 1. An increased agreement on appropriateness was observed in Round 3 for the PPH and OM clusters from 87.5% and 87.9%; this increased to 100% and 96.7%, respectively, in Round 5. In Round 5, the PC and PP clusters maintained their 100% ratings from Round 3 (Table 3).

The behaviours with the lowest agreement on appropriateness in both rounds were from the OM cluster, namely "budget and reimbursement," "human resources and management," and "procurement" competency groups in Round 3 and the "procurement" competency group in Round 5. Of the five behaviours with the lowest agreement in Round 3, behaviours 10.4 "ensure financial transparency," 11.1 "demonstrate organisational and management skills (e.g., plan, organise and lead on medicines management; risk management; self-management; time management; people management; project management; policy management," and 11.2 " identify and manage human resources and staffing issues" showed a wide IQR, and behaviour 3.3 "support the patient's use of health information technologies and digital communication (including IT driven health solutions)" showed a response of disagreement. Behaviour 13.8 "understand the tendering methods and evaluation of tender bids" remained a behaviour of disagreement in Round 3 and Round 5.

Following the re-rating from Round 3, three out of five behaviours kept their lowest score of agreement on appropriateness from the first meeting, including: behaviour 10.4 "ensure financial transparency," 11.2 "identify and manage human resources and staffing issues," and 13.8 "understand the tendering methods and evaluation of tender bids". As such, these behaviours moved to the second meeting (Round 4) for another round of clarification and discussion.

Consensus development

At the first meeting (Round 2), the nine experts discussed the 19 behaviours with the lowest agreement from Round 1 and agreed to change the wording of nine behavioural statements to make them more relevant to Saudi pharmacy practice. This included behaviours in the PC (6.6, 9.3), OM (10.2, 10.3, 13.3, 13.4, 13.8), and PP (21.5, 21.7) clusters (Table 4). It was agreed to keep the remaining 10 behaviours with no amendments. One of the significant amendments to the framework was to add the new suggested behaviours from the previous research phase to the adapted framework. The new behaviours "provide point of care testing for patients and communities (e.g., BS, BP, INR)" and "discuss and agree with the patients about the appropriate generic substitution of medicines according to

Table 2
List of the 19 behavioural statements with lowest agreement on appropriateness from Round 1.

Competency group	Behavioural statement
Custer 2: Pharmaceutical care (PC) competencies	
5. Compounding medicines	5.2 Compound under the good manufacturing practice for pharmaceutical (GMP) medicines
6. Dispensing	6.3 Appropriately validate prescriptions, ensuring that prescriptions are correctly interpreted and legal
	6.6 Implement and maintain a dispensing error reporting system and a 'near misses' reporting system
9. Patient consultation and diagnosis	9.3 Assess and diagnose based on objective and subjective measures (where applicable)
	9.6 Document any intervention (e.g., document allergies, such as from medicines and nutrition in patient's medicines history)
Cluster 3: Organisation and Management (OM) competencies	
10. Budget and reimbursement	10.1 Acknowledge the workplace organisational structure
	10.2 Effectively set and apply budgets
	10.3 Manage appropriate claims for reimbursements
	10.4 Ensure financial transparency
	10.5 Ensure proper reference sources for service reimbursement
11. Human resources and management	11.1 Demonstrate organisational and management skills (e.g., plan, organise and lead on medicines management; risk management; self-management; time management; people management; project management; policy management)
13. Procurement	13.3 Efficiently link procurement to formulary, to push/pull system (supply chain management) and payment mechanisms
	13.4 Ensure there is no conflict of interest
	13.8 Understand the tendering methods and evaluation of tender bids
Cluster 4: Professional/ Personal (PP) competencies	
21. Legal and regulatory practice	21.2 Apply the principals of business economics and intellectual property rights including the basics of patent interpretation
	21.5 Apply the principles of marketing and sales
	21.7 Recognise the steps needed to bring a medical device or medicine to the market including the safety, quality, efficacy and pharmacoeconomic assessments of the product
23. Quality assurance and research in the workplace	23.2 Audit quality of service (meet local and national standards and specifications)
	23.3 Develop and implement Standing Operating Procedures (SOP's)

Table 3
Percentage and number of behavioural statements with agreement on appropriateness within each competency clusters across consensus measurement rounds.

Competency cluster	Round 1 (%, number)	Round 3 (%, number)	Round 5 (%, number)
Pharmaceutical Public Health (PPH)	100 (8/8)	87.5 (7/8)	100 (8/8)
Pharmaceutical Care (PC)	82.2 (23/28)	100 (28/28)	100 (28/28)
Organisation and Management (OM)	72.7 (24/33)	87.9 (29/33)	96.7 (32/33)
Professional/Personal (PP)	90.9 (50/55)	100 (55/55)	100 (55/55)

Table 4
List of original behavioural statements and the amended behavioural statements generated from the consensus development Round 2 and Round 4.

Competency group	FIP GbCF v2 behavioural statement	The amended behavioural statements
Custer 2: Pharmaceutical care (PC) competencies		
6. Dispensing	6.6 Implement and maintain a dispensing error reporting system and a 'near misses' reporting system	6.6 Identify and report ALL medication errors (including dispensing errors) and near misses following relevant medication error reporting systems
9. Patient consultation and diagnosis	9.3 Assess and diagnose based on objective and subjective measures (where applicable)	9.3 Assess and support individual self-care needs based on objective and subjective measures (where applicable) and participate in differential diagnosis for minor illnesses
Cluster 3: Organisation and Management (OM) competencies		
10. Budget and reimbursement	10.2 Effectively set and apply budgets	10.2 Participate in setting and applying budgets
	10.3 Manage appropriate claims for reimbursements	10.3 Manage appropriate claims for reimbursements (including those from governmental agencies or private entities)
	10.4 Ensure financial transparency	10.4 Ensure financial transparency by providing a complete, timely and accurate financial information relevant to area of practice
13. Procurement	13.3 Efficiently link procurement to formulary, to push/pull system (supply chain management) and payment mechanisms	13.3 Efficiently link procurement to formulary or drug lists, to push/pull system (supply chain management) and payment mechanisms
	13.4 Ensure there is no conflict of interest	13.4 Avoid and declare personal or professional conflict of interests, if and where they arise
Cluster 4: Professional/ Personal (PP) competencies		
21. Legal and regulatory practice	21.5 Apply the principles of marketing and sales	21.5 Engage in appropriate marketing and sales
	21.7 Recognise the steps needed to bring a medical device or medicine to the market including the safety, quality, efficacy and pharmacoeconomic assessments of the product	21.7 Recognise the steps needed to bring a medicine to the market including the safety, quality, efficacy and pharmacoeconomic assessments of the product

patients' preference and / or budget" were included in the "Assessment of Medicines" competency group under the PC cluster. In addition, experts agreed to amend the new behaviour "discuss and agree with the patients about the appropriate generic substitution of medicines according to patients' preference and/or budget" to "discuss the appropriate generic substitution of medicines according to patients' preference (where applicable)."

Further amendments in the second meeting (Round 4) encompassed adding a definition to clarify behaviour 10.4 from "ensure financial transparency" to "ensure financial transparency by providing a complete, timely and accurate financial information relevant to area of practice" (Table 4). Behaviour 11.2 "identify and manage human resources and staffing issues" was agreed by the majority of the group on its appropriateness for inclusion, whereas behaviour 13.8 "understand the tendering methods and evaluation of tender bids" was considered for exclusion for being too advanced for foundation level practitioners as it is often conducted by senior pharmacists and high-level managers.

The final framework consisted of 125 behavioural statements, grouped in 23 competencies under four competency clusters: PPH, PC, OM, and PP. A detailed overview of the framework with the final scores of the medians and IQR is given in Table 5.

Discussion

To our knowledge, this is the first development of a competency framework for foundation level pharmacists in Saudi Arabia. The process employed in this study is a common method that has been applied in development of health guidelines and policy and practice development in a number of countries since the 1960s.[28] This study used an evidence-based tool to develop a profession-wide consensus on a list of core competencies and behavioural statements required to inform pharmacy education development, assure practice consistency, and foster CPD across all sectors. The use of consensus methods in adapting a country-specific competency framework in this study was found to be effective, similar to previous studies conducted in other countries.[26,32,33]

Responses from the expert panel confirmed that the FIP GbCF v2 is appropriate to the Saudi practice environment. However, some of the behaviours underwent modification to fit the local pharmacy practice needs. Consistent with the findings of the national survey of pharmacists in the previous phase of this research,[30] PPH, PC, and PP clusters scored the highest agreement on appropriateness for inclusion overall compared to the OM cluster (Table 3). On a global level, findings from studies that assessed the relevance of the GbCF behaviours to their contexts were similar to those from this study.[26,33–35]

Table 5
Overview of the proposed foundation national competency framework showing median score, IQR and consensus status for each behavioural statement.

Cluster 1: Pharmaceutical Public Health (PPH) competencies		Median (IQR)	Consensus status
Competency group	Behavioural statements		
1. Emergency response	1.1 Participate in the response to public health emergencies	9 (9–9)	Consensus
	1.2 Assist the multidisciplinary healthcare teams in emergency situations	9 (9–9)	Consensus
2. Health promotion	2.1 Assess the patient's/population's primary healthcare needs (taking into account the cultural and social setting of the patient/populations)	8.5 (8–9)	Consensus
	2.2 Advise and provide services related to health promotion; disease prevention and control (e.g. vaccination); and healthy lifestyle	9 (8.25–9)	Consensus
	2.3 Identify and support national and local health priorities and initiatives	9 (9–9)	Consensus
3. Medicines information and advice	3.1 Counsel the patient/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)	9 (9–9)	Consensus
	3.2 Identify sources, retrieve, evaluate, organise, assess and provide relevant and appropriate medicines information according to the needs of patients and clients	9 (9–9)	Consensus
	3.3 Support the patient's use of health information technologies and digital communication (including IT driven health solutions)	8 (8–9)	Consensus
Cluster 2: Pharmaceutical Care (PC) competencies			
4. Assessment of medicines	4.1 Gather, analyse, research, and interpret information about the patient and patient's medicines-related needs (e.g., indication, effectiveness, safety and adherence)	9 (8.25–9)	Consensus
	4.2 Retrieve relevant patient information (including drug history, or immunisation status for example) and record of allergies to medicines and Adverse Drug Reactions (ADR) in medication record	9 (8.25–6)	Consensus
	4.3 Identify, prioritise, resolve and follow up on medicine-medicine interactions; medicine-disease interactions; medicine-patient interactions; medicines-food interactions	9 (9–9)	Consensus
	4.4 Appropriately select medicines (e.g., according to the patient, hospital, government policy)	9 (8–9)	Consensus
	4.5 Provide point of care testing for patients and communities (e.g., BS, BP, INR)	9 (8–9)	Consensus
	4.6 Discuss the appropriate generic substitution of medicines according to patients' preference (where applicable)	8.5 (8–9)	Consensus
5. Compounding medicines	5.1 Prepare pharmaceutical medicines (e.g., extemporaneous, cytotoxic medicines), determine the requirements for preparation (calculations, appropriate formulation, procedures, raw materials, equipment)	9 (8.25–9)	Consensus
	5.2 Compound under the good manufacturing practice for pharmaceutical (GMP) medicines	8.5 (6.5–9)	Consensus
6. Dispensing	6.1 Accurately dispense medicines for prescribed and/or minor ailments, including an embedded checking process	9 (8.25–9)	Consensus
	6.2 Accurately report defective or substandard medicines to the appropriate authorities	9 (8–9)	Consensus
	6.3 Appropriately validate prescriptions, ensuring that prescriptions are correctly interpreted and legal	9 (9–9)	Consensus
	6.4 Dispense devices (e.g., inhaler or a blood glucose meter)	9 (8–9)	Consensus
	6.5 Document and act upon dispensing errors	9 (9–9)	Consensus
	6.6 Identify and report ALL medication errors (including dispensing errors) and near misses following relevant medication error reporting systems	9 (8.25–9)	Consensus
	6.7 Label the medicines (with the required and appropriate information)	9 (9–9)	Consensus
	6.8 Learn from and act upon previous 'near misses' and 'dispensing errors'	9 (9–9)	Consensus
7. Medicines	7.1 Advise patients on proper storage conditions of the medicines and ensure that medicines are stored appropriately (e.g., humidity, temperature, expiry date)	9 (9–9)	Consensus
	7.2 Appropriately select medicine formulation and concentration for minor ailments (e.g., diarrhoea, constipation, cough, hay fever, insect bites)	9 (8.25–9)	Consensus
	7.3 Ensure appropriate medicines, route, time, dose, documentation, action, form and response for individual patients	9 (9–9)	Consensus
	7.4 Package medicines to optimise safety (ensuring appropriate re-packaging and labelling of the medicines)	9 (8.25–9)	Consensus
8. Monitor medicines therapy	8.1 Apply guidelines, medicines formulary system, protocols and treatment pathways	9 (9–9)	Consensus
	8.2 Apply therapeutic medicines monitoring and assess impact and outcomes (including objective and subjective measures)	9 (8.25–9)	Consensus
	8.3 Identify, prioritise and resolve medicines management problems (including errors)	9 (8.25–9)	Consensus
9. Patient consultation and diagnosis	9.1 Support urgent care needs (physical and mental) of patients and others and act upon arranging follow-up care	9 (8–9)	Consensus
	9.2 Appropriately refer the patient or carer	8 (7.25–9)	Consensus
	9.3 Assess and support individual self-care needs based on objective and subjective measures (where applicable) and participate in differential diagnosis for minor illnesses	8.5 (7.25–9)	Consensus
	9.4 Evaluate, assess, and develop health literacy education and counselling on medicines and healthcare needs	9 (8–9)	Consensus
	9.5 Discuss and agree with the patients on the appropriate use of medicines, taking into account patients' preferences	9 (8.25–9)	Consensus
	9.6 Document any intervention (e.g., document allergies, such as from medicines and nutrition in patient's medicines history)	9 (8.25–9)	Consensus

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Table 5 (*continued*)

Cluster 1: Pharmaceutical Public Health (PPH) competencies		Median (IQR)	Consensus status
Competency group	Behavioural statements		
	9.7 Obtain, reconcile, review, maintain and update relevant patient medication and diseases history	9 (9–9)	Consensus
Cluster 3: Organisation and Management (OM) competencies			
10. Budget and reimbursement	10.1 Acknowledge the workplace organisational structure	9 (7.25–9)	Consensus
	10.2 Participate in setting and applying budgets	7.50 (6.25–8)	Consensus
	10.3 Manage appropriate claims for reimbursements (including those from governmental agencies or private entities)	8.50 (6–9)	Consensus
	10.4 Ensure financial transparency by providing a complete, timely and accurate financial information relevant to area of practice	8 (7–8)	Consensus
	10.5 Ensure proper reference sources for service reimbursement	8 (6.25–8.75)	Consensus
11. Human resources management	11.1 Demonstrate organisational and management skills (e.g., plan, organise and lead on medicines management; risk management; self-management; time management; people management; project management; policy management)	8 (5–8)	Consensus
	11.2 Identify and manage human resources and staffing issues	8 (6–8)	Consensus
	11.3 Recognise and manage the potential of each staff member and utilise systems for performance management (e.g., conduct staff appraisals)	9 (7.25–9)	Consensus
	11.4 Recognise the value of the pharmacy team and of a multidisciplinary team	9 (9–9)	Consensus
	11.5 Support and facilitate staff training and continuing professional development	9 (8–9)	Consensus
12. Improvement of service	12.1 Identify, implement and monitor new services (according to local needs)	8.5 (7.25–9)	Consensus
	12.2 Resolve, follow up and prevent medicines related problems	9 (9–9)	Consensus
13. Procurement	13.1 Access reliable information and ensure the most cost-effective medicines in the right quantities with the appropriate quality	9 (8–9)	Consensus
	13.2 Develop and implement contingency plan for shortages	9 (8–9)	Consensus
	13.3 Efficiently link procurement to formulary or drug lists, to push/pull system (supply chain management) and payment mechanisms	8 (8–9)	Consensus
	13.4 Avoid and declare personal or professional conflict of interests, if and where they arise	8 (8–9)	Consensus
	13.5 Identify and select reliable supplier(s)	9 (8–9)	Consensus
	13.6 Select reliable supply of high-quality products (including appropriate selection and procurement processes, cost effectiveness, timely delivery)	8.5 (7.25–9)	Consensus
	13.7 Supervise procurement activities	8 (7.25–9)	Consensus
	13.8 Understand the tendering methods and evaluation of tender bids	7 (2–7)	Elimination
14. Supply chain and management	14.1 Demonstrate knowledge in store medicines to minimise errors and maximise accuracy	8.5 (7.25–9)	Consensus
	14.2 Verify the accuracy of rolling stocks	9 (6.25–9)	Consensus
	14.3 Ensure effective stock management and running of service with the dispensary	9 (6.5–9)	Consensus
	14.4 Ensure logistics of delivery and storage	8.5 (6.5–9)	Consensus
	14.5 Implement a system for documentation and record keeping	9 (8–9)	Consensus
	14.6 Take responsibility for quantification and supply chain forecasting	9 (7.25–9)	Consensus
	14.7 Mitigate risk of medicines shortages and stock outs through liaison and appropriate communication with healthcare staff, healthcare stakeholders, clients/customers and patients	9 (8–9)	Consensus
15. Workplace management	15.1 Address and manage day to day management issues	9 (7.25–9)	Consensus
	15.2 Demonstrate the ability to take accurate and timely decisions and make appropriate judgements	9 (7.25–9)	Consensus
	15.3 Ensure the production schedules are appropriately planned and managed	8.5 (7.25–9)	Consensus
	15.4 Ensure the work time is appropriately planned and managed	9 (8–9)	Consensus
	15.5 Improve and manage the provision of pharmaceutical services	9 (8.25–9)	Consensus
	15.6 Recognise and manage pharmacy resources (e.g., financial, infrastructure)	8.50 (8–9)	Consensus
Cluster 4: Professional/ Personal (PP) competencies			
16. Communication skills	16.1 Communicate clearly, precisely and appropriately while being a mentor or tutor	9 (8.25–9)	Consensus
	16.2 Communicate effectively with health and social care staff, support staff, patients, carer, family relatives and clients/customers, using lay terms and checking understanding	9 (9–9)	Consensus
	16.3 Tailor communication that is appropriate to the patient's needs (including health literacy, cultural or language barriers, social needs, and emotional status)	9 (9–9)	Consensus
	16.4 Use appropriate communication skills (e.g., verbal and non-verbal) to establish and maintain rapport with the patient and others including when communicating through digital and electronic platforms	9 (9–9)	Consensus
17. Continuing Professional Development (CPD)	17.1 Document CPD activities	9 (8–9)	Consensus
	17.2 Engage with students/interns/residents	9 (8.25–9)	Consensus
	17.3 Evaluate accuracy of knowledge and skills	9 (8.25–9)	Consensus
	17.4 Identify learning and development needs	9 (8–9)	Consensus
	17.5 Evaluate learning and development progress	9 (8–9)	Consensus
	17.6 Identify if expertise is needed outside current scope of knowledge	8 (7.25–9)	Consensus
	17.7 Recognise own limitations and act upon them	9 (8–9)	Consensus
	17.8 Reflect on performance	8.5 (8–9)	Consensus

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Table 5 (*continued*)

Cluster 1: Pharmaceutical Public Health (PPH) competencies		Median (IQR)	Consensus status
Competency group	Behavioural statements		
	17.9 Demonstrate engagement/participation in professional development and lifelong learning activities	8.5 (8–9)	Consensus
18. Digital literacy	18.1 Identify, manage, organise, store, and share digital information	9 (7.50–9)	Consensus
	18.2 Critically appraise, analyse, evaluate, and/or interpret digital information and their sources	8.5 (8–9)	Consensus
	18.3 Where applicable, participate in digital health services that promote health outcomes and engage with digital technologies (e.g., social media platforms & mobile applications) to facilitate discussions with the patient and others	8.5 (8–9)	Consensus
	18.4 Maintain patient privacy and security of digital information related to the patient and workplace	9 (9–9)	Consensus
19. Interprofessional collaboration	19.1 Respect and acknowledge the expertise, roles and responsibilities of colleagues and other health professionals	9 (8.25–9)	Consensus
	19.2 Participate, collaborate, advise in therapeutic decision-making, and use appropriate referral in a multi-disciplinary team	9 (8.25–9)	Consensus
	19.3 Engage in collaborative practice, research and service provision to optimise patient health outcomes	8.50 (8–9)	Consensus
	19.4 Engage in relationship-building with health professionals allowing conflict resolution, teamwork, communication, and consultation	9 (8–9)	Consensus
	19.5 Demonstrate mutual respect and adopt shared values of the workplace and toward patient care	9 (9–9)	Consensus
20. Leadership and self-regulation	20.1 Apply assertiveness skills (inspire confidence)	8.5 (8–9)	Consensus
	20.2 Demonstrate leadership and practice management skills, initiative and efficiency	8.5 (8–9)	Consensus
	20.3 Document risk management (critical incidents)	9 (8–9)	Consensus
	20.4 Prioritise work, practice punctuality and time management	9 (8.25–9)	Consensus
	20.5 Develop, implement and monitor innovative ideas	9 (8–9)	Consensus
	20.6 Recognise and describe emotional information about self and others (e.g., self-awareness, self-regulation, motivation, social skills and empathy)	8 (8–9)	Consensus
	20.7 Demonstrate flexibility and adaptability to a variety of conditions and circumstances	9 (8–9)	Consensus
	20.8 Recognise when affected by setbacks or stress and manage with effective coping strategies (resilience)	9 (8–9)	Consensus
21. Legal and regulatory practice	21.1 Apply regulatory affairs and the key aspects of pharmaceutical registration and legislation	9 (8.25–9)	Consensus
	21.2 Apply the principals of business economics and intellectual property rights including the basics of patent interpretation	9 (8–9)	Consensus
	21.3 Be aware of and identify the new medicines coming to the market	8 (8–9)	Consensus
	21.4 Comply with legislation for drugs with the potential for abuse	9 (9–9)	Consensus
	21.5 Engage in appropriate marketing and sales	8 (7–9)	Consensus
	21.6 Engage with health and medicines policies	9 (8.25–9)	Consensus
	21.7 Recognise the steps needed to bring a medicine to the market including the safety, quality, efficacy and pharmacoeconomic assessments of the product	8.5 (6.50–9)	Consensus
22. Professional and ethical practice	22.1 Demonstrate awareness and employment of local/national codes of ethics	9 (8.25–9)	Consensus
	22.2 Fulfil duty of care to the patient and the public	9 (9–9)	Consensus
	22.3 Maintain privacy and confidentiality (with the patient and other healthcare professionals)	9 (9–9)	Consensus
	22.4 Comply with patient privacy legislation including documentation of information	9 (8.25–9)	Consensus
	22.5 Consider available evidence and support the patient to make informed choices about medicine use	9 (8.25–9)	Consensus
	22.6 Obtain patient consent (it can be implicit on occasion)	9 (7.25–9)	Consensus
	22.7 Recognise professional limitations of self and others in the team	9 (9–9)	Consensus
	22.8 Demonstrate professional responsibility for all decisions made and actions taken	9 (9–9)	Consensus
	22.9 Demonstrate awareness of socially accountable practice (including cultural and social needs; cultural safety, respect, and responsiveness; diversity, equity and inclusiveness)	8.5 (8–9)	Consensus
23. Quality assurance and research in the workplace	23.1 Apply research findings and understand risk-benefit analyses (e.g., pre-clinical, clinical trials, experimental clinical pharmacological research, and risk management)	8.5 (7.25–9)	Consensus
	23.2 Audit quality of service (meet local and national standards and specifications)	8.5 (8–9)	Consensus
	23.3 Develop and implement Standing Operating Procedures (SOP's)	9 (7.25–9)	Consensus
	23.4 Ensure appropriate quality control tests are performed and managed appropriately	8 (6.25–9)	Consensus
	23.5 Ensure medicines are not counterfeit and adhere to quality standards	9 (7.25–9)	Consensus
	23.6 Identify and evaluate evidence-base to improve the use of medicines and services	9 (8–9)	Consensus
	23.7 Identify, investigate, conduct, supervise and support research at the workplace (enquiry-driven practice)	8 (7.25–9)	Consensus
	23.8 Implement, conduct and maintain a reporting system of pharmacovigilance (e.g., report Adverse Drug Reactions)	9 (8.25—9)	Consensus
	23.9 Initiate and implement audit research activities	8.5 (7–9)	Consensus

BP = blood pressure; BS = blood sugar; INR = international normalized ratio.

The variation in the level of agreement among experts on the behaviours in the initially suggested competency framework (Table 3) might reflect the uncertainty about core competencies required for foundation level practitioners, as foundation level practice is not yet defined in Saudi Arabia. The disagreement observed in the behaviours in the consensus measurements rounds was mainly related to behaviours under OM and PC competencies. Of the 19 statements that received the lowest agreement ratings from the experts, 10 of them were perceived as "not relevant" by the surveyed pharmacists in the previous phase of this study.[30] This suggests consistency of agreement between both experts and pharmacists on the inappropriateness of these behaviours to the current responsibilities and roles of pharmacists in the Saudi pharmacy practice environment.

During the consensus development discussions, the main factors that influenced experts' views about appropriateness included their practice settings (e.g., hospitals, community pharmacy, industry), the capacity of pharmacy institution (large, medium, small facility), and individual perceptions to the foundation level practice. Some experts in the panel showed disagreement on the appropriateness of "compounding medicines" and "patient assessment and diagnosis" competencies under the PC cluster, given that these services were neither conducted nor routinely available in community settings. However, through discussion, there was an increased recognition of the value of the developed framework to help define and lay the foundations for new and current pharmacists to develop their competencies to provide the newly expanded services. For example, the experts agreed on the inclusion of "patient assessment and diagnosis" competency given the recent MOH regulation for medication therapy management and minor illnesses care services provision in community pharmacy.[21] This inclusion supports evidence from previous studies about the need to involve clinical skills training in initial education and CPD activities to support delivery of these services by community pharmacists.[36,37] For the "compounding medicines" competency, experts agreed on including it given the fact that it is an inherent core competency for all pharmacists regardless of their practice settings. The addition of two new competencies to the PC cluster was a significant amendment to the adapted framework, recognising that the provision of point of care testing and therapeutic substitutions are part of the progression toward advanced future pharmaceutical care services in community pharmacies.

Similar to studies conducted in other countries,[26,33–35] behaviours in the OM cluster were the most disagreed on and the most amended behaviours in the present study. A possible explanation for this might be that the application and appropriateness of the OM behaviours for foundation level pharmacists are often dependent on the local and national circumstances as the type and level of organisation and management tasks for pharmacists can be country specific.[26] In the current study, the lowest level of agreement over appropriateness was for behaviours in "budget and reimbursement," "human resources management," and "procurement," which also aligns with the earlier findings of the national survey of pharmacists.[30] This result may be explained by the fact that a majority of these activities are a responsibility of senior pharmacists at the level of organisation or sector rather than of foundation level pharmacists on a departmental level.

However, the government advocacy and support for nationals to establish a small and medium enterprise, as part of the Future Vision 2030 initiative, prompted the consensus on retaining and amending these competencies to support early career pharmacists to build in and scale up their administrative skills alongside their technical skills. Given that community pharmacy is based on private institutions and businesses, the consensus was a means to support entrepreneur pharmacists to establish and run their own business smoothly and independently, especially as 14% to 50% of routine tasks in community pharmacies are administrative in Saudi Arabia.[38] These competencies will also be of great benefit to support pharmacists who wish to establish their community pharmacy business in underserved remote areas lacking quality pharmacy services and expert mentors.[17,18,39,40]

To satisfy the government plans for new services in community pharmacy, an appropriate mix of professional scientific, organisation, management, and personal competencies is required. Regardless of the level of the responsibility and practice, the final result of pharmacy institutions in the provision of healthcare requires not only technical scientific and clinical competencies of pharmaceutical care and public health but also a complementary mix of competencies in managing medicines supply, business operation, finance, procurement, self-regulation, communication, and teamwork.[41] Furthermore, the continuous development and expansion of pharmacy roles and services require these competencies to be cultivated in pharmacists from the start of their training to assure timely and efficient quality service execution. Embedding these competencies into initial education will therefore facilitate a smooth transition from initial education to foundation level and eventually to an advanced and specialised practice. By that, not only will the quality and safety of patients' services be delivered to a minimum standards, but also excellence in practice will be attained and maintained.[11]

After validation, this framework could serve as a basis for curriculum development to be competency-based and of high quality and appropriate to meet the country's and its peoples' needs.[42] It will also help to inform the development of the licensure exam, not only to measure pharmacists' minimum knowledge for registration, but also to design appropriate activities to assess their competencies and fitness to practise. Such a framework could also assist registration authorities to design national assessment, continuing education, and CPD training programmes at a national level to reduce the variation in competencies and of professional performance reported in previous research between local and overseas pharmacists and between male and female pharmacists.[30]

As CPD activities are mandatory in Saudi Arabia, this framework will further help to provide foundations for developing a post-registration pathway and building a new CPD model to support learning activities for pre and in-service pharmacists on a national level. It will also assist pharmacy institutions to implement consistent, harmonised, and useful career development opportunities and initiatives to attain and maintain their pharmacists' fitness to practice at institutional level. It will also help in-service pharmacists in identifying learning gaps and advancing their careers.

The methods used in this study demonstrate a practical approach for other countries to adopt and adapt a global competency framework in the development of a country specific competency framework. The unique design of this study demonstrates a replicable example on how the global competency framework can be used to create a profession-wide country-specific competency framework that reflects local practise and service needs and priorities.

Further work is necessary to qualitatively explore the opinions of other stakeholders, including policymakers and practising

pharmacists, about the validity and acceptability of this framework as a road map for pharmacists' career development. Furthermore, a validation study is required to obtain feedback from practitioners in non-direct patient care roles, such as industry, regulatory, and academia, on the suitability of this framework as a developmental tool in those areas of practise. Finally, to ensure pharmacists' evolvement and role expansion, future research is suggested to develop an advanced level competency work for the inclusion of speciality services.

Limitations

Although the number of experts who participated in this study was moderate, the level of consensus was found appropriate as demonstrated by the narrow IQR around the median values. The use of purposive sampling approach to identify and recruit experts might not have identified other potentially useful experts. Yet the selection of experts was guided by and validated with other local experts to ensure that the recruited participants were of recognised expertise in their pharmacy sector. The withdrawal of experts from the pharmaceutical industry might have led to limited insight into the developed framework's appropriateness to this area of practice. Nevertheless, there is no practical guide to determine how including more participants might alter the results of such study.[43] There was a high proportion of male to female experts in the panel, but this reflects the gender distribution of pharmacists in Saudi Arabia, which is predominantly male (81%).[44] In the absence of empirical evidence or other information about core competencies required for pharmacists working in Saudi Arabia, using an expert panel approach for development of the first national foundation competency framework for pharmacists was found appropriate and effective in this study similar to others elsewhere.[26,32,33]

Conclusion

Using an evidence-based approach, this study developed and proposed the first national competency framework for foundation level pharmacists in Saudi Arabia. The study determined the core competencies and behavioural statements needed to provide effective, high-quality pharmaceutical services. The proposed national competency framework could be used to achieve quality initial pharmacy education development and to support professional development for foundation level pharmacists in performing their current and developing new roles to best meet the country's pharmaceutical needs.

Disclosure(s)

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Author contributions

Salihah Alfaifi: Conceptualisation, Data curation, Formal analysis, Writing - original draft.
Stephanie Bridges: Conceptualisation, Supervision, Writing - review & editing.
Naoko Arakawa: Conceptualisation, Supervision, Writing - review & editing.

Declaration of Competing Interest

None.

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