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RESEARCH ARTICLE

Development and evaluation of the pharmacy alumni employment experience questionnaire

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Abstract

Objectives: This study aimed to develop and evaluate the 'Pharmacy Alumni Employment Experience Questionnaire' (PAEEQ). **Methods:** Literature review and Herzberg's 'motivation-hygiene' theory were used to derive PAEEQ domains: satisfaction with the profession, achievements in the workplace, and preparedness to practice. Content and face validities were assessed by 11 experts and five pharmacy alumni. To evaluate the construct validity and reliability, PAEEQ was tested on 136 Qatar University College of Pharmacy alumni and the principal component analysis (PCA) and internal consistency reliability were performed. **Results:** Content and face validities suggested a questionnaire with 12-item, 14-item, and 13-item domains measured on 5-point Likert scales, and open-ended questions. PCA resulted in four-factor, two-factor, and two-factor structures for the three domains, respectively. Strong factor loadings and high Cronbach's alpha scores were revealed. The final version of PAEEQ consists of 27 items. **Conclusion:** This initial assessment suggests PAEEQ appropriateness for use. However, the findings are sample-dependent and further external validation is warranted.

Introduction

The need for maintaining the motivation of the pharmacists, ensuring their competencies to take over a variety of responsibilities, and ultimately improving their overall satisfaction with their employment experience is important. Job satisfaction is a multidimensional concept that refers to the perception and attitude of an individual toward his/her job as a whole (Yami *et al*., 2011). Pharmacists' job satisfaction has a positive impact on their motivation, productivity, and commitment, while job dissatisfaction influences their intention to leave, and absenteeism (Desselle & Peirce, 2011; Ahmad *et al*., 2016; Al-Muallem & Al-Surimi, 201). Worldwide, pharmacists demonstrated varying degrees of job satisfaction (Chua *et al*., 2014; Ahmad *et al*., 2016; Ayele *et al*., 2020).

Factors shown to be associated with job satisfaction include gender (Carvajal, Popovici, & Hardigan, 2018), age (Carvajal & Popovici, 2018), marital status (Al Khalidi & Wazaify, 2013), job roles and responsibilities (Odukoya & Chui, 2013; Lea, Corlett, & Rodgers, 2016), work setting (Ahmad *et al*., 2016), salary (Manan *et al*., 2015), the level of education (Sinopoulou, Summerfield, & Rutter, 2017), degree of autonomy (Manan *et al*., 2015), and perceived level of skill utilisation (Manan *et al*., 2015). Workplace achievement was shown to be closely related to job satisfaction and contributes to a positive long-term employment experience (Herzberg, Mausner, & Snyderman, 1959; Mackenzie, 2008). Workplace achievement is the individual capacity to attain specific objectives or have a positive influence on the organisation (Harmania & Nessa, 2016). It is associated with psychological development, autonomy, and independence (Herzberg, 1968; Maissiat *et al.,* 2015). Job satisfaction and positive pharmacy employment experience were also shown to be related to employees' educational preparation acquired during undergraduate education, even though this relationship was not demonstrated in Herzberg's theory (Gustafsson *et al*., 2018). "Preparedness to practice" reflects the extent to which educational institutions prepare students for professional roles and

responsibilities, including components of competencies, skills, and attitudes (Ameer *et al*., 2018).

Furthermore, the alignment of pharmacy courses with pharmacy practice was deemed crucial for job satisfaction (Chikanda, 2006). On the other hand, over-education refers to employees' possession of education or skills that surpass their job requirements, while under-utilisation of skills refers to the perception that employees' capabilities are not being properly used (Khan & Morrow, 1991; Wang *et al*., 2022). Over- or under-education, and skill utilisation were shown to be major job satisfaction determinants (Cox & Fitzpatrick, 1999; Sansgiry & Ngo, 2003; Lau, Pang, & Chui, 2011). Previous research showed that job satisfaction among pharmacists increased as they became more involved in clinical activities and patient-oriented roles (Al Khalidi & Wazaify, 2013; Suleiman, 2015)

Employees' job satisfaction and its influencing factors can be examined through two commonly used approaches. The first includes particular characteristics of a work (a facet item), which can lead to satisfaction or dissatisfaction. The second comprises an overall satisfaction scale with no reference to specific features of the work (a facet-free item) (Korsakienė, Tvaronavičius, & Tvaronavičienė, 2006). The job satisfaction of pharmacy professionals has been previously investigated using validated questionnaires, but they were either biased toward a specific work setting or nature (Willett & Cooper, 1996; Cavaco *et al*., 2001), lengthy, unwieldy, and costly (Rajah *et al*., 2001), or they were focused on examining job satisfaction concerning a specific factor (e.g., stress) (Willett & Cooper, 1996). Moreover, questionnaires not originally developed for healthcare professions have been used (Seston *et al*., 2009), which restricted the exploration of important facets specific to the job characteristics of pharmacy professionals and, hence, limited the comprehensive understanding of their job satisfaction (Seston *et al*., 2009). Other studies have used questionnaires that were not adequately validated or had a limited regional context (Awalom *et al*., 2015; Ahmad *et al*., 2016).

A comprehensive review of the literature indicated that there was no previous questionnaire that holistically examined pharmacy alumni's satisfaction with their employment experience, considering their workplace performance, and their preparedness to practice through education. Furthermore, the application of the landmark contribution of Herzberg's theory in the questionnaire construction in health-related fields is scarce. Moreover, studies investigating job satisfaction while targeting pharmacists working in various practice settings, such as clinical settings, community pharmacies, academia, and research organisations are not available. Therefore, a theoretically informed, thoroughly validated, and pharmacy profession-focused questionnaire is warranted to truly reflect the satisfaction of pharmacy professionals with their employment. This article describes the development, and assessment of validity and reliability of the 'Pharmacy Alumni Employment Experience Questionnaire' (PAEEQ), as a tool to examine pharmacists perception of job satisfaction, satisfaction with achievements in the workplace, and preparedness to practice.

Method

Setting

This study was conducted in the College of Pharmacy at Qatar University (CPH-QU). CPH-QU was designed to meet the educational outcomes identified by the Association of Faculties of Pharmacy of Canada (AFPC) (AFPC, 2017), and the Canadian National Association of Pharmacy Regulatory Authorities (NAPRA) competencies (NAPRA., 2014). This study aimed to develop and evaluate the 'Pharmacy Alumni Employment Experience Questionnaire' (PAEEQ). The questionnaire development targeted three domains: satisfaction with the pharmacy profession and practice, satisfaction with achievements in the workplace, and level of preparedness to practice. The questionnaire development and evaluation involved literature search, use of theoretical model, content and face validities, exploratory factor analysis, and internal consistency reliability analysis. Criterion validity was not performed in this study due to the lack of a 'gold standard' to estimate the degree of agreement with an external criterion of the phenomenon being tested. Ethical approval to conduct the study was obtained from the QU Institutional Review Board (approval number: QU-IRB 1187-EA/19).

Questionnaire construction

Items pool generation

A thorough literature search of online databases (i.e., PubMed, ProQuest, Web of Science, Scopus, and Google Scholar) for studies assessing the perception of pharmacists and other healthcare professionals of their employment experience was conducted to select items that were most relevant to the study's objectives. The key terms "pharmacy/ist" and "healthcare", were combined with terms such as "job", "employment", "work", or "occupation" to search for the first component of the study aim (i.e., job satisfaction), both

were also combined with "achievements", or "accomplishments" to search for the second component (i.e., achievements in the workplace), and also further combined with "preparedness" "preparation" or "readiness" to search for the third component (i.e., preparedness to practice). Three relevant pre-tested questionnaires were identified from the literature search (Hassell, 2007; Richardson *et al*., 2008; Gregory & Austin, 2014), which were used to comprehensively cover the three objectives of the current study. A deductive items pool generation strategy was used. Herzberg 'motivation-hygiene theory' (Herzberg *et al*., 1959; Singh *et al*., 2019; Alrawahi *et al*., 2020) was used to derive the pharmacy employment experience domains. Herzberg's theory (also called the two-factor theory) is a well-established theory on job satisfaction and one of the most commonly used theoretical frameworks in healthcare professions to examine job satisfaction (Herzberg *et al*., 1959; Singh *et al*., 2019; Alrawahi *et al*., 2020).

The motivation-hygiene theoretical framework was influenced by Abraham Maslow's hierarchy of needs (Herzberg *et al*., 1959), and was developed after several years of studying employees' behaviour at work. The hypothesis behind Herzberg's theory is that some influencers can lead to a positive attitude at work, while others can lead to a negative attitude (Alshmemri, Shahwan-Akl, & Maude, 2017). This hypothesis resulted in the categorisation of elements that affect job satisfaction into two categories. The first category is the 'motivation factors', which include achievement, recognition, the work itself, responsibility, advancement, and the possibility for growth (Herzberg *et al*., 1959; Herzberg, 1966; Herzberg, 1968). The factors in this category are considered intrinsic to the job and play a direct role in enhancing employees' level of satisfaction (Herzberg *et al*., 1959; Herzberg, 1966; Herzberg, 1968). The second category is the 'hygiene factors', which include policies and administration of the company, relationship with supervisors, interpersonal relations, working conditions, and salary (Herzberg *et al*., 1959; Herzberg, 1966; Herzberg, 1968). These factors are extrinsic to the job, and if present, they do not directly increase satisfaction, but they minimise job dissatisfaction (Herzberg *et al*., 1959; Herzberg, 1966; Herzberg, 1968). The questionnaire items aiming to examine alumni's perceptions of their job satisfaction were primarily developed based on Herzberg's motivation/intrinsic and hygiene/extrinsic factors that are most relevant to the pharmacy profession (Herzberg, 1968). Two sub-domains under job satisfaction (i.e., motivation factors and hygiene factors) were developed. Three components under motivation factors (i.e., work itself, possibility of growth, and achievements) and three elements under hygiene factors (i.e., interpersonal relationship, salary, and working condition) matched the factors in the job satisfaction theory. Additional items were adapted from the 'Recent Graduate Survey' tool that was developed by Gregory and Austin (2014). Gregory and Austin's questionnaire was developed and pilot tested to examine the post-graduation employment experiences of recent graduates from pharmacy programmes in Ontario (Gregory & Austin, 2014). The use of the questionnaire enabled the researchers to identify the impact of employment procedures on the practice of new pharmacists in Ontario (Gregory & Austin, 2014). Other items in the PAEEQ relating to alumni's perception of their job satisfaction were derived from other published literature that describes factors affecting employment satisfaction (Lin, Viscardi, & McHugh, 2014).

Assessment of alumni's perception of their achievements in the workplace in this study was inspired by Herzberg and authors (1959) intrinsic factors of job satisfaction theory (Herzberg *et al*., 1959; Singh *et al*., 2019; Alrawahi *et al*., 2020). 'Achievement' was one element of the motivation factors in Herzberg's job satisfaction theory with no sub-factors. The research team aimed to highlight the importance of pharmacy alumni's achievements in their workplace. Therefore, 'achievements in the workplace' was studied in a stand-alone domain where subdomains were developed by the research team as follows: general achievements, and NAPRA competencies achievement. Achievement in the workplace items in the PAEEQ was adapted from the questionnaire developed by Richardson and authors (2008).

The questionnaire was developed to examine the satisfaction of occupational therapy graduates with their professional skills and engagements in professional activities from the time they graduated from the online post-professional master's programme in occupational therapy at the University of California (Richardson *et al*., 2008). This questionnaire was used because the literature search did not identify any scales that specifically address pharmacy graduates' perceptions of their achievements; however, the questionnaire items were relevant to health professions in general. Additional items were derived from the literature review and the current study experts' opinions, to ensure comprehensiveness in examining alumni's achievements in various practice settings. In addition, the NAPRA competencies (2014) were used in PAEEQ to assess pharmacy alumni's ability to achieve , and satisfaction with their achievements of NAPRA pharmacists' professional competencies at the start of pharmacy school till practice (e.g., patient care, professional collaboration, and teamwork, and ethical, legal and professional responsibilities (NAPRA., 2014).

Finally, items to examine the perception of alumni on their preparedness to practice were adapted from the 'Pre-Registration Choices Questionnaire', which was developed by Willis and Hassell's (2007) to explore the perspectives of final year Master of Pharmacy (M. Pharm.) students about their undergraduate pharmacy and pharmaceutical sciences programme at the University of Manchester (Hassell, 2007). The questionnaire was also used to evaluate the impact of the pharmacy programme on the career choices of graduates. Additional items related to preparedness in the PAEEQ questionnaire were generated from the AFPC (2017) learning outcomes (AFPC, 2017). AFPC educational outcomes highlighted general curricular priorities, and served as a framework for entry-to-practice pharmacy programmes (AFPC, 2017). A structural model of sub-domains and components is illustrated in Figure 1.

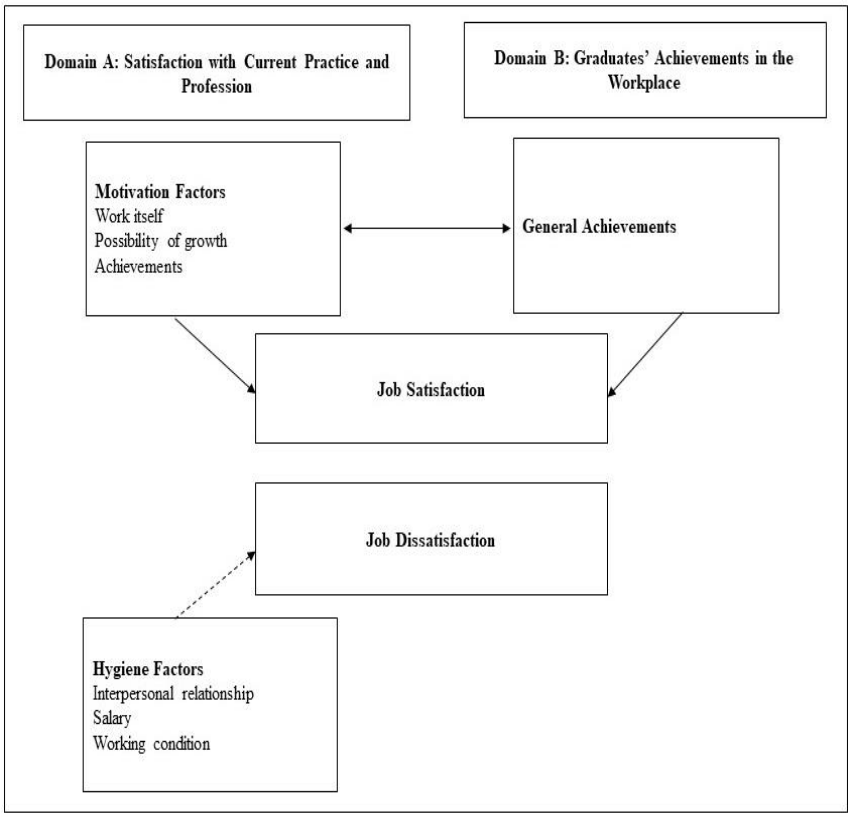

Figure 1: A structural model of sub-domains and components

First draft of PAEEQ

The first draft of the PAEEQ was composed of 84 items (including 17 items aimed to capture the alumni's sociodemographic and professional characteristics). The three key domains that assessed pharmacy alumni's employment experiences were framed as follows; Domain A: satisfaction with current practice and profession (11 items). A summative rating scale structure was used, where items were framed as statements that participants rated, using a 5-point Likert-type scale format, based on their level of satisfaction. Domain B: graduates' achievements in the workplace (40 items). This was intended to assess whether or not the participant has attained certain achievements that are relevant to a wide range of pharmacy profession work settings, and the items were framed as close-ended questions (Yes/No and multiple-choice questions) (33 items). Additionally, because the research team believed that pharmacy alumni must apply NAPRA competencies in their workplaces at varying extents, statements that participants rate, using a 5-point Likert scale format, based on their level of agreement of achieving NAPRA 2014 competencies were added (7 items). Domain C: graduates' perception of preparedness to practice (16 items). The items were framed as statements that participants rated, using a 5-point Likert-type scale format, based on their level of agreement with their preparedness through undergraduate teaching, learning, and skills (9 items), and their preparedness according to 2017 AFPC learning outcomes (7 items).

Content validity testing

After developing and reviewing the domains and items in the first draft of the questionnaire by the research team, content and face validities were conducted. Content validity was conducted by scholars in pharmacy education and practice, who were experts in the investigated phenomena and who also had expertise in the development of the survey instrument. The questionnaire draft was sent by email to a sample of 11 international experts from Kuwait, Saudi Arabia, Canada, the United States (US), and the United Kingdom (UK). They were asked to critically review the questionnaire and to provide feedback on items under each section for content relevance, representativeness, and technical quality. Additionally, they were also required to comment on the adequacy and comprehensiveness of the questionnaire items, and whether additional items or deletion of any item were needed to accurately capture pharmacy alumni employment experience.

Face validity testing

After considering the feedback received in the content validity assessment, the modified draft of the questionnaire was shared for face validity conduction with a sample of five CPH-QU alumni who consented to the testing through SurveyMonkey (Survey Monkey Inc., San Mateo, California, USA). Five alumni, who graduated in different years (from 2011 to 2020) and who work in different practice settings, were invited to check the extent of the questionnaire's practicality and relevance for use by other pharmacy alumni. The participants were also asked to provide feedback on the appropriateness of items, clarity, and difficulty. The questionnaire development process is illustrated in Figure 2.

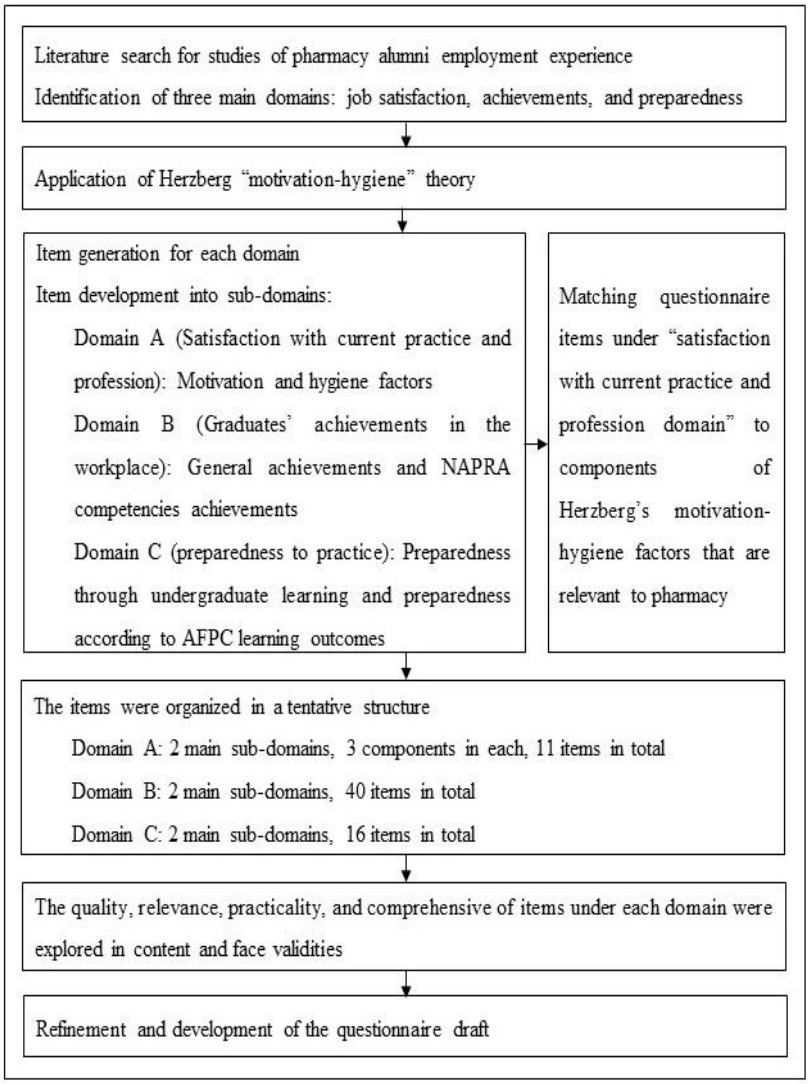

Figure 2: An overview of the questionnaire development process

Questionnaire validation

Questionnaire administration

The total number of CPH–QU alumni who completed their B. Pharm. degree from the CPH-QU between 2011 and 2020 was 214. Raosoft online calculator was used to determine the minimum sample size of the participants, taking into consideration a 5% margin of error and confidence level of 95%. A sample of 138 participants was needed. However, the total eligible population (n=214) was approached considering the possibility of non-response. The alumni's contact information (e.g., alumni names, contact numbers, and email addresses) was retrieved from the CPH-QU alumni database. Individual and group emails were sent to alumni to inform them about the study aim and objectives, data collection procedure, anonymity and confidentiality, and the voluntary nature of the study and to invite them to participate in the study. The invitation emails contained a link to a self-administered questionnaire at SurveyMonkey (Survey Monkey Inc., San Mateo, California, USA) with implied informed consent. The questionnaire was open from January to March 2021. To encourage participation and improve the response rate, multiple reminder emails were sent to the alumni.

Statistical analysis

Data were imported into IBM Statistical Package for Social Sciences (IBM SPSS 27 software) where all statistical analyses were conducted. The validity and reliability of the scales were tested using exploratory factor analysis and internal consistency reliability analysis.

Exploratory Factor Analysis (EFA)

Since PAEEQ is a newly developed questionnaire, exploratory factor analysis was used to assess the construct validity (Thompson & Daniel, 1996; Pett, Lackey, & Sullivan, 2003; Thompson, 2004). Principal components analysis (PCA) was chosen as a method of factor extraction because it can identify how items are closely related to their underlying factors, and whether certain items correlate with one or more factors (Jolliffe & Cadima, 2016). PCA was conducted on the initial pool of items in each scale (12-item, 14-item, and 13-item scales, respectively) using maximum likelihood extraction with a direct oblimin rotation. The oblique rotation was selected because the authors hypothesised that the factors from a single scale would be correlated. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy, significant Bartlett's Test of Sphericity (BTS), and inter-item correlation determinant (r >0.3) were inspected for each of the three scales to examine whether the sample is appropriate for exploratory factor analysis (Tabachnick, Fidell, & Ullman, 2007). Visual inspection of scree plots for each scale and factor solutions that met the eigenvalue criteria (i.e., eigenvalue > 1.0) were examined to determine the appropriate number of factors (Kaiser, 1958). Total variance explained as 60% or greater was considered an acceptable target in the assessment of the relevance of the retained factors (Hinkin, 1998). Communalities values were also reviewed for items under each scale and those of < 0.40 were subjected to elimination (Worthington & Whittaker, 2006). The pattern matrices were also reviewed, and items were retained if they; 1) loaded by > 0.3 on only a primary factor, 2) loaded onto an alternative factor by ≤ 0.30, and 3) demonstrated a difference of 0.20 between their primary and alternative factor loadings (Howard, 2016).

Reliability testing

The internal consistency reliability analysis was assessed using Cronbach's alpha, considering $\alpha \geq 0.7$ as the minimum satisfactory value for this newly developed questionnaire (Hinkin, 1998).

Results

Alumni characteristics

One hundred and thirty-six CPH-QU alumni responded to the administered questionnaire (response rate = 63.5%). All participants were female, from different nationalities, including Egyptians (22.1%), Syrians (14.5%), Jordanians (13.7%), Sundanese (13.0%), Palestinians (8.4%), and Qataris (3.1%). Around half of the participants graduated in the past few years (i.e. between 2017 and 2020). The majority of the participants (67%) obtained an additional degree, and the QU-Doctor of Pharmacy (Pharm. D.) was the predominant degree obtained (58%). Most of the participants were licensed pharmacists (67.5%) and currently working in Qatar (74%) for more than 39 hours per week (69.6%).

Content validity

The questionnaire layout, use of terms and grammar, clarity, and understandability were checked and revised. The experts agreed on the comprehensiveness of the tool and its consistency with the stated aim. Moreover, some participants disclosed the applicability of the questionnaire to other institutions. The perception of the length and the expected time to complete the questionnaire was two-sided. Some experts perceived it appropriate in length and others suggested that further reduction of some items be done. Remarkably, Domain B

(i.e., achievements in the workplace) was subjected to significant modifications as suggested by the experts, as such all items were changed to a 5-point Likert scale, and the alignment of alumni's achievements to NAPRA competencies was removed. Appendix 1 provides a summary of the comments of experts and the responses of the authors.

Face validity

Feedback received from the selected alumni indicated that they agreed that the questionnaire is a useful tool to examine the perception of job satisfaction, achievements, and preparedness to practice among CPH-QU alumni. However, minor changes were made, including enhancement of the questionnaire layout, consistency, concisely rephrasing of some items to improve clarity and understandability, and unifying of the scales as 5-point Likert-type scales (e.g., 0 = highly dissatisfied/strongly disagree, 1= dissatisfied/disagree, 2= neither satisfied nor dissatisfied/ neither agree nor disagree, 3= satisfied/agree, and 4= highly satisfied/ strongly agree). Moreover, few alumni recommended adding the 'not applicable' option under the 'satisfaction with achievements in the workplace' domain to fairly reflect whether an achievement has been attained by the participants. Furthermore, two alumni commented on the use of an unclear word (i.e., commuting) in the questionnaire item 'time spent commuting from your residence to your current practice', hence, "commuting" was replaced by 'transporting'. Most of the comments received from the alumni sample were valid and were considered in the revised version of the questionnaire. The completion time of the questionnaire was estimated by QU-CPH alumni as 20 minutes on average. Appendix 2 shows the three key domains of the questionnaire after the content and face validities.

Exploratory factor analysis and internal consistency analysis

Job satisfaction

The KMO measure of sampling adequacy (0.733), significant Bartlett's test of sphericity (p<0.001), and correlation determinant (0.023) indicated that the sample was appropriate for the EFA. PCA extraction produced item communalities values ranging from 0.498 – 0.858. Therefore, no item was removed at this stage. An examination of the scree plot suggested a four-factor solution. The four-factor component accounted for 65% of the variance. The Cronbach's alpha score for this scale was 0.80. Five items were removed because they violated the loading criteria specified earlier. After removing the five items, PCA extraction produced item communalities values ranging from 0.730 – 0.951. An examination of the scree plot suggested a four-factor solution, namely: the work itself (motivation factor), interpersonal relationship, and two distinct factors for working conditions (hygiene factors). Factor loadings and mean (SD) are presented in Table I. The four-factor component accounted for 81.8% of the variance. The Cronbach's alpha score for this scale was 0.63.

Achievements in the workplace

Similarly, the sample was appropriate for EFA as suggested by the KMO measure of sampling adequacy (0.853), significant Bartlett's test of sphericity (p<0.001), and correlation determinant (5.74). Initially, no item was removed based on item communalities values produced by the PCA extraction (0.599 – 0.879). The scree plot suggested a three-factor solution which accounted for 77.71% of the variance, and a Cronbach's alpha score of 0.95. Item loading assessment suggested the removal of six items that violated the earlier specified loading criteria. Item communalities values produced by the PCA extraction after the removal of the six items ranged from 0.580 – 0.925. An examination of the scree plot suggested a two-factor solution, namely: general achievements, and academia/research-specific achievements. Table I presents the factor loadings and mean (SD) of the 'achievements in the workplace' items. The two-factor component accounted for 72.9% of the variance and produced a Cronbach's alpha score of 0.89.

Preparedness to practice

Suitability assessments for EFA, including the KMO measure of sampling adequacy (0.870), significant Bartlett's test of sphericity (p < .001), and correlation determinant (.001), showed that the sample was appropriate. PCA extraction produced item communalities values ranging from 0.254 – 0.763. Therefore, only one item (CPH structured Practical Experiential Training [SPEP] is adequate to prepare me with the required knowledge and skills) was removed at this stage, because the item communality value was < 0.4. A two-factor solution, which accounted for 57.83% of the variance, was suggested by the scree plot. The Cronbach's alpha score for this scale was 0.88. Based on the item loading assessment, two items violated the loading criteria and were removed. After removing a total of three items, the PCA extraction produced item communalities values ranging from 0.460 – 0.772. An examination of the scree plot suggested a two-factor solution, namely: preparedness through undergraduate teaching and learning, and preparedness according to the AFPC learning outcomes. Factor loadings and means (SD) are demonstrated in Table I. The two-factor component accounted for 65.07 % of the variance and resulted in a Cronbach's alpha score of 0.86.

Table I: Factor loadings and mean (SD) for Job satisfaction, Achievements in the workplace, and Preparedness to practice scales

Item	Factor				Mean (SD)
	1	2	3	4	
Job satisfaction					
The pharmacy profession in general	-.002	.174	.814	-.203	2.5 (.99)
The value of pharmacists in the community	.035	-.162	.849	.196	2.38 (1.08)
Time spent in transportation from your residence to your current practice	.016	.087	.007	.968	2.79 (.88)
Workload in terms of number of hours per week	.104	.834	-.030	-.046	2.10 (1.04)
Professional relationships with co-workers/colleagues	.968	-.129	-.054	.018	2.92 (.77)
Professional relationship with management	.827	.208	.100	-.008	2.81 (.893)
A balance between wellbeing and job-related stress	-.074	.879	.026	.125	2.00 (1.06)
Achievements in the workplace					
Developing a pharmacy-related service (new guideline/policy/protocol, counseling services, medication safety services, etc.)?	.785	-.051			2.29 (1.089)
Being involved in a practice-related committee (e.g. pharmacy and therapeutics committee)?	.754	.036			2.18 (1.06)
Delivering a workshop or a CPD activity	.721	.082			2.56 (.89)
Taking part of a scientific/organising committee at a conference	.866	.077			2.267 (.96)
Serving as a preceptor/ clinical instructor (either for pharmacy or non-pharmacy students)	.894	-.065			2.47 (.93)
Being a guest-lecturer in an academic course	.168	.871			2.09 (1.08)
Coordinating a course in an academic institution	-.162	.998			2.09 (1.03)
Awarding a research grant as a principal investigator or co-principal investigator since graduation	.170	.749			2.09 (1.0)
Preparedness to practice					
The amount of content related to clinical pharmacy practice in the undergraduate pharmacy curriculum is adequate to prepare me with the required knowledge and skills	.273	.578			2.67 (1.08)
The amount of content related to pharmaceutical sciences in the undergraduate pharmacy curriculum is adequate to prepare me with the required knowledge and skills	-.089	.830			1.99 (1.17)
The general science content of pre-admission to pharmacy curriculum is necessary for the remaining professional years in pharmacy programme	-.088	.782			2.25 (1.07)
The assessments used in the undergraduate curriculum adequately measures the skills necessary to be a practicing pharmacist	.290	.630			2.47 (1.05)
The undergraduate curriculum provided me with the required knowledge and skills necessary to become a care provider	.800	.082			3.22 (.68)
The undergraduate curriculum provided me with the required knowledge and skills necessary to become a communicator	.912	-.090			3.36 (.63)
The undergraduate curriculum provided me with the required knowledge and skills necessary to become a collaborator	.898	-.073			3.21 (.66)
The undergraduate curriculum provided me with the required knowledge and skills necessary to become a health advocate	.819	.082			3.24 (.70)
The undergraduate curriculum provided me with the required knowledge and skills necessary to become a scholar	.586	.178			3.07 (.87)
The undergraduate curriculum provided me with the required knowledge and skills necessary to become a professional	.872	-.069			3.42 (.62)

The pharmacy alumni employment experience questionnaire (PAEEQ)

The final version of the questionnaire (PAEEQ) comprised of 48 items (including 21 items aimed at capturing the alumni's personal and professional characteristics such as their age, nationality, year of graduation, nature of work setting, and additional degree obtained). Domain A: Job satisfaction (7 items). This domain aimed at examining alumni's level of

professional satisfaction with their current employment and their role as pharmacy professionals in general. It was examined using a 5-point Likert scale (0= highly dissatisfied, 1= dissatisfied, 2= neither satisfied nor dissatisfied, 3= satisfied, and 4= highly satisfied). Domain B: Satisfaction with achievements in the workplace (8 items, and 1 open-ended question). It aimed at investigating the alumni's satisfaction with different possible professional achievements (e.g., professional, scholarly, engagement, and teaching). It was investigated using a 5-point Likert scale with the addition of 'not applicable' option if the item was not achieved, and 'open comments' if another professional achievement was attained. Domain C: Level of preparedness to practice (10 items and 1 open-ended question). It aimed at examining the alumni's level of agreement with how well the CPH's B. Pharm. programme prepared them for their current employment and for their role as pharmacy professionals in general. It was examined using a 5-point Likert scale (0= strongly disagree, 1= disagree, 2= neither agree nor disagree, 3= agree, and 4= strongly agree). The minimum – maximum obtainable scores for the three scales of satisfaction/agreement (A, B, and C) were 0–28, 0–32, and 0–40, respectively. The total score for each scale can be computed by summing the scores of the individual scale items, and a higher score indicated a higher satisfaction/agreement level. Table II demonstrates the scoring system of the PAEEQ questionnaire.

Table II: Pharmacy Alumni Employment Experience Questionnaire: Domains and Scoring System

Domain	No. of items	Possible score (minimum – maximum)
Job Satisfaction	7	(0-28)
Satisfaction with achievements in the workplace	8	(0-32)
Level of educational preparedness for current practice	10	(0-40)

Discussion

The purpose of this study was to develop the PAEEQ and to determine its validity and reliability to be used in the assessment of pharmacy graduates' perception of job satisfaction, achievements in the workplace, and preparedness to practice.

Job satisfaction

The satisfaction with the pharmacy profession and current practice domain was supported by Herzberg's motivation-hygiene theory, which is a widely employed theory and a conceptual framework when researching job satisfaction (Nyame-Mireku, 2012; Alshmemri, Shahwan-Akl, & Maude, 2016). Utilisation of this theory in PAEEQ is deemed essential, as it provides healthcare organisation managers with a tool for appropriate management of human resources through continuous monitoring of employees' dual perspectives of satisfaction and dissatisfaction (Bhatnagar & Srivastava, 2012; Borkowski & Meese, 2020). The four-factor structure identified in the PCA suggested that the PAEEQ can capture various of Herzberg's motivation/intrinsic and hygiene/extrinsic factors that are most relevant to the pharmacy profession. This ensured the comprehensiveness and practicality of the assessment. The current study investigators believe that previous questionnaires that were used to investigate job satisfaction among pharmacy professionals revealed inadequate incorporation of factors that could affect job satisfaction, and/or the absence of a real evaluation of their satisfaction level related to the investigated factors (Gregory & Austin, 2014). One of the key comments received in the content validity assessment was that the assessment of satisfaction with the 'pharmacy profession' was broad in scope. However, it is important to highlight that the aim of this domain was to examine satisfaction with the pharmacy profession and the job nature among all potential pharmacy alumni regardless of practice country, site, or setting.

Despite the fact that this domain had originally a good Cronbach's alpha score (i.e., α= 0.80), it was the lowest among the three domains, with item reduction resulting in an unsatisfactory score (0.63). Cronbach's alpha score for this domain was also lower than that reported for the single combined job and career satisfaction construct (α= 0.84) in Cavaco and authors instrument (Cavaco *et al*., 2001). The literature argues that the number of items on a scale, and insufficient inter-relatedness between items might result in lower scores of Cronbach's alpha (Cortina, 1993; Tavakol & Dennick, 2011). It is worth mentioning that the satisfaction with the pharmacy profession and the role of pharmacy professionals in the community was examined by two items, whereas five items were dedicated to job satisfaction. Therefore, future modifications of the questionnaire might focus on studying the adequacy and the inter-relatedness between items examining alumni's satisfaction with the pharmacy profession and their current practice.

Moreover, the PAEEQ developers suggested renaming this domain as 'job satisfaction' in future uses of the questionnaire to accurately reflect the central theme of that domain.

Achievements in the workplace

Satisfaction with achievements in the workplace domain was one of Herzberg's motivation factors that had a positive effect on job satisfaction (Chen, 2008). Despite the significance of this element in affecting employees' experience (Herzberg *et al*., 1959; Mackenzie, 2008), there is a paucity of tools assessing the achievements of pharmacy professionals in their workplaces and the associated level of satisfaction. The PAEEQ validation indicated the importance of this element for the overall assessment of pharmacy professionals' employment experience, and for its potential association with job satisfaction. This is consistent with Savery's (1996) study which indicated that 'a feeling of achievement' was one of the most important factors influencing pharmacy professionals' satisfaction with the job (Savery, 1996). The author advised job managers to critically examine employees' perception of their achievements as one of the job motivators for better managing organisational limited resources and for yielding positive outcomes (Savery, 1996).

This domain was modified significantly after the validity assessments in some aspects. For example, the response format of all items in the three domains was standardised to a 5-point 'Likert-type scale' which is the most frequently employed type of scale (Lavrakas, 2008). The use of a 5-point Likert scale enhanced uniformity of the three domains of PAEEQ, and eased responding to, and analysis of the domain items (Lavrakas, 2008). Furthermore, adding the 'not applicable' option to all items ensured the credibility of data collection, as such that the collected data represented the satisfaction of only those who attained achievements. However, this proposes that the data of some questionnaire respondents will be missed systematically by the design (Leeuw & Hox, 2008; aus Bruchsal *et al*., 2015). Yet, missing data mechanisms can still be incorporated in statistical analyses since the missing data can be determined by responses to other items (Leeuw & Hox, 2008; aus Bruchsal *et al*., 2015).

Another modification made to this domain was the exclusion of NAPRA competencies from the questionnaire. This was done to avoid confining the focus of the assessment to practicing pharmacists (i.e., healthcare system/institution), and to eliminate redundancy that occurred due to similarities with the AFPC learning outcomes. Future research on this questionnaire might study the usefulness of including a wider range of potential workplace achievements that pharmacy professionals around the globe may attain.

The internal consistency for the original list of items in this domain revealed closely related items as a group of achievements, as demonstrated by the high Cronbach's alpha score (i.e., $\alpha = 0.95$). It is argued that the alpha score that is too high ($\alpha \geq 0.90$) suggests that some questionnaire items may be redundant (Streiner, 2003; Tsang, Royse, & Terkawi, 2017). A complementary assessment of EPA suggested the elimination of six items that might have caused this redundancy, resulting in a Cronbach's alpha score of 0.885. Yet, the items under this domain reflected a wide spectrum of achievements that are relevant to different practice settings and/or the nature of work of pharmacy professionals (e.g. hospital or non-hospital pharmacy practice, academia, or research).

Preparedness to practice

The essence of strength in this domain is that it connects work and educational environments, as such, it can provide translational evidence from pharmacy professionals' workplaces to improve pharmacy professional educational efforts. Significant information can be obtained about what knowledge and skills pharmacy alumni perceive necessary as they engage in their work activities, and whether these knowledge and skills mirror those predicted by pharmacy educators and policymakers. Continuous educational programme evaluations and improvements can be sought to prepare graduates who possess competencies and capabilities that are relevant for future workplace requirements, which in turn result in the enhancement of alumni's employment experience.

The domain's sub-categories were merged after validity testing to represent one related group of items that reflects alumni's perception of their preparedness to practice according to their agreement with the quality of teaching and learning in the undergraduate programme, and according to the usability of the AFPC learning outcomes to their work. Yet, the two-factor structure identified in the PCA suggested that the PAEEQ was able to capture the alumni's perception of their preparedness according to these distinct categories. The research team believes that incorporating AFPC learning outcomes added value to this questionnaire because AFPC learning outcomes can provide insight into how well a pharmacy programme or college prepares its students for employment (AFPC, 2017). Content validity testing of this domain suggested addressing the preparedness of alumni to practice in a subject-specific fashion (e.g., preparedness for medicinal chemistry, pharmacology,

pharmaceutics, or professional skills). However, this puts the questionnaire at risk of preventing its applicability to the global context, because pre-professional and pharmacy professional courses vary by pharmacy programmes around the globe.

Moreover, content validity highlighted the significance of examining the perception of alumni on their internship experiences (i.e., SPEP), which is the first-hand exposure to practicing in the real world, and a significant aspect of pharmacy undergraduate programmes worldwide (Kettis *et al*., 2013). This reflected the quality and significance of content validity testing conducted for this domain. Nevertheless, the PAEEQ developers recommend a further review of terms and phrases to avoid using programme-specific terms, in order to ensure global applicability to other colleges of pharmacy worldwide. This unique domain was not related directly to Herzberg's job satisfaction theory; hence it was not measured as a "satisfaction" scale, but as an "agreement" scale. However, the questionnaire developers suggest that future improvement of this domain might consider this domain scoring to "satisfaction" in order to maintain consistency of assessment throughout the questionnaire, and to facilitate future correlation assessments between the three domains. Assessment of alumni's perception of their professional education and preparedness for practice was briefly examined as a "satisfaction" in other healthcare professions (Hodgetts *et al*., 2007). Internal consistency of this domain showed good reliability (i.e., the original list of items α= 0.88, and after item reduction α= 0.86), which indicates a good interrelatedness between items that were originally divided into two sub-categories (i.e., undergraduate education in pharmacy programmes and AFPC learning outcomes (Tavakol & Dennick, 2011).

PAEEQ length, comprehensiveness, and representativeness

Although the number of the questionnaire items has been reduced after the validity testing, the feedback received indicated an overall agreement that the questionnaire items were adequate to examine pharmacy alumni employment experience, and were representative of the three domains addressed. Avoidance of incorporating 'too-many' or 'too-few' items was sought by the questionnaire developers to maintain data quality as suggested by Lavrakas (Lavrakas, 2008). The time spent to complete the original version of the questionnaire was approximately 20 minutes, which appeared to be an adequate time for items to be comprehended, and answered appropriately, particularly since the published literature argues that data collection costs increase and data quality declines when online surveys are longer than 20 minutes, and that longer questionnaires may lead to lower response rates (Lavrakas, 2008). The excellent percentage of returned responses (i.e., 63.5%), which is greater than the reported average response rate of mail surveys among healthcare professionals (Cook, Dickinson, & Eccles, 2009), further reaffirms the questionnaire's appropriateness in length and relevance to the intended population (Lavrakas, 2008). However, the issues of representativeness, questionnaire comprehensiveness, and completion time need to be reassessed for the shorter version of the questionnaire (i.e. after factor analysis and items reduction).

Limitations and strengths

Although the findings of this study demonstrated that the PAEEQ showed promising validity and reliability properties and is useful in examining pharmacy alumni employment experience, the findings should be interpreted with caution given the following potential weaknesses. First, sampling bias and generalisability issues cannot be excluded given that the study participants were selected from a small-scale population in one institution, and were all female. Also, this study used classical test theory and therefore sample-dependent on the alumni from this single institution and single geographic region. Hence, further external validation is warranted.

Second, the study had a small sample size, based on Comrey and Lee's graded scale of sample sizes for scale development:100 = poor, 200 = fair, 300 = good, 500 = very good, ≥1,000 = excellent, which can be argued to be disadvantageous for relying on factor analysis findings (Williams, Onsman, & Brown, 2010; Comrey & Lee, 2013). However, it showed adequacy to produce a clear factor structure and strong factor loadings (MacCallum *et al*., 1999; Costello & Osborne, 2005).

Third, further psychometric testing (e.g., confirmatory factor analysis, criterion analysis, additional theoretical models of job satisfaction, and test-retest reliability) is needed to strengthen the conclusions about the validity and reliability of PAEEQ. On the other hand, this study has a number of strengths. First, the PAEEQ development integrated previous empirical evidence that relates the job satisfaction of pharmacy or healthcare professionals to workplace achievements and preparedness, with perspectives from a widely used theory of job satisfaction. This contributed to the questionnaire's relevance, comprehensiveness, and usefulness, and make it the first questionnaire to examine all potential domains related to pharmacy professionals' employment experiences. Second, the sample of 11 national, regional, and international

content experts who had diverse and essential expertise in the investigated topic was fundamental to providing comprehensive and thoughtful validation (Haynes, Richard, & Kubany, 1995). Third, the questionnaire was relevant to different pharmacy educational programmes and to different work settings. Hence it is anticipated that this questionnaire would be useful to be adopted in global contexts; yet, future studies should be carried out to further validate the PAEEQ.

Future research

There would be merit in conducting additional psychometric tests (e.g., confirmatory factor analysis) to provide further validation of PAEEQ. Moreover, adopting the questionnaire in other international contexts is necessary for generalisability assessment. Moreover, studying the adequacy and the inter-relatedness between items examining each domain of PAEEQ, and assessing the correlation between the three domains might be useful.

Conclusion

The PAEEQ is a self-administered multi-dimensional questionnaire that comprehensively examines pharmacy alumni employment experience. The review of the literature and the use of a theoretical model guided the development of PAEEQ. The PAEEQ was designed to examine alumni's perception in three domains, namely: 1) satisfaction with the pharmacy profession and current practice, 2) satisfaction with achievements in the workplace, and 3) level of educational preparedness to current practice. Initial validation of PAEEQ included 1) content validity testing by 11 pharmacy education and practice experts, and 2) face validity by five pharmacy alumni. EFA and the internal consistency reliability were conducted on 136 pharmacy alumni who responded to the survey.

Content validity resulted in a clearer, more comprehensive, and more suitable version of the items to be used for future assessments of pharmacy employment experiences. Face validity provided evidence of the questionnaire's relevance to pharmacy alumni. Construct validity, as conducted through PCA, resulted in four-factors, two-factors, and two-factors for the three domains, respectively. Internal consistency assessment revealed adequate reliability for most of the questionnaire domains. Although the PAEEQ can be utilised as an instrument to examine pharmacy alumni employment experience, further work in further psychometric assessments should be conducted to provide further validity and reliability to this questionnaire.

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Conflict of interest

The authors declare that they have no competing interests.

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Appendices

Appendix 1. Content expert feedback and decision made

Domain	Validators' (V) comment	Decision made
Domain A: **Satisfaction with your current practice and profession** Please indicate overall how satisfied you are regarding each of the following statements:	V4: - Suggested to be: Satisfaction with the pharmacy profession and your current practice - Add a short paragraph here to describe why you are asking these questions....e.g., "We are interested in your level of professional satisfaction with your current employment and your role as a pharmacist in general...." V7: I would add a short explanatory paragraph	- The name of the domain was changed as suggested - Explanatory sentence was added under each domain Explanatory sentence was added under each domain
Item	**Validators' comment**	**Decision made**
The pharmacy profession	V1: "Profession" It needs more clarification to be interpreted uniformly by all respondents. I suggest "Based on my current practice experience, I am satisfied with pharmacy as my profession" OR Satisfied to work as a pharmacist V4: Suggested: The pharmacy profession in general V7: This seems very general and could be a study in its own. Do they answer this from their setting and their practice or globally? V8. Please add "…. in the country where you work" V9: Please modify to indicate a complete statement	None. The item intended to ask about the alumni satisfaction with Pharmacy as a profession, in general, taking into account all considerations Modified as suggested None. This item is essential to be incorporated in this study for more in depth understanding of the topic None. The item intended to ask about the alumni satisfaction with Pharmacy as a profession, in general, regardless of places of practice None. The stem of this domain along with this item makes it a complete statement
The nature of your job in your current employment (e.g. direct patient care role, administration, dispensary role, etc.)	V7: Suggest delete the examples. V9: - These examples are not necessarily related to my position. - Also, what if I am not working, your interpretation of this question will change. So, better modify to reflect your objective from this statement	Modified as suggested; examples were removed - Modified as suggested; examples were removed - None. None-workers are requested to skip questions related to current employment.
Current place of employment and practice. (This item has been changed to: "Geographical location of employment and practice" to enhance clarity)	V3: Consider adding "Organizational culture of your" V9: What if I am not working; this comment applies to many statements so please revise accordingly or consider redirecting those who are not employed to the end of the questionnaire.	None. Irrelevant None. None-workers are requested to skip questions related to current employment.
Time spent commuting from your residence to your current practice	V1: Is this relevant to satisfaction with current practice? I suggest to be deleted.	

	V7: Relevance to your research aim?	None. The research team believe that this factor might affect alumni job satisfaction
Social/family support	V1: It needs more clarification to be interpreted uniformly by all respondents. I believe it should be Manager/Supervisor support i.e., proper guidance is provided by the supervisor V7: Support for what? V11: Is it relevant for this questionnaire?	None. Prior researches have shown that social/family support affect job satisfaction
A balance between wellbeing and job-related stress	V1: I suggest to be modified to "Work-life balance between social and psychological well-being and job-related stress"	None. A complicated sentence
Opportunities for career growth (e.g. promotions, professional development, work motivation/reward, etc .)	V1: I suggest to break down into two statements (one for professional development, and the other for promotions, motivation/reward).	None. The intention was to keep it general and suit all. These were just examples for opportunities
Domain B: **Graduates' Achievements in the Workplace** - "The stem sentence for this domain was modified as follows: "For questions below, please indicate the extent of your satisfaction with each of the following achievement/s in your workplace up to date:" - All items in this domain was changed to 5-point Likert scale, with an additional N/A option	V7: - I would add a short explanatory paragraph - Most of the content of this section is about activities	- Explanatory sentence was added under each domain - This domain was renamed to appropriately items being assessed, as follows: "Satisfaction with achievements in the Workplace"
Item	**Validators' comment**	**Decision made**
Have you ever developed a pharmacy-related service (new guideline-policy-protocol, counseling services, medication safety services, etc)? Yes/No	V4: Suggest the following: (? it may be worth qualifying the question with the "since you graduated..." as some respondents (e.g., part-time PharmD students) will have had years of practice before entering the programme and may have been involved in starting new programmes and/or in leadership roles). You can eliminated the redundant preamble to each question if you add a short introductory paragraph under the title for this section referring to the fact that you are only interested in the graduate's achievements in the workplace AFTER graduation from CPH... V7: 'developed' Not clear what this means or the intention. Does developed mean conceived, led, participated, delivered.	- The stem sentence for this domain was modified as follows: "For questions below, please indicate the extent of your satisfaction with each of the following achievement/s in your workplace up to date:" - All items in this domain was changed to 5-point Likert scale, with an additional N/A option None. All meanings of the word 'develop' was acceptable
If yes to Q#, please provide a brief description of its/their name(s) and function(s). (open ended)	V1: If you do not prefer to add to the number of the previous question, you should include the option "non-applicable) in this question. This applies to the following questions (48, 50,….77) V4: If you answered yes to the previous question, please provide the name(s) and brief description of the function of each service.	Modified as suggest. "Not applicable" option was added to this domain to fairly reflect whether an achievement has been attained by the alumni, and what is the associated level of satisfaction

Have you ever worked as a manager/leader in your current practice (e.g. pharmacy director, pharmacy supervisor, etc.)? Yes/No	V4: Please change to: (Since you graduated from the CPH B. Pharm. programme)...Have you ever worked as a manager/leader in your current practice (e.g. pharmacy director, pharmacy supervisor, etc.)? (? I assume that you don't care if the respondent is no longer in this position...only that they have occupied such a position)	- The stem sentence for this domain was modified as follows: "For questions below, please indicate the extent of your satisfaction with each of the following achievement/s in your workplace up to date:" - All items in this domain was changed to 5-point Likert scale, with an additional N/A option
	V9: All examples listed assume that a participant is working in pharmacy	Modified as suggested. The focus on pharmacy practice was avoided
If yes to Q47, please indicate this position. (Open ended)	V4: Please change it to: If you answered yes to the previous question, please identify the title of the manager/leader position that you occupied	This item was deleted because of insignificance. All items in this domain was changed to 5-point Likert scale, with an additional N/A option
	V7: Not clear what you want.	This item was deleted because of insignificance. All items in this domain was changed to 5-point Likert scale, with an additional N/A option
Have you ever had a role in a practice-related committee (e.g. pharmacy and therapeutics committee)? Yes/No	V4: Please change it to: (as per above) Have you ever had a role in a practice-related committee (e.g. pharmacy and therapeutics committee)?	The stem sentence for this domain was modified as follows: "For questions below, please indicate the extent of your satisfaction with each of the following achievement/s in your workplace up to date:"
	V7: Open to varied interpretation	None. This item intended to explore whether the alumni had 'any kinds of roles' in 'any practice-related committee'
Have you ever presented as a keynote/plenary speaker at a professional conference? Yes/No	V9: "professional" You mean pharmacy related?	None. Clarification to this item is not needed
Have you ever presented (a poster or an oral) presentation at a professional conference? Yes/No	V9: 'professional' Does this include during studying? Or only after graduating?	None. The stem sentence for this domain specified that achievement/s done in alumni's workplace
Are you currently a preceptor or have you ever served as a preceptor? Yes/No	V7: define the word "preceptor"	This item was modified to enhance clarity, as follows: "Serving as a preceptor/ clinical instructor (either for pharmacy or non-pharmacy students"
	V11: Please add: "for students?"	This item was modified to enhance clarity, as follows: "Serving as a preceptor/ clinical instructor (either for pharmacy or non-pharmacy students"
If yes to Q61, please choose all the student categories that apply. (Categories)	V4: If yes, please choose all the student categories that apply. (Categories)	This item was deleted, as the intention was to explore whether or not the alumni has served as preceptors, which is captured in the prior item
If you selected a CPH student in the question above, please specify the number mentored. (Categories)	V4: If you selected a QU CPH student in the question above, please specify the number mentored.	This item was deleted, as the intention was to explore whether or not the

		alumni has served as preceptors, which is captured in a prior item
Have you ever guest- lectured in an academic course? Yes/No	V7: meaning of "guest- lectured in an academic course"	"Guest-lecturer" is a common word used with the alumni throughout their years of study. However, "guest-lectures" was misspelled, which it was corrected to "guest-lecturer"
If yes to Q64, how many guest lectures have you participated in? (Categories)	V8: Different ones or repeated year after year?	This item was deleted. The intention was to explore whether or not the alumni was a guest-lecturer in an academic course, which is captured in a prior item
Have you ever coordinated a course in an academic institution? Yes/No	V7: needs definition of "coordinate"	None. The word 'coordinate' is a common word used with the alumni throughout their years of study
If yes to Q68, how many grants have you been awarded? (Categories)	V4: If yes, how many grants have you been awarded? (Categories)	This item was deleted. The intention was to explore whether or not the alumni was awarded a research grant as a principal investigator or co-principal investigator since graduation, which is captured in a prior item
Have you ever been involved in writing professional documents/ materials (e.g. clinical therapeutic guidelines)? Yes/No	V4: Have you ever been involved in writing internal professional documents/ materials (e.g. clinical therapeutic guidelines) that have been used in your practice site?	None. It was not intended to restrict the alumni's achievements to national/local level.
If yes to Q72, how many have you been involved in writing? (Categories)	V11: please change "article" to "document"	This item was deleted. The intention was to explore whether or not the alumni was involved in writing professional documents/ materials, which is captured in a prior item
Have you ever published an article in a peer-reviewed journal since graduation? Yes/No	V4: Have you ever published an article in a peer-reviewed journal since graduation from QU CPH?	This item was deleted, as it was captured in a prior item
The following statements have been made about the Professional Competencies for Pharmacists at Entry to Practice, which has been adapted by the CPH from the National Association of Pharmacy Regulatory Authorities (NAPRA) 2014. For each statement below, please indicate the extent of your agreement.	V1: I suggest moving this part to be under preparedness. I suggest also to delete the repeated information in the first table for preparedness which is included in the AFPC learning outcomes, 2017 and/or the Professional Competencies for Pharmacists at Entry to Practice, adapted by the CPH. V6: I would recommend to move this section up, after preparedness to practice section V8: I think there are 9 competency domains in the NAPRA document. Why leave out 2?	This part was deleted, as it was captured in other items
Domain C: **Graduates' Perception of Preparedness**	V4: - Consider change this to: "Level of educational preparedness for your current practice" - Add a short paragraph here to describe why you are asking these questions…. .e.g., "We are interested in how well your pharmacy education prepared you for your current employment and your role as a pharmacist in general...."	- The name of the domain was changed as suggested - Explanatory sentence was added under each domain

	V7: I would add a short explanatory paragraph	Explanatory sentence was added under each domain
Category 1: Preparedness through Undergraduate teaching, learning, and skills Thinking about your undergraduate education in clinical pharmacy and practice (e.g. professional skills, pharmacotherapy, and integrated case-based learning) and in the pharmaceutical sciences (e.g. medicinal chemistry, pharmacology, pharmaceutics, and microbiology) and the skills learned, please indicate how much you agree with each of the following statements	V2: The items are well phrased and they are nice to measure the curriculum in general. However, I do not agree with the statement placed above it "i.e. thinking about your undergraduate… (e.g. medicinal chemistry, …)". This is because the items can not indicate the suitability of all subjects mentioned in detail. If you want to assess the relevance and usefulness of such subjects you should ask for every subject	None. These items intended to provide a brief understanding of the alumni perception of the undergraduate curriculum based on the main, highlighted divisions.
	V4: 5-point scale for these questions, 6-point scale for questions above...consider making both a 5-point scale	Both domains were changed to 5-point Likert scale
	V7: - Replace "clinical pharmacy and practice (e.g. professional skills, …… , pharmaceutics, and microbiology)" with 'pharmacy' - Need to add space for open comments	- None. The original sentence was clearer - An open-ended item for commenting on this domain was added
Item	**Validators' comment**	**Decision made**
The amount of content related to clinical pharmacy and practice in the undergraduate pharmacy curriculum is adequate	V11: please add: "to prepare me with the required knowledge and skills"	Modified as suggested
The amount of content related to pharmaceutical sciences in the undergraduate pharmacy curriculum is adequate to prepare me with the required knowledge and skills	V3: Clarity is required. Knowledge and skills to do what?	An explanatory sentence was added to section as follows: "In this section, we are interested in how well your pharmacy education prepared you for your current employment and your role as a pharmacist in general."
	V7: Why this additional part: "to prepare me with the required knowledge and skills"	None. This part is kept to enhance clarity and maintain consistency with other items
	V9: Why is this statement different from above? Use similar but replace clinical with pharmaceutical	Modified as suggested. Consistency was maintained
The general science content of the undergraduate pharmacy curriculum is necessary for the remaining professional years in pharmacy	V1: I suggest to be defined above as being done for clinical pharmacy and practice and pharmaceutical sciences V7: Programme or as a practitioner V6: Do you mean anatomy, pathophysiology, statistics, calculus, etc.? I had a difficulty understanding this question. V9: This changed a lot since I graduated so it will give you hard time in analysis because you need to consider when the student took the general year and what courses were there at the time.	This item was rephrased to enhance clarity by using common phrases used by the QU-CPH alumni, as follows: "The general science content of pre-admission to pharmacy curriculum is necessary for the remaining professional years in pharmacy programme"
The hospital / community pharmacy rotations (SPEP)	V11: Suggested item to be added	The item was considered and rephrased, as follows: "CPH Structured Practical Experiential Training (SPEP) is

		adequate to prepare me with the required knowledge and skills"
The assessments used in the undergraduate curriculum adequately measure the skills necessary to be a practicing pharmacist	V6: I have a difficulty understanding the context of the question. Is this question specific to clinical practicing pharmacists? Pharmacist who has not worked in the clinical practice yet and/or working in industry or academia only will have insufficient information to answer the question. Suggestion: - To rephrase the question to "The assessments used in the undergraduate curriculum adequately measures the skills necessary to be a practicing pharmacist in the clinical setting"	None. The item intended to target both clinical and non-clinical pharmacists
	V9: Very broad question; this includes way too many assessments (JC, exams, OSCE, SMSA, laboratory, practical.. etc)	None. These items intended to provide a brief understanding of the alumni perception of the assessments in the undergraduate curriculum, in general
Generally, the undergraduate curriculum has relevance to the knowledge and skills required for my current job	V8: Change the word "knowledge" to "competencies"	None. To maintain consistency of word use.
	V9: I think you are expecting participants to have worked in pharmacy profession, what if they are not working as pharmacists or even in a major related to pharmacy?	None. The current employment section was developed to ask intended participants about their current employment (e.g., work setting, position) So, this item was also useful to assess whether the pharmacy education is also relevant to those who work in non-pharmacy related fields.
* The undergraduate curriculum prepared me with the required knowledge and skills necessary for critical appraisal evaluation	V11: Please add: "of scientific literature"	This item was deleted. Very specific job activities
* The undergraduate curriculum prepared me with the necessary skills for verbal presentation	V1: I suggest changing to "The undergraduate curriculum prepared me with the necessary oral communication skills" V2. Consider replacing with "oral"	This item was deleted. Very specific job activities
Category 2: **Preparedness according to AFPC learning outcomes, 2017** "The undergraduate pharmacy curriculum provided me with the knowledge and skills necessary to act as:"	V4: Add a short paragraph here to describe why you are asking these questions....e.g., "We are interested in how well your pharmacy education addressed the AFPC learning outcomes...." V7: - Need to explain the AFPC - "The undergraduate pharmacy curriculum provided me with the knowledge and skills necessary to act as:" This is easy to miss – I did!! V11: What is AFPC?	To improve clarity and prevent unnecessary elongation of the questionnaire, this category was merged with the previous one under the same stem. While the AFPC learning outcomes have been addressed in this domain, no specific referral of the "AFPC" was mentioned.

Appendix 2. Domains and Items of the PAEEQ after the content and face validities

Domain/item						
Job Satisfaction	**Highly Dissatisfied**	**Dissatisfied**	**Neither satisfied nor dissatisfied**	**Satisfied**	**Highly Satisfied**	**N/A**
1. The pharmacy profession in general						
2. The value of pharmacists in the community						
3. The nature of your job in your current employment						
4. Salary/wage/benefits offered by your current place of employment						
5. Geographical location of employment and practice						
6. Time spent in transportation from your residence to your current practice						
7. Workload in terms of number of hours per week						
8. Professional relationships with co-workers/colleagues						
9. Professional relationship with management						
10. Social/family support						
11. A balance between wellbeing and job-related stress						
12. Opportunities for career growth						
Achievements in the Workplace	**Highly Dissatisfied**	**Dissatisfied**	**Neither satisfied nor dissatisfied**	**Satisfied**	**Highly Satisfied**	**N/A**
1. Developing a pharmacy-related service (e.g., new guideline/policy/protocol, counseling services, etc.)						
2. Acting as a manager/leader in your current practice						
3. Being involved in a practice-related committee (e.g. Pharmacy and therapeutics committee)						
4. Being involved in a national-level committee (e.g. drug supply committee)						
5. Delivering a workshop or a CPD activity						
6. Taking part of a scientific/organizing committee at a conference						
7. Presenting as a keynote/plenary speaker at a professional conference						
8. Presenting a poster or an oral presentation at a professional conference						
9. Serving as a preceptor/ clinical instructor (either for pharmacy or non-pharmacy students)						
10. Being a guest-lecturer in an academic course						

11. Coordinating a course in an academic institution		
12. Awarding a research grant as a principal investigator or co-principal investigator since graduation		
13. Being involved in any community-based communication		
14. Being involved in writing professional documents/ materials (e.g. Clinical therapeutic guidelines)		
Please indicate any other professional achievements not mentioned in the table above: (open-ended)		

Preparedness to Practice	**Strongly Disagree** / **Disagree** / **Neither satisfied nor dissatisfied** / **Agree** / **Strongly Agree**	**N/A**
1. The amount of content related to clinical pharmacy practice in the undergraduate pharmacy curriculum is adequate to prepare me with the required knowledge and skills		
2. The amount of content related to pharmaceutical sciences in the undergraduate pharmacy curriculum is adequate to prepare me with the required knowledge and skills		
3. The general science content of pre-admission to pharmacy curriculum is necessary for the remaining professional years in pharmacy programme		
4. CPH structured practical experiential training (SPEP) is adequate to prepare me with the required knowledge and skills		
5. The assessments used in the undergraduate curriculum adequately measures the skills necessary to be a practicing pharmacist		
6. Generally, the undergraduate curriculum has relevance to the knowledge and skills required for my current job		
7. The undergraduate curriculum provided me with the required knowledge and skills necessary to become a care provider		
8. The undergraduate curriculum provided me with the required knowledge and skills necessary to become a communicator		
9. The undergraduate curriculum provided me with the required knowledge and skills necessary to become a collaborator		
10. The undergraduate curriculum provided me with the required knowledge and skills necessary to become a leader/manager		
11. The undergraduate curriculum provided me with the required knowledge and skills necessary to become a health advocate		
12. The undergraduate curriculum provided me with the required knowledge and skills necessary to become a scholar		
13. The undergraduate curriculum provided me with the required knowledge and skills necessary to become a professional		
Do you have further comment about the knowledge and skills learned during your undergraduate education? (open-ended)		