Assessment of professionalism among pharmacy students: A pilot study exploring professionalism tenets and associated factors

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[6] Academic Quality Department, QU Health, Qatar University, Doha, Qatar

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Abstract

Background: Enhancing student pharmacist professionalism has gained much attention in pharmacy education. This study aimed to assess the professionalism of professional year students in a private pharmacy school in Lebanon and identify significant factors. **Methods:** This descriptive cross-sectional study was conducted using the validated pharmacy professionalism instrument (PPI) applied to students of the three professional years of pharmacy study. A stratification by professional year was performed to compare groups and subgroups and identify significant associations. **Results:** The students reported a high overall professionalism score (78.65±10.36) and good scores for the six tenets of professionalism, including excellence (21.79±3.18), respect (17.47±2.66), altruism (12.74±2.00), duty (9.32±1.38), accountability (8.62±1.55), and integrity (8.89±1.51). There was no significant improvement in overall professionalism and tenets scores across the professional years, nor was there a significant change in demographics. However, working on a part-time basis was significantly associated with lower overall professionalism (beta=-2.674), respect (beta=-0.553), altruism (beta=0.523), duty (beta=-0.295), and accountability scores (beta=-0.316). **Conclusion:** The study revealed high overall baseline professionalism and tenets scores among all students with no significant improvements from one year to the other. Further studies that follow cohorts of students up across the curriculum are necessary for individual comparisons.

Introduction

Pharmacist-patient dynamics have transformed worldwide due to various pharmacy practices and technological advancements (Mossialos *et al.,* 2015). Nowadays, pharmacists are directly interacting with patients rather than staying behind the counter (Ayele *et al.,* 2018). Their role as healthcare providers has extended to active patient-centred care (Stergachis, 2006; Torrance, 2014). This considerable shift in responsibilities has led regulatory bodies to emphasise the importance of promoting and applying the highest possible level of professional competence (Hill, 2000; Wilson, Tordoff & Beckett, 2010). Hence, pharmacists must gain knowledge and skills during their studies and following graduation to attain their professional

competencies and demonstrate their abilities to successfully and efficiently apply the professional attitudes and behaviours necessary to deliver quality pharmaceutical care (Hammer *et al.,* 2003; Holt *et al.,* 2009).

The definition and assessment of professionalism in pharmacy have been widely debated. In 2000, the American Pharmaceutical Association-Academy of Students of Pharmacy (APhA-ASP) and the American Association of Colleges of Pharmacy (AACP) issued a white paper on Pharmacy Professionalism (Hill, 2000). This paper outlined the essential domains that professional pharmacists should demonstrate in their practice (Hill, 2000). Professionalism can be defined as the active demonstration of the merits of a profession that focuses on displaying values, beliefs, and attitudes that place the needs of patients above the personal interests of practitioners (Hill, 2000; Hammer, 2006; Holt *et al.,* 2009). The International Pharmaceutical Federation (FIP) has defined the professionalism of pharmacists as "complying with the quality of behaviours and the respect guided by attitudes and moral values, with an additional commitment to achieve what is expected of the practitioners that uphold the public trust of the profession" (FIP, 2014).

Pharmacy schools were called to define professionalism and measure its development among students (Jungnickel *et al.,* 2009). Moreover, the Accreditation Council for Pharmacy Education (ACPE) designated professionalism as essential to the practice of pharmacy and required outcome data outlining student achievement of professionalism (ACPE, 2016). Several tools have been developed to measure professionalism among pharmacy students, including the Behavioral Professionalism Assessment Instrument (BPAI) (Hammer *et al.,* 2000), Pharmacy Professionalism Instrument (PPI) (Chisholm *et al.,* 2006), Lerkiatbundit's Instrument (Lerkiatbundit, 2011), and Professionalism Assessment Tool (PAT) (Kelley *et al.,* 2011). While BPAI and PAT measure professional behaviours among students, Lerkiatbundit's Instrument and PPI measure professionalism attitudes.

The PPI adapted the six tenets of professionalism defined by the American Board of Internal Medicine to measure professionalism in pharmacy students and graduates (Chisholm *et al.,* 2006). These six tenets include altruism (prioritising the welfare of patients above self-interest), accountability (being responsible for responding to patients, society, and the health profession), excellence in performance, the duty of care (assuring the safety of the patient), honour and integrity (being fair and honest and reflecting credibility in performance), and respect for others (patients, their families, peers at work, and other healthcare professionals).

Numerous factors may affect the professionalism of pharmacy students, such as age (Eukel *et al.,* 2018) and the number of organisations students are engaged with (Fusco, Prescott & Prescott, 2015). Other factors, including gender, the year of study, and employment status, arguably influence the development of professionalism among pharmacy students (Eukel *et al.,* 2018). Preceptors can also have a role-model effect on students' attainment and refinement of professional attributions (Schafheutle *et al.,* 2012). Whether curricular or extracurricular, the type and duration of professionalism activities in which students participate can influence the development of professional behaviours and attitudes (Schafheutle *et al.,* 2012; O'Sullivan & Sy, 2017; Huang *et al.,* 2022).

The School of Pharmacy (SOP) at the Lebanese International University (LIU) aims to educate and train students to become distinguished professionals in pharmacy practice, research, and community services (Akel *et al.,* 2020). Professionalism is one of the domains of the programme learning outcomes at LIU-SOP (Younes *et al.,* 2022). In 2018, a task force at SOP updated the programme and integrated the domain of professionalism into the curriculum. It introduced professionalism-related learning outcomes in several didactic, simulation, and experiential courses. Additionally, the concept of professionalism was introduced in the extracurricular activities and through the involvement in professional student organisations like the Lebanese Pharmacy Students Association (LPSA). LIU's Bachelor of Pharmacy (BPharm) programme is fully compliant with ACPE standards and quality criteria and is currently the only ACPE certified programme in Lebanon as of August 2020. During their first evaluation visit to the school in 2020, the ACPE evaluation team encouraged the school to purposefully assess how students are transitioned within the programme, with a focus on fostering their personal and professional development. This suggestion was considered a considered a valuable addition to the existing set of professional competencies.

Given the emphasis on student professionalism, tracking the development of pharmacy students in this area at LIU-SOP is an essential assessment objective, and following pharmacy student cohorts from the first professional year through graduation is critical to determining how professionalism develops over the years of study. Therefore, it is necessary to evaluate the baseline professional level of students and its evolution across the academic year. As such, this study aimed to assess the professionalism of professional year pharmacy students using the PPI, targeting the overall

professionalism scale and its subscales specific to each of the six tenets, and explore contributing factors that may have significance on professionalism.

Methods

Study design and setting

This descriptive observational cross-sectional study was conducted during the summer term of the academic year 2021-2022 at the LIU-SOP. A total of 471 students were approached with the PPI survey (197 students from the first professional year, 201 from the second professional year, and 73 from the third professional year). The number of participating students from each academic year reflects the distribution of students enrolled within the pharmacy programme across the academic years. These numbers included students of the professional years enrolled in the two main campuses where the School operates, the Beqaa Campus and Beirut Campus.

Ethics approval

As part of its assessment activities across the programme, the Assessment Committee of SOP prepared and agreed on the research proposal, which was then approved by the Research Committee of SOP at LIU (2022RC-042-LIUSOP).

Study population and recruitment

The PPI was created on Google Forms and uploaded on the Google Classroom platform for courses students are registered in. This approach ensured that the survey reached all registered students. Students were invited to voluntarily participate in this survey and were assured that their responses would be used for assessment and research purposes only, implying that the collected data would not affect their grades or evaluation in any way. Completing and submitting the survey was taken as consent by the student to participate in the study.

Data collection and measures

The data collection sheet was established based on the validated and standardised PPI. The questionnaire was self-reported and administered in English. It retrieved data on student demographics (age, gender, campus, year of study, and occupation) and the six tenets of professionalism developed by Chisholm and colleagues (Chisholm *et al.,* 2006).

The PPI consists of 18 items scored on a Likert-type scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree). In addition to the overall professionalism scale with the highest possible score of 90, the following subscales were also considered: excellence (5 items; maximum score: 25), respect for others (4 items; maximum score=20), altruism (3 items; maximum score: 15), duty (2 items; maximum score: 10), accountability (2 items; maximum score: 10), and honour/integrity (2 items; maximum score: 10). Scores for the overall professionalism and subscales were calculated by summing the item scores of the respective scales. Higher scores indicated a higher level of professionalism.

Statistical analysis

Data were analysed using the IBM Statistical Package for Social Sciences (IBM SPSS) version 26.0. The baseline characteristics of the students were evaluated by descriptive statistics. Continuous variables were reported by their means (standard deviation), and categorical variables were reported by their frequencies and percentages. The reliability of the standardised professionalism instrument (PPI scale) was assessed using Cronbach alpha. For bivariate analysis, the student t-test and ANOVA were used to compare the means of the total PPI scale and subscales between the subgroups. Post hoc analysis was done to identify the difference between groups.

A stratification analysis by professional year was done to compare the professionalism scores of students enrolled in various academic years. Five linear regressions were performed, taking the total PPI score and the different subscales as the dependent variables in the whole sample, and two linear regressions were done in the stratified groups. Overall, the statistical significance was set at a p-value<0.05, but when a value of p between 0.05 and 0.1 was included, it was considered a hypothesis generation argument related to the lack of power of some analyses (Dahiru, 2008).

Results

Sample characteristics

The response rate to the PPI was 88% (92.8% for the first professional year, 88.6% for the second professional year, and 70% for the third professional year). In this sample of 402 pharmacy students who were predominantly females, the mean age was 22.98 (3.06) years. The majority were studying at the Beirut Campus and were not employed. Of note, LIU-SOP has a majority of female students. In addition, enrolment rates in the first and second professional years were similar (41.6% vs 45.4%, respectively) (Table I).

Table I: Demographic characteristics of the sample

Characteristics	N (%)
Gender	
Male	103 (26.3%)
Female	289 (73.7%)
Year of study	
1st professional year	183 (41.6%)
2nd professional year	178 (45.4%)
3rd professional year	51 (13%)
Campus location	
Beirut	303 (77.3%)
Beqaa	89 (22.7%)
Work status	
Not working	231 (58.9%)
Part-time job	114 (29.1%)
Full-time job	47 (12%)
	Mean (SD)
Age (years)	22.98 (3.06)

Scales description

Table II presents the PPI total scale and the excellence, respect, altruism, duty, accountability, and integrity subscales. Concerning reliability, Cronbach's alpha was calculated for the total scale and subscales, and it showed high overall reliability (Table II).

Bivariate analysis in the whole sample

No significant difference was shown between the various subgroups in the total PPI scale (Appendix A). When taking each subscale alone, the means for the accountability and integrity subscales were significantly higher in students who were not employed versus those who worked part-time or full-time. No significant differences were seen between the different subgroups for the other subscales (Table III).

Table II: Description of the scales

Scale	Mean (SD)	Median	Range	Chronbach alpha
PPI Total	78.65 (10.36)	81.00	18 - 90	0.934
Excellence subscale	21.79 (3.18)	22.00	5 - 25	0.822
Respect subscale	17.47 (2.66)	18.00	4 – 20	0.865
Altruism subscale	12.74 (2.00)	13.00	3 - 15	0.641
Duty subscale	9.32 (1.38)	10.00	2 - 10	0.739
Accountability subscale	8.62 (1.55)	9.00	2 - 10	0.700
Integrity subscale	8.89 (1.51)	10.00	2 - 10	0.571

Table III: Bivariate analysis comparing the subscales in the whole sample

Variable	Excellence subscale Mean (SD)	Respect subscale Mean (SD)	Altruism subscale Mean (SD)	Duty subscale Mean (SD)	Accountability subscale Mean (SD)	Integrity subscale Mean (SD)
Gender						
Male	21.86 (3.12)	17.25 (2.58)	12.76 (1.75)	9.11 (1.26)	8.65 (1.53)	8.88 (1.60)
Female	21.76 (3.21)	17.56 (2.69)	12.74 (2.09)	9.14 (1.43)	8.61 (1.56)	8.89 (1.48)
p- value	0.783	0.315	0.924	0.815	0.815	0.959
Year of study						
1st professional year	21.72 (2.92)	17.40 (2.51)	12.74 (1.89)	9.15 (1.30)	8.59 (1.53)	8.85 (1.57)
2nd professional year	22.07 (3.01)	17.62 (2.46)	12.83 (1.86)	9.23 (1.25)	8.62 (1.45)	8.98 (1.33)
3rd professional year	21.06 (4.31)	17.20 (3.63)	12.45 (2.72)	8.75 (1.95)	8.71 (1.93)	8.73 (1.87)
p- value	0.127	0.536	0.501	0.086	0.895	0.514
Campus location						
Beirut	21.88 (3.37)	17.55 (2.80)	12.76 (2.05)	9.13 (1.45)	8.60 (1.62)	8.86 (1.57)
Beqaa	21.49 (2.43)	17.22 (2.08)	12.69 (1.85)	9.16 (1.14)	8.69 (1.28)	8.89 (1.31)
p- value	0.236	0.238	0.796	0.828	0.608	0.442
Work status						
Not working	21.93 (2.68)	17.66 (2.31)	12.88 (1.87)	9.21 (1.15)	8.67 (1.40)	9.06 (1.29)
Part-time job	21.47 (3.95)	17.11 (3.33)	12.36 (2.33)	8.88 (1.86)	8.35 (1.93)	8.57 (1.79)
Full-time job	21.87 (3.37)	17.47 (2.34)	12.98 (1.66)	9.36 (0.99)	8.04 (1.04)	8.83 (1.66)
p- value	0.448	0.192	0.051	0.051	0.028*	0.017*
	R	R	r	r	R	r
Age (years)	0.017	0.020	0.011	-0.071	0.046	0.032
p- value	0.743	0.668	0.825	0.163	0.361	0.526

*Significant results

Bivariate analysis for students of the first professional year

No significant differences were shown between the different subgroups in the total PPI scale (Appendix B). When taking each subscale alone, the means of the integrity subscale were significantly higher in students who were not employed versus those working part-time or full-time. No significant differences were seen between the different subgroups for the other subscales (Table IV).

Table IV: Bivariate analysis comparing the subscales in students of the first professional year

Variable	Excellence subscale Mean (SD)	Respect subscale Mean (SD)	Altruism subscale Mean (SD)	Duty subscale Mean (SD)	Accountability subscale Mean (SD)	Integrity subscale Mean (SD)
Gender						
Male	21.60 (2.96)	17.06 (2.90)	12.49 (1.76)	9.00 (1.40)	8.40 (1.58)	8.64 (1.86)
Female	21.77 (2.96)	17.53 (2.44)	12.84 (1.95)	9.21 (1.25)	8.66 (1.51)	8.93 (1.44)
p- value	0.732	0.302	0.260	0.381	0.340	0.336
Campus location						
Beirut	21.81 (3.01)	17.37 (2.63)	12.66 (1.90)	9.12 (1.34)	8.56 (1.55)	8.83 (1.61)
Beqaa	21.44 (2.66)	17.49 (2.16)	12.98 (1.89)	9.22 (1.17)	8.68 (1.51)	8.90 (1.48)
p- value	0.455	0.774	0.661	0.681	0.648	0.786
Work status						
Not working	21.71 (3.77)	17.60 (2.14)	12.98 (1.75)	9.22 (1.06)	8.66 (1.38)	9.12 (1.18)
Part-time job	21.61 (2.42)	17.09 (3.10)	12.45 (2.18)	8.96 (1.66)	8.32 (1.85)	8.54 (1.84)
Full time job	22.11 (2.42)	17.39 (2.23)	12.89 (1.57)	9.33 (1.03)	9.06 (0.99)	8.44 (2.15)
p- value	0.818	0.501	0.355	0.409	0.168	0.046*
	r	R	r	r	r	r
Age (years)	0.029	0.005	0.000	-0.072	-0.006	-0.021
p- value	0.716	0.950	0.998	0.364	0.937	0.789

*Significant results

Bivariate analysis for students of the second professional year

No significant difference was shown between the different subgroups in the total PPI scale (Appendix C). When taking each subscale alone, the means of the respect subscale were significantly higher in students who were enroled in the Beirut Campus versus those in Beqaa Campus (Table V). No significant differences were shown between the different subgroups for the other subscales (Table V).

Table V: Bivariate analysis comparing the subscales in students of the second professional year

Variable	Excellence subscale Mean (SD)	Respect subscale Mean (SD)	Altruism subscale Mean (SD)	Duty subscale Mean (SD)	Accountability subscale Mean (SD)	Integrity subscale Mean (SD)
Gender						
Male	22.21 (3.68)	17.38 (2.62)	13.05 (1.65)	9.25 (1.21)	8.78 (1.63)	9.26 (1.07)
Female	22.03 (2.81)	17.69 (2.42)	12.76 (1.92)	9.22 (1.27)	8.58 (1.40)	8.90 (1.39)
p- value	0.783	0.515	0.356	0.881	0.446	0.139
Campus location						
Beirut	22.21 (3.19)	17.82 (2.54)	12.93 (1.90)	9.25 (1.29)	8.62 (1.54)	8.97 (1.38)
Beqaa	21.59 (2.29)	16.95 (2.06)	1.49 (1.72)	9.17 (1.12)	8.63 (1.09)	9.00 (1.18)
p- value	0.167	0.027*	0.186	0.709	0.949	0.894
Work status						
Not working	22.25 (2.48)	17.79 (2.13)	12.89 (1.84)	9.31 (1.04)	8.64 (1.36)	9.09 (1.27)
Part-time job	21.86 (3.47)	17.34 (3.05)	12.66 (2.03)	8.85 (1.75)	8.50 (1.77)	8.70 (1.50)
Full time job	22.07 (3.01)	17.19 (2.97)	12.81 (1.56)	9.37 (1.02)	8.81 (1.11)	8.87 (1.20)
p- value	0.402	0.449	0.783	0.239	0.737	0.244
	r	R	R	r	r	r
Age (years)	0.012	-0.016	0.058	-0.087	0.078	0.079
p- value	0.869	0.829	0.441	0.246	0.303	0.296

*Significant results

Bivariate analysis for students of the third professional year

No significant difference was shown between the different subgroups in the total PPI scale (Appendix D). When taking each subscale alone, no significant differences were seen between the different subgroups (Appendix E).

Linear regression models in the whole sample

Table VI illustrates the linear regression models for checking the differences between groups that were found to be significant in the bivariate analysis. Linear regression 1, taking the PPI total as the dependent variable in the whole sample, showed that being a student working on a part-time basis (Beta=-2.674) was significantly associated with a lower score on the total PPI scale versus a non-working student.

Linear regression 2, taking the respect subscale as the dependent variable in the whole sample, showed that working on a part-time basis (Beta=-0.553) was associated with a lower score on the respect subscale versus not working.

Linear regression 3, taking the altruism subscale as the dependent variable in the whole sample, showed that working on a part-time basis versus not working (Beta=-0.523) was significantly associated with a lower score on the altruism subscale.

Linear regression 4, taking the duty subscale as the dependent variable in the whole sample, showed that working on a part-time (Beta=-0.295) and being in the third professional year (Beta=-0.398) were associated with a lower score on the duty subscale.

Linear regression 5, taking the accountability subscale as the dependent variable in the whole sample, showed that working on a part-time basis versus not working (Beta=-0.316) was significantly associated with a lower score on the accountability subscale.

Table VI: Linear regressions

Linear regression models				
Linear regression 1 taking the PPI total as dependent variable in the whole sample				
Factor	**Unstandardized Beta**	**Standardized Beta**	**95% CI**	*p* **value**
Work status (part-time vs. no work#)	-2.674	-0.117	-4.993; -0.355	0.024*
Variables entered: Work status (part-time vs. no work); Work status (full-time vs. no work)				
Linear regression 2 taking the respect subscale as dependent variable in the whole sample				
Factor	**Unstandardized Beta**	**Standardized Beta**	**95% CI**	*p* **value**
Work status (part-time vs. no work#)	-0.553	-0.095	-1.150; 0.044	0.070
Variables entered: Work status (part-time vs. no work); Work status (full-time vs. no work)				
Linear regression 3 taking the altruism subscale as dependent variable in the whole sample				
Factor	**Unstandardized Beta**	**Standardized Beta**	**95% CI**	*p* **value**
Work status (part-time vs. no work#)	-0.523	-0.119	-0.972; -0.075	0.022*
Variables entered: Work status (part-time vs. no work); Work status (full-time vs. no work)				
Linear regression 4 taking the duty subscale as dependent variable in the whole sample				
Factor	**Unstandardized Beta**	**Standardized Beta**	**95% CI**	*p* **value**
Work status (part-time vs. no work#)	-0.295	-0.097	-0.608; 0.015	0.064
Year of study (3rd vs. 1st professional year #)	-0.398	-0.097	-0.846; 0.050	0.081
Variables entered: Work status (part-time vs. no work); Work status (full-time vs. no work); Year of study (PPE2 vs. PPE1); Year of study (PPE3/4 vs. PPE1); age (years)				
Linear regression 5 taking the accountability subscale as dependent variable in the whole sample				
Factor	**Unstandardized Beta**	**Standardized Beta**	**95% CI**	*p* **value**
Work status (part-time vs. no work#)	-0.316	-0.093	-0.662; -0.032	0.074
Variables entered: Work status (part-time vs. no work); Work status (full-time vs. no work)				
Post Hoc Analysis				
Linear regression 6 taking the respect subscale as dependent variable in the second professional year pharmacy students				
Factor	**Unstandardized Beta**	**Standardized Beta**	**95% CI**	*p* **value**
Beqaa campus vs. Beirut campus#	-0.874	-0.150	-1.731; --0.016	0.046*
Variables entered: Beqaa campus vs. Beirut campus				
Linear regression 7 taking the altruism subscale as dependent variable in the third professional year pharmacy students				
Factor	**Unstandardized Beta**	**Standardized Beta**	**95% CI**	*p* **value**
Work status (part-time vs. no work#)	-1.720	-0.286	-3.492; -0.052	0.057
Variables entered: Work status (part-time vs. no work); Work status (full-time vs. no work)				

#reference value
*significant results

Analysis of the stratified sample

Linear regression 6, taking the respect subscale as the dependent variable in second professional-year pharmacy students, showed that being enroled in Beqaa Campus versus the Beirut Campus (Beta=-0.874) was significantly associated with a lower score on the respect subscale.

Linear regression 7, taking the altruism subscale as the dependent variable in third professional-year pharmacy students, showed that working on a part-time basis versus not working (Beta=-1.720) was associated with a lower score on the altruism subscale.

Discussion

This study evaluated pharmacy students' attitudes towards professionalism, which integrates the knowledge, attitudes, and behaviours required by pharmacists to deliver high-quality pharmaceutical care (Holt *et al.,* 2009). Such an assessment implies addressing gaps in the professional competency domain of the pharmacy programme.

Most respondents in this study were females, reflecting the enrolment at LIU-SOP. For instance, 212 females (78.8 %) and 57 males (21.2%) were enroled during the academic year 2020-2021. Women now make up the majority of practising pharmacists worldwide, as pharmacy has been touted as a female-friendly profession (Janzen *et al.,* 2013). This finding aligns with the majority of pharmacists in Lebanon being females (Hallit *et al.,* 2019). Also, a small percentage of the respondents were from the third professional year, likely because of the timing of the survey administration. At that time, most third professional-year students were completing their final clinical rotations in the spring rather than the summer term during which the study was conducted.

Students reported high mean overall professionalism scores and high mean tenet scores across all three professional years, consistent with other studies done in the United Kingdom and Nigeria, where final-year students perceived themselves as having a high level of professionalism (Hanna, Gillen & Hall, 2017; Okoro, 2019). However, in our study, not only final-year pharmacy students reported high levels of professionalism but also those in their first and second professional years. Understanding the reasons for such findings cannot be concluded from our analysis, despite introducing professional attitudes and the role of the pharmacist early in the curriculum and prior to the professional years while regularly monitoring student and faculty behaviours as part of the routine operating

procedures (Halat *et al.,* 2022; Safwan *et al.,* 2022). Yet, a follow-up of first professional-year students is warranted to examine how the scores of this same cohort may change as students progress in the programme.

To uphold the ideals of the profession, students must achieve competency in core clinical knowledge and skills and develop, maintain, and exhibit professional attitudes and behaviours (Hill, 2000; Wilson, Tordoff & Beckett, 2010; Hammer *et al.,* 2003). They can demonstrate their professionalism by their actions in the classroom, at experiential sites, through volunteerism, and through organisational activities (Hammer *et al.,* 2000). Pharmacy students at LIU are exposed early to the concepts of professionalism during orientation sessions, where newly enroled students are introduced to professionalism and the importance of adopting and demonstrating professional attitudes and behaviours to deliver high-quality patient-centered care. Later, students are provided with various opportunities, including curricular and extracurricular activities, to develop their professionalism.

One of the core domains of the LIU-SOP programme is professionalism. Curricular didactic and experiential courses are provided to students to improve their professional attitudes and behaviours. Such development is influenced by role models such as faculty, preceptors, other students, practice environments, and a clear understanding of institutional expectations (Hammer *et al.,* 2000). At LIU-SOP, students are always encouraged to act with strict ethical conduct to maintain professionalism at the school and eventually as pharmacists. Didactic courses help students acquire the core knowledge and skills of the profession, but cultivating professionalism goes beyond pharmacy curricula (Schafheutle *et al.,* 2013). Hence, professionalism can be best achieved through profession-related activities, such as dispensing sessions, problem-solving activities, presentations, and role plays (Schafheutle *et al.,* 2012). Accordingly, the LIU-SOP curriculum includes some didactic courses, e.g., Pharmacy Practice, History, and Ethics, Professional Communications, Pharmacy Seminar, Introduction to Pharmacy Practice and Simulation, and Pharmacy Dispensing Practice, which mainly aim to develop and refine professional attitudes and behaviours of students. In addition to didactic courses, the curriculum provides students with extensive experiential training, with a minimum of 300 hours for Introductory Pharmacy Practice Experiences in the first two years of the programme and a minimum of 1140 curricular hours for Pharmacy Practice Experiences in the three professional years, resulting in a total of 1440 hours (Akel *et al.,* 2020). In the first and the second

professional years, students rotate in community pharmacies through a series of twelve-week practice experiences, which introduce them to pharmaceutical care practice and help them demonstrate behaviours and values that are consistent with the trust given to the profession by patients, other healthcare providers, and society, and operate as a pharmacist in real-practice settings. During the third professional year, students rotate in clinical settings over fifteen-week rotations within a tertiary hospital. This training helps the students develop their clinical skills in pharmacy practice while enabling them to provide patient care and develop their inter-professional skills to ensure safe and effective drug therapy (Sakr *et al.,* 2022). Pharmacy students are more confident and exhibit more positive attitudes toward professionalism when engaged in real-world experiential training (O'Sullivan & Sy, 2017). LIU-SOP follows a model that introduces experiential education to expose students early on to rich components of pharmacy practices (Hammer, 2006; O'Sullivan & Sy, 2017). A study in Taiwan that aimed to measure changes in perceptions of and attitudes towards professionalism among third-year pharmacy students following an introductory-intermediate experiential learning course revealed a significant improvement in three tenets of professionalism, i.e., altruism, accountability, and duty, after completing a 5-week experiential course (Huang *et al.,* 2022). Such results emphasise the importance of early exposure of pharmacy students to experiential practices to improve their professional attributes.

In addition to didactic courses, extracurricular activities can help students achieve and improve their professional attitudes and behaviours. Students in their professional years are prompted to be involved in internal, local, and international pharmacy organisations. Many pharmacy students have joined several committees at LIU-SOP, such as the curricular, extracurricular, assessment, and research committees, along with active participation with the LIU pharmacy students' clubs, LPSA, the International Pharmaceutical Students Federation (IPSF), and other organisations. Such engagements can help students contribute positively to the profession, provide networking opportunities, and offer valuable student programming (Fusco, Prescott & Prescott, 2015). In addition, LIU students participate in national and international conferences where they attend events, present research, engage in committee services, or assume other volunteer roles. This approach can aid their professional development and the pursuit of a life-long learning process (Chadha, Charrois & Hall, 2022). The webinars and seminars provided throughout the academic year are a valuable contribution to learning for students, especially in areas of clinical skills, clinical

decision-making, and patient-centred care (Sutton *et al.,* 2010). Students should prepare, engage, and share in various health campaigns that raise health awareness at community pharmacies, hospitals, or malls, along with blood donation campaigns and fund-raising events for orphaned children, cancer patients, or the elderly. Such events allow students to interact with patients, demonstrating empathy, compassion, integrity, and respect for patient privacy. These professional traits are vital in providing optimal patient care in healthcare environments (Hammer, 2006). Furthermore, an annual Pharmacy Day, a big, theme-based health event, is held at LIU-SOP, where pharmacy students realise educational, competitive, and joyful activities. All LIU pharmacy students, administrators, faculty, preceptors, and representatives of the Lebanese Order of Pharmacists, Ministry of Public Health, and other universities are invited to join this celebration. Such an event has an immense impact on the development of professional attitudes of students through nurturing enthusiasm, personal initiative, and commitment to the profession. These extracurricular activities enable pharmacy students to create within the school a culture that fosters the development of professionalism and ultimately benefits the patients and societies they serve, thereby explaining the high professionalism scores obtained in this preliminary analysis.

This study revealed no significant differences in overall professionalism and tenets scores across the three professional years. This lack of significant differences between the groups may be due to the high PPI scores of first-year students, thus producing a ceiling effect, where a slight, non-significant increase in the overall professionalism scale was seen from the first to the second professional year. There was also a slight insignificant decrease in the overall professionalism score from the second to the third professional year, which could be attributed to the small sample size of students from the third professional year. Similar to our results, a study compared first-professional-year pharmacy students with recent graduates and found no differences in professionalism between these two cohorts (Chisholm *et al.,* 2006), while other studies showed an improvement in professionalism scores across the years. One study revealed statistically significant longitudinal increases in all five domains of professionalism (i.e., reliability, responsibility and accountability, lifelong learning and adaptability, and citizenship and professional engagement) of the Professionalism Assessment Tool (PAT) as students progressed from baseline first professional year to the end of the third professional year (Eukel *et al.,* 2018). Such differences can be explained by the higher baseline professionalism score at LIU-SOP due to the

various curricular and extracurricular activities provided and the use of PPI instead of PAT to assess professionalism. The results of a multi-institutional evaluation of the PAT indicated a moderated ceiling effect, which is essential for measuring professionalism development over time (Kelley *et al.,* 2011). Another study that used the PPI to assess professionalism noted significant differences in professionalism scores between students of the first and fourth professional years and for altruism, accountability, and honour/integrity scores (Poirier & Gupchup, 2010). However, no significant differences were noted between the scores of students in the first and second professional years (Poirier & Gupchup, 2010). Such results can be attributed to the involvement of students in the fourth professional year (Doctor of Pharmacy; PharmD), who could have developed additional attributes of professionalism during their PharmD education.

Except for the employment status, our study revealed no significant changes in the overall professionalism score regarding age, gender, year of study, or campus, consistent with previous findings showing that most demographic categories (sex, employment in a pharmacy, and the number of other degrees held) of respondents did not affect self-assessment results (Eukel *et al.,* 2018). Such results were expected since all students were involved in various curricular and extra-curricular professional activities, regardless of their demographic characteristics. Regarding employment status, our study showed higher accountability and integrity among unemployed students in the entire sample and higher integrity among unemployed first-professional-year students. Also, linear regression analysis demonstrated a significant association between working on a part-time basis and lower total PPI, respect, altruism, duty, and accountability scores. This discrepancy could be attributed to the higher burden and poor time management among employed students. Indeed, unemployed students have more time and make better efforts to respond to patients, other health professionals, and society and perform more conscientiously in their experiential training. This finding could also be explained by the non-optimal work conditions that pharmacists are passing through in Lebanon following the COVID-19 pandemic, the stifling financial crisis, and drug shortages (Alameddine, Bou-Karroum & Hijazi, 2022). In addition, our results demonstrated higher respect scores among second-professional-year students from Beirut Campus and a significant association between being a second-professional-year pharmacy student at the Beqaa Campus and lower respect scores. The reasons for these results could not be directly inferred from this study nor our knowledge about the culture in both

areas. Pharmacy students should consistently demonstrate respect for others, whether they are patients, peers, faculty, preceptors, or other healthcare providers. This gap should be addressed to emphasise the importance of displaying respect in pharmacy practice among second-year pharmacy students and normalise this practice across both campuses.

Limitations

Although this study compared professionalism scores of pharmacy students across the three professional years, cohorts of students were have not followed across the curriculum to allow for longitudinal comparison at the individual level. Furthermore, the authors acknowledge that some worthwile variables that would have impacted the results were not included, e.g., the socioeconomic status and academic achievement. Also, the study reports the views of professional year students from one pharmacy school. Therefore, the findings are specific to this institution and cannot be generalised to other pharmacy schools with different professionalism and ethics syllabi and teaching methods. Moreover, the score of the professionalism scale may have been exaggerated due to the self-reported nature of the scale and the bias students may have expressed upon answering it.

Conclusion

This study revealed high overall professionalism and tenets scores among all pharmacy students across the three professional years, providing evidence that the curricular and co-curricular activities at the School of Pharmacy helped develop professionalism among students. No significant increases in professionalism scales were revealed from one year to the other, as high professionalism scores of first-professional-year students created a ceiling effect for any further improvement to be detected in the following academic years. Demographic characteristics did not affect the results except for part-time work, which was significantly associated with lower total professionalism and subscale scores. Overall, the results reflect a noticeable involvement of professionalism activities and engagement of students with such activities at LIU School of Pharmacy for all professional year students. Further studies that follow cohorts of students across the curriculum, from entry to professional years, are necessary for individual comparisons. Despite providing several possible explanations for the results in this study, it would be beneficial in the future to compare whether professionalism data vary according to other factors

such as the type, timing, and duration of the implemented professional activities, student academic performance or having a previous degree, and preceptor experience. These comparisons were not possible in this study because related data were not collected in the questionnaire. In addition, controlling for the effect of demographic characteristics and various factors that affect professionalism scores might allow the attribution of these changes more specifically to components of a curriculum.

Acknowledgements

Conflict of interest

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Appendices

Appendix A: Bivariate analysis taking the total PPI scale in the whole sample

Variable	Mean (SD)	*p*-value
Gender		
Male	78.51 (8.87)	0.866
Female	78.70 (10.82)	
Year of study		
1st professional year	78.44 (9.50)	0.308
2nd professional year	79.35 (9.29)	
3rd professional year	76.88 (15.33)	
Campus location		
Beirut	78.77 (10.99)	0.618
Beqaa	78.25 (7.84)	
Work status		
Not working	79.41 (8.62)	0.064
Part-time job	76.74 (13.76)	
Full time job	79.55 (7.85)	
	R	***p*-value**
Age (years)	0.015	0.772

Significant results

Appendix B: Bivariate analysis taking the total PPI scale in students of the 1st professional year

Variable	Mean (SD)	*p*-value
Gender		
Male	77.19 (9.41)	0.285
Female	78.95 (9.53)	
Campus location		
Beirut	78.35 (9.84)	0.825
Beqaa	78.71 (8.49)	
Work status		
Not working	79.21 (7.22)	0.358
Part-time job	76.96 (12.62)	
Full time job	79.22 (7.96)	
	R	***p*-value**
Age (years)	-0.004	0.958

Significant results

Appendix C: Bivariate analysis taking the total PPI scale in students of the 2nd professional year

Variable	Mean (SD)	*p*-value
Gender		
Male	79.95 (8.87)	0.639
Female	79.18 (9.43)	
Campus location		
Beirut	79.80 (9.76)	0.171
Beqaa	77.83 (9.22)	
Work status		
Not working	79.98 (8.13)	0.442
Part-time job	78.02 (12.16)	
Full time job	78.31 (8.36)	
	R	***p*-value**
Age (years)	0.023	0.761

Significant results

Appendix D: Bivariate analysis taking the total PPI scale in students of the 3rd professional year

Variable	Mean (SD)	*p*-value
Gender		
Male	78.88 (7.80)	0.411
Female	75.88 (17.98)	
Campus location		
Beirut	76.70 (16.32)	0.722
Beqaa	78.00 (6.93)	
Work status		
Not working	77.33 (14.16)	0.255
Part-time job	71.79 (21.21)	
Full time job	81.53 (7.26)	
	R	***p*-value**
Age (years)	0.097	0.500

Significant results

Appendix E: Bivariate analysis comparing the subscales in students of the 3rd professional year

Variable	Excellence subscale Mean (SD)	Respect subscale Mean (SD)	Altruism subscale Mean (SD)	Duty subscale Mean (SD)	Accountability subscale Mean (SD)	Integrity subscale Mean (SD)
Gender						
Male	21.82 (2.38)	17.47 (2.24)	12.82 (1.91)	9.06 (0.97)	9.00 (1.00)	8.71 (1.75)
Female	20.67 (4.99)	17.05 (4.18)	12.26 (3.05)	8.58 (2.28)	8.56 (2.26)	8.74 (1.94)
***p*-value**	0.375	0.649	0.428	0.308	0.338	0.957
Campus location						
Beirut	21.02 (4.57)	17.18 (3.86)	12.48 (2.79)	8.75 (2.06)	8.66 (2.05)	8.61 (1.96)
Beqaa	21.89 (2.14)	17.29 (1.70)	12.29 (2.36)	8.71 (1.11)	9.00 (1.00)	9.43 (0.98)
***p*-value**	0.807	0.906	0.850	0.947	0.495	0.105
Work status						
Not working	21.16 (4.19)	17.25 (3.57)	12.79 (2.43)	8.67 (1.73)	8.79 (1.69)	8.66 (1.71)
Part-time job	19.71 (5.62)	16.43 (4.95)	11.07 (3.36)	8.28 (2.78)	8.00 (2.72)	8.28 (2.46)
Full time job	22.31 (2.32)	17.92 (1.61)	13.31 (1.97)	9.38 (0.96)	9.31 (1.03)	9.31 (1.32)
***p*-value**	0.296	0.571	0.068	0.336	0.207	0.363
	R	**R**	**R**	**r**	**R**	**r**
Age (years)	0.081	0.194	-0.026	0.073	0.083	0.104
***p*-value**	0.570	0.172	0.855	0.611	0.565	0.467

Significant results