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RESEARCH ARTICLE

A survey exploring perceptions and influences of professional dress in the profession of pharmacy

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Abstract

Background: Limited data exist on pharmacy preceptors' and student pharmacists' perceptions of appropriate attire. This study compared views on professional dress clothing and influencing factors between students and preceptors. **Methods:** An electronic survey was distributed to pharmacy preceptors and P1-P4 students over 14 days, assessing four domains: (1) perceptions of 33 clothing images, (2) influencing factors, (3) demographics, and (4) open-ended comments. Descriptive statistics and Mann-Whitney U tests were used to estimate effect sizes. **Results:** Most preceptors were female, white, and aged 25–44, while most students were female, Asian, and aged 18–24. Employment in pharmacy was more common among P2–P4s (90%) than P1s (73%), with 303 participants completing Part One. While there was general agreement on clothing professionalism among the groups, P1s rated 24 clothing images (15 professional, 9 unprofessional) significantly lower than P2–P4s and preceptors, showing a negative rank-biserial correlation. In Part Two (n=301), students cited family and friends as more influential, while preceptors valued patient/client influence more. P1s were notably influenced by social media (p=.001), and comments highlighted preceptors' impact on student dress for P2-P4s. **Conclusion:** Preceptors and P2-P4s shared similar views on professional dress, while P1s were stricter in their assessments. Participants' views were mainly influenced by people.

Introduction

Professionalism is an ever-evolving aspect of healthcare. Common themes of professionalism include adherence to ethical principles, respectful interactions with patients, teamwork with other healthcare professionals, and reliability and competence in the workplace (Collier, 2012). Professionalism begins before healthcare professionals enter the workplace and is an important educational component in the training of student healthcare professionals. The Accreditation Council for Pharmacy Education (ACPE) Standards 2025 emphasise the importance of professional behaviour in pharmacy education (e.g., 1.5.a Leadership and professionalism, 2.1.l Professionalism (Professional), 2.1.n Professional skills and attitudes, 4.2.a Student information) (ACPE, 2025). In addition, the American Association of Colleges of Pharmacy (AACP) provides professionalism resources for student pharmacists (AACP, n.d.).

One aspect of professionalism that is difficult to standardise is professional dress. Dress code requirements in schools of pharmacy are inconsistent and come with both advantages and disadvantages. Some advantages include improved self-perception, enhanced perception by others, and academic performance benefits. Potential disadvantages include challenges in establishing dress code standards and the risk of focusing more on appearance than on professional behaviour (Naughton, 2016).

Ford and colleagues examined standardised patients' (SPs') perspectives on the qualities and behaviours exhibited by student pharmacists during an objective structured clinical examination (OSCE). One key theme that emerged was professionalism, with students' professional attire being a significant factor in

determining whether the SP would feel comfortable having the student as their provider (Ford, 2021). Frenzel and colleagues' evaluation of Advanced Pharmacy Practice Experience (APPE) preceptors' perceptions of which critical skills entry-level pharmacists should possess cited appropriate dress and hygiene as the most important factors within the professionalism domain (Frenzel, 2015).

Professional attire may impact patients' perspectives on healthcare providers. Petrelli and colleagues surveyed 4,000 patients and found that 53% indicated that physician attire is important to them. Additionally, one-third of patients agreed that professional attire impacted their satisfaction with care (Petrilli, 2018). Professional attire also affects patients' perspectives towards pharmacists. A survey by Knahfar and colleagues found that patients preferred community practice pharmacists to wear a shirt and tie, dress shoes, a white coat, and name tag. In addition, patients did not prefer jeans, casual shoes, or visible body art (Khanfar, 2013). Cretton-Scott and colleagues similarly found that pharmacists in business formal attire and white coats were viewed as more approachable by patients (Cretton-Scott, 2011). Despite the importance of professionalism for students and pharmacists, and the recognition of dress code as a key element of professionalism, a universally accepted dress code remains undefined. At the authors' institution, professional dress is outlined in the student handbook; however, dress code for didactic courses is generally left to the course coordinators. Although examples of professional dress are provided, dress code expectations may vary by didactic course and experiential rotation site.

Understanding student pharmacists' and experiential rotation preceptors' perceptions of professional dress can help inform dress code expectations, guide professionalism-focused education, and ensure clear expectations. The primary objective of this study was to evaluate professional-year student pharmacists' and experiential rotation preceptors' (adjunct and faculty preceptors) perceptions of professional dress in the pharmacy practice setting. Secondary objectives included identifying factors that influence these perceptions and comparing findings between student pharmacists and preceptors.

Methods

Study design

This was a survey-based study design using Qualtrics XM® (Qualtrics LLC, Provo, UT), an online survey platform. The research was approved by the authors' institutional review board on April 1, 2024 (Study ID: Pro2024000642). The study was conducted over a 14-day period in April 2024. One additional email reminder was sent on day seven to preceptors and fourth professional (P4) year students. An in-class reminder was made to first through third professional (P1-P3) year students during the second week of the collection period in their skills laboratory class time. No incentives were provided for completing the survey. The survey had settings that prevented multiple submissions of participants by redirecting them to a website stating end of survey.

Sample

Introductory Pharmacy Practice Experience (IPPE) and APPE preceptors, and P1-P4's were emailed a link to an anonymous and voluntary electronic survey that assessed their perceptions of and influences on professional dress in the pharmacy practice setting. Email addresses were obtained from the School's Dean's Office and Office of Experiential Education to solicit participation.

Instruments

Professional dress based on a standardised dress policy is a requirement for completion of skills laboratory OSCEs for P1-P3 years. The skills laboratory faculty coordinators also precept P4s on experiential rotations and enforce a similar dress code. Given this experience creating and enforcing a dress code, several skills laboratory faculty members from one institution in the United States created the survey. The survey consisted of four parts with questions collecting: 1) perceptions of specific clothing images [33 images: shoes, pants, tops listed in Table I], 2) eight potential factors influencing their professional dress, 3) demographics, and 4) comments. For Part One, participants were asked to evaluate whether they considered the clothing images professional using a Likert scale from 1 to 5. Scores of 1 or 2 were considered unprofessional, 3 was neutral, and 4 or 5 were professional. These images were selected based on the professional dress codes for the School, skills laboratories, and experiential rotations. For Part Two, participants were instructed to rate the various factors using a Likert scale from 1 to 5, where 1 was not at all influential and 5 was extremely influential. The survey questionnaire was not formally validated; however, it was reviewed by several of the investigators and their P4 rotation students to check for question clarity, survey logic, and time required for completion.

Table I: Description of clothing images from survey

Image number	Description	Image number	Description
Shoes		**Tops**	
1*	Black slip-on shoe with white rubber sole	21*	Pink high neck sleeveless blouse
2*	Tan backless flat	22*	Beige untucked sweater with white undershirt
3*	Black leather platform boots	23*	Black sleeveless V-neck tank top
4*	White/tan lace up tennis shoe	24*	White long-sleeve shirt dress with black leggings
5*	Black slip-on shoe with black sole	25	Royal blue short sleeve polo shirt
6*	Black or white open toe high heel	26	Gray long-sleeve V-neck sweater with untucked white shirt
7*	Tan sheepskin boot	27	Black long sleeve tucked in V-neck bouse
8*	Brown work boot	28	Pink short sleeve high neck tucked in blouse
9*	Tan moccasin slipper	29	Blue long-sleeve button down with belt
10*	Black lace-up running shoe with black sole	**Bottoms**	
11	Black leather platform penny loafer	30	Black knee length pencil skirt
12	Black flat leather penny loafer with brown heel	31	Black sleeveless maxi dress
13	Black leather closed toe high heel pump	32	Khaki long pants with belt
14	Black leather heeled bootie	33*	Black knee length shorts
15	Black leather closed toe block heel pump		
16	Brown tie sneaker with white rubber sole		
17	Black closed toe leather flats		
18	Black leather lace up dress shoe		
19*	White classic clogs with heel strap		
20	Brown leather chukka boot		

*The following images were deemed unacceptable as professional dress attire per the institution's course policies.

Data analysis

The data were analysed among three groups: preceptors vs. P1s vs. P2-P4s. The decision to group P2-P4s together was due to the curriculum design at the investigators' school. The P1s are entering pharmacy school as a transitional period with no experiential education experiences and no formal training for professional dress, while the P2-P4s have repeated exposure through IPPE/APPEs as well as within their lab curriculum. Professional dress is expected for all OSCEs and is taught throughout the years by the skills laboratory faculty. The investigators of this study are skills laboratory faculty and felt this was reason enough to group P2-P4s as one cohort due to the repeated exposure to professional dress. Descriptive analyses were used to evaluate the quantitative survey responses in the baseline demographics portion. Mann-Whitney U tests were used to assess the Likert scales associated with Parts One and Two of the survey. For Part One, Cronbach's alpha was utilised to determine internal consistency for all clothing images. For images deemed unacceptable by instructors, the Likert scale was reverse scored to align all the questions in their scoring values. A score of 0.7 was used as the reliability threshold. In addition, rank-biserial correlation was used to determine effect sizes between the groups. A descriptive analysis was performed for the optional response comments section of the survey. The primary investigator reviewed the data in search of patterns and meaningful comments, while secondary investigators agreed upon the findings. Responses from preceptors and student pharmacists who consented to participate were included and kept confidential. Since participants were allowed to skip questions, all complete and incomplete survey responses were retained.

Results

Baseline demographics

One-thousand six hundred and fifty-two preceptors, 188 P1s, and 576 P2-P4s were emailed the survey, with 143 (8.7%) of preceptors, 66 (35.1%) of P1s, and 97 (16.8%) of P2-P4s completing the survey, which can be shown in Figure 1. All questions were optional, so the responses vary per part of the survey. A full

analysis of all data, including separated data from P2-P4 classes, can be found in Appendix A. A total of 306 participants completed the baseline demographics portion, which is shown in Table II. The majority of the preceptors identified as female (67.1%), white/Caucasian (55.2%), between the ages of 25-44 years old (65%), and practising as an adjunct preceptor in a hospital (clinical, 36.4%) or community setting (25.9%). The P1 and P2-P4s were similar, with most identifying as female (60.6% vs. 66%), Asian (63.6% vs. 59.8%), between the ages of 18-24 years old (98.5% vs. 90.7%), with an interest in pharmaceutical industry fellowships (51.5% vs. 49.5%). However, more P2-P4s (89.7%) reported pharmacy-related employment compared to the P1s (72.7%).

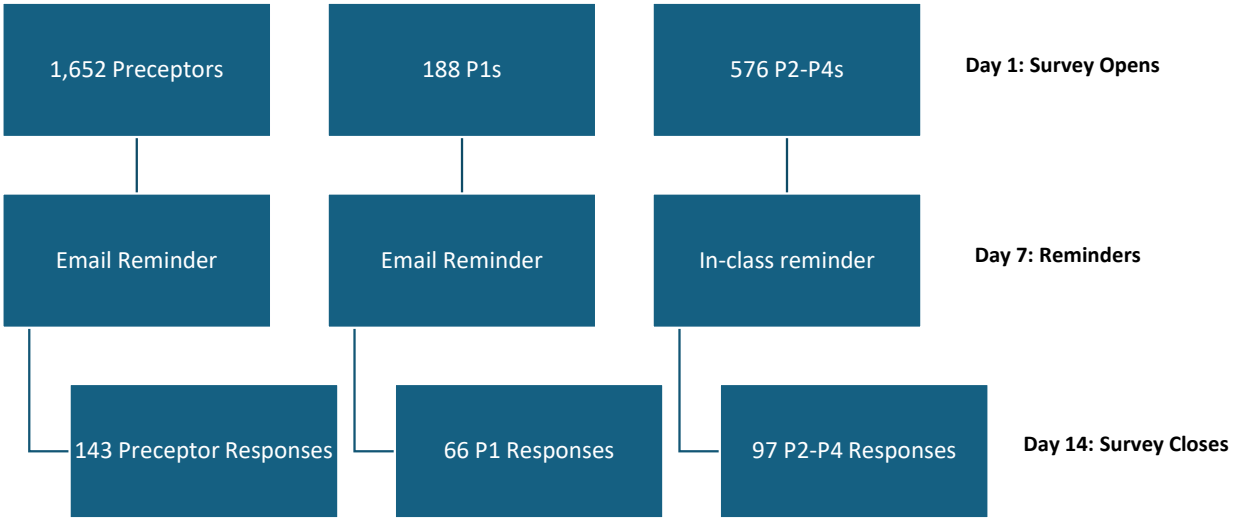

Figure 1: Distribution of survey and response rate from participants

Table II: Baseline demographics of pharmacy preceptors and student pharmacists

Demographic	Preceptors Number (%) [n=143]	P1s Number (%) [n=66]	P2-P4s Number (%) [n=97]
Gender identity			
Male	45 (31.5)	24 (36.4)	29 (29.9)
Female	96 (67.1)	40 (60.6)	64 (66)
Nonbinary	--	1 (1.5)	--
Prefer not to answer	2 (1.4)	1 (1.5)	2 (2.1)
Unknown*	--	--	2 (2.1)
Age			
18-24 years old	6 (4.2)	65 (98.5)	88 (90.7)
25-44 years old	93 (65)	1 (1.5)	7 (7.2)
45-64 years old	35 (24.5)	--	--
65 years and older	8 (5.6)	--	--
Unknown*	1 (0.7)	--	2 (2.1)
Primary racial identification			
American Indian	1 (0.7)	--	--
Asian	41 (28.7)	42 (63.6)	58 (59.8)
Black/African American	5 (3.5)	--	1 (1)
Hispanic/Latino	6 (4.2)	3 (4.5)	3 (3.1)
White/Caucasian	79 (55.2)	14 (21.2)	22 (22.7)
Other	3 (2.1)	4 (6.1)	7 (7.2)
Prefer not to answer	5 (3.5)	3 (4.5)	4 (4.1)

Demographic	Preceptors Number (%) [n=143]	P1s Number (%) [n=66]	P2-P4s Number (%) [n=97]
Unknown*	3 (2.1)	--	2 (2.1)
Area primarily precept/student plan post grad			
Academia	3 (2.1)	4 (6.1)	--
Ambulatory care	5 (3.5)	--	2 (2.1)
Community	37 (25.9)	1 (1.5)	2 (2.1)
Consulting	--	--	1 (1)
Hospital (clinical)	52 (36.4)	18 (27.3)	28 (28.9)
Hospital (staff)	13 (9.1)	4 (6.1)	4 (4.1)
Industry	15 (10.5)	34 (51.5)	48 (49.5)
Managed care	--	--	2 (2.1)
Medical writing	2 (1.4)	--	--
Pharmacy administration	9 (6.3)	--	1 (1)
Other	7 (4.9)	4 (6.1)	6 (6.2)
Unknown	--	1 (1.5)	3 (3.1)
Precepting role			
Adjunct preceptor	93 (65)		
Faculty preceptor	23 (16.1)		
Post-doctoral fellow or resident	25 (17.5)		
Unknown*	2 (1.4)		
Student employment in pharmacy related job		**48 (72.7)**	**87 (89.7)**
Community		31 (64.6)	46 (52.9)
Consulting		-	1 (1.1)
Hospital		7 (14.6)	20 (23)
Industry		1 (2.1)	16 (18.4)
Other		8 (16.7)	3 (3.4)
Unknown*		1 (2.1)	1 (1.1)

*Questions were optional. Unknown was used to note participants who did not answer that question.

The preceptor and student groups were similar, as about two-thirds in all groups identified as female and about one-third in all groups practised in or reported interest in hospital clinical pharmacy. The groups differed in ethnicity, as the majority of the preceptors identified as white/Caucasian (55.2%), while the majority of the P1s and P2-P4s identified as Asian (63.6% and 59.8%, respectively).

Perceptions of specific clothing images

A total of 303 participants (66 P1s,95 P2-P4s and 142 preceptors,) completed Part One of the survey. The 33-image survey demonstrated acceptable internal consistency, with an overall Cronbach's alpha of 0.7191 as shown in Table III. The evaluation of the 33 images across three groups revealed notable differences in perceptions of professionalism. The comparison of P1s and preceptors is shown in Table IV. A collective agreement of which images were professional was observed in 15 instances (images 11, 12, 13, 14, 15, 17, 18, 20, 21, 26, 27, 28, 29, 30, and 32) and in nine instances (images 3, 4, 7, 8, 9, 19, 23, 31 and 33). Although P1s and preceptors that images 20, 21, 26, 27, 28 and 30 were professional and images 3, 4, 7, 8, 19 and 23 were unprofessional, the data revealed a statistical difference among these. The rank-biserial correlation also reinforces this concept as most of these images have a small (<-0.1) or medium (<-0.3) correlation suggesting that P1s are ranking images as less professional compared to preceptors. In addition, P1s ranked three images as unprofessional, whereas preceptors ranked them as neutral (images 1, 5, and 10 with images 1 and 10 showing statistical significance), one image as unprofessional vs. professional (image 25 showing statistical significance), and four instances as neutral vs. professional (images 2, 16, 22, and 24 with all images being statistically significant). It is important to note that the rank biserial correlation is null to

medium for most of these values. Nonetheless, most of the values are negative, indicating that P1s were stricter than preceptors in their ranking of images as more unprofessional. There was only one instance when P1s were less strict than preceptors, ranking image 6 as professional, while preceptors ranked as neutral. However, the high negative rank biserial correlation (<-0.5) indicates a major difference in ranking here. The comparison of P1s to P2-P4s is shown in Table V. Similar to preceptors, there were 15 instances (images 11, 12, 13, 14, 15, 17, 18, 20, 21, 26, 27, 28, 29, 30, 32) where the groups agreed on professional images and nine instances (images 3, 4, 7, 8, 9, 19, 23, 31, 33) as unprofessional. P1s ranked three images as unprofessional, whereas P2-P4s ranked as neutral (images 1, 5, and 10, all showing statistical significance), one image as unprofessional vs. professional (image 25 showing statistical significance) and four instances as neutral vs. professional (images 2, 16, 22 and 24, all showing statistical significance). It is important to note that for all images, regardless of statistical significance, the rank biserial correlation is medium (<-0.3) or high (<-0.5), suggesting that P1s were much stricter than P2-P4s in rating images as unprofessional.

Table III: Reliability analysis for survey part one using Cronbach's Alpha

Image number	Cronbach Alpha	Threshold ≥ 0.7
Image 1	0.6994	No
Image 2	0.7281	Yes
Image 3	0.7015	Yes
Image 4	0.6978	No
Image 5	0.7035	Yes
Image 6	0.7413	Yes
Image 7	0.6957	No
Image 8	0.6982	No
Image 9	0.6955	No
Image 10	0.7055	Yes
Image 11	0.717	Yes
Image 12	0.7066	Yes
Image 13	0.7045	Yes
Image 14	0.7204	Yes
Image 15	0.7045	Yes
Image 16	0.7336	Yes
Image 17	0.707	Yes
Image 18	0.7036	Yes
Image 19	0.6978	No
Image 20	0.7055	Yes
Image 21	0.7398	Yes
Image 22	0.7155	Yes
Image 23	0.7045	Yes
Image 24	0.7245	Yes
Image 25	0.7449	Yes
Image 26	0.7209	Yes
Image 27	0.7088	Yes
Image 28	0.7081	Yes
Image 29	0.7068	Yes
Image 30	0.7031	Yes
Image 31	0.7456	Yes
Image 32	0.7075	Yes
Image 33	0.7097	Yes

Table IV: Survey part one – Rating of clothing images based on perceptions of professionalism between P1s and preceptors

Image number	P1s [n=66]	Preceptors [n=142]	Mann-Whitney U	Rank-Biserial correlation	*p*-value*
Image 1	Unprofessional	Neutral	5144.5	-0.155	<0.001
Image 2	Neutral	Professional	5704.5	-0.290	0.012
Image 3	Unprofessional	Unprofessional	5475.5	-0.238	0.001
Image 4	Unprofessional	Unprofessional	5317.5	-0.212	0.001
Image 5	Unprofessional	Neutral	6447.0	-0.458	0.62
Image 6	Professional	Neutral	7448.5	-0.710	0.018
Image 7	Unprofessional	Unprofessional	5798.0	-0.311	0.013
Image 8	Unprofessional	Unprofessional	5534.5	-0.252	0.002
Image 9	Unprofessional	Unprofessional	6071.5	-0.373	0.097
Image 10	Unprofessional	Neutral	4700.0	-0.055	<0.001
Image 11	Professional	Professional	6672.0	-0.498	0.987

Image number	P1s [n=66]	Preceptors [n=142]	Mann-Whitney U	Rank-Biserial correlation	*p*-value*
Image 12	Professional	Professional	6843.5	-0.548	0.535
Image 13	Professional	Professional	7173.5	-0.622	0.127
Image 14	Professional	Professional	6015.5	-0.381	0.18
Image 15	Professional	Professional	6160.0	-0.414	0.322
Image 16	Neutral	Professional	5012.0	-0.151	<0.001
Image 17	Professional	Professional	6166.5	-0.416	0.315
Image 18	Professional	Professional	6192.0	-0.433	0.505
Image 19	Unprofessional	Unprofessional	4885.0	-0.130	<0.001
Image 20	Professional	Professional	5830.0	-0.339	0.039
Image 21	Professional	Professional	5088.5	-0.195	<0.001
Image 22	Neutral	Professional	4339.5	-0.004	<0.001
Image 23	Unprofessional	Unprofessional	5760.5	-0.323	0.038
Image 24	Neutral	Professional	4937.5	-0.125	<0.001
Image 25	Unprofessional	Professional	4596.0	-0.039	<0.001
Image 26	Professional	Professional	5528.0	-0.250	0.002
Image 27	Professional	Professional	5771.0	-0.315	0.022
Image 28	Professional	Professional	5849.0	-0.333	0.036
Image 29	Professional	Professional	6573.5	-0.476	0.758
Image 30	Professional	Professional	6031.0	-0.354	0.045
Image 31	Unprofessional	Unprofessional	6319.0	-0.418	0.343
Image 32	Professional	Professional	6360.0	-0.428	0.341
Image 33	Unprofessional	Unprofessional	7297.0	-0.638	0.071

Full data can be shown in Table I of the Appendix A. A median score of 1-2 was considered unprofessional, 3 neutral and 4-5 as professional.
**p*-value calculated using Mann-Whitney

Table V: Survey part one – Rating of clothing images based on perceptions of professionalism between P1s and P2-P4s

Image number	P1s [n=66]	P2-P4s [n=95]	Mann-Whitney U	Rank-Biserial Correlation	*p*-value*
Image 1	Unprofessional	Neutral	4501.5	-0.436	0.002
Image 2	Neutral	Professional	4568.0	-0.457	0.005
Image 3	Unprofessional	Unprofessional	4547.5	-0.466	0.005
Image 4	Unprofessional	Unprofessional	4296.0	-0.370	<0.001
Image 5	Unprofessional	Neutral	4650.0	-0.483	0.014
Image 6	Professional	Neutral	5665.5	-0.807	0.259
Image 7	Unprofessional	Unprofessional	4871.5	-0.554	0.055
Image 8	Unprofessional	Unprofessional	4660.5	-0.502	0.013
Image 9	Unprofessional	Unprofessional	4940.0	-0.576	0.111
Image 10	Unprofessional	Neutral	4422.0	-0.411	0.001
Image 11	Professional	Professional	4938.0	-0.575	0.123
Image 12	Professional	Professional	5194.5	-0.657	0.546
Image 13	Professional	Professional	5479.5	-0.748	0.613
Image 14	Professional	Professional	4736.5	-0.534	0.068
Image 15	Professional	Professional	4966.0	-0.608	0.303
Image 16	Neutral	Professional	4490.5	-0.454	0.007

Image number	P1s [n=66]	P2-P4s [n=95]	Mann-Whitney U	Rank-Biserial Correlation	*p*-value*
Image 17	Professional	Professional	5108.0	-0.654	0.624
Image 18	Professional	Professional	4868.0	-0.601	0.275
Image 19	Unprofessional	Unprofessional	4862.0	-0.591	0.121
Image 20	Professional	Professional	4720.0	-0.545	0.05
Image 21	Professional	Professional	4243.0	-0.389	<0.001
Image 22	Neutral	Professional	3944.0	-0.305	<0.001
Image 23	Unprofessional	Unprofessional	5062.5	-0.657	0.596
Image 24	Neutral	Professional	4016.5	-0.329	<0.001
Image 25	Unprofessional	Professional	4232.5	-0.379	<0.001
Image 26	Professional	Professional	4603.5	-0.484	0.006
Image 27	Professional	Professional	4698.0	-0.538	0.044
Image 28	Professional	Professional	4858.5	-0.590	0.167
Image 29	Professional	Professional	5014.0	-0.616	0.157
Image 30	Professional	Professional	5078.5	-0.637	0.339
Image 31	Unprofessional	Unprofessional	5097.0	-0.643	0.432
Image 32	Professional	Professional	4904.0	-0.581	0.08
Image 33	Unprofessional	Unprofessional	5320.5	-0.715	0.977

Full data can be shown in Table I of the Appendix A. A median score of 1-2 was considered unprofessional, 3 neutral and 4-5 as professional.
*p-value calculated using Mann-Whitney

Factors influencing professional dress

A total of 301 participants completed survey Part Two (143 preceptors, 66 P1s, and 92 P2-P4s) as shown in Table VI. Preceptors were less likely to be influenced by family members and friends when compared to P1s ($p < 0.001$ and $p = 0.019$) and P2-P4s ($p = 0.003$ and $p = 0.001$). P1s responded that social media somewhat influenced their perceptions of professional dress, while preceptors responded that it only slightly influenced their perceptions ($p = 0.001$). There was no detectable difference in social media influence between P2-P4s and preceptors ($p = 0.053$). Although all groups ranked patients and clients as very influential towards professionalism, there was a detectable difference in effect with P2-P4s and preceptors ($p = 0.033$). No detectable differences were noted among preceptors, P1s, and P2-P4s for culture, finances, and religion in having influence on perceptions of professional dress.

Table VI: Survey part two – Factors influencing the perception of professional dress

	Preceptor [n=143]	P1s [n=66]	P2-4s [n=92]	*p*-value* P1s vs. Preceptors	*p*-value* Preceptors vs. P2-4s
Coworkers	Very	Very	Very	0.827	0.029
Culture	Very	Very	Very	0.816	0.303
Family members	Slightly	Somewhat	Somewhat	<0.001	0.003
Finances	Somewhat	Somewhat	Somewhat	0.903	0.11
Friends	Slightly	Somewhat	Somewhat	0.019	0.001
Patients/clients	Very	Very	Very	0.254	0.033
Religion	Not at all	Slightly	Not at all	0.321	0.537
Social media	Slightly	Somewhat	Slightly	0.001	0.053

A median score of 1 was considered not at all influential, 2 slightly influential, 3 somewhat influential, 4 very influential, 5 as extremely influential.
*p-value calculated using Mann-Whitney

Participant comments: Descriptive results

Sixty (42%) preceptors, eleven (16.7%) P1s, and seventeen (17.5%) P2-P4s completed the optional comments section. Preceptors frequently noted that 1) comfort and casual wear (scrubs, sneakers, etc.) are more acceptable and 2) professional dress is highly dependent on the workplace setting. For instance, multiple comments noted how pharmacists on their feet all day should wear sneakers for their comfort and support. The P1s' comments were notably split, with half the group detailing how professional dress is "*too strict*" and focuses on images of clothing too much, whereas the other half stated it was important and can promote confidence. The P2-P4s also had two common comments: 1) comfort and casual wear (scrubs, sneakers, etc.) are more acceptable and 2) their preceptors directly influence their choices of professional dress.

Discussion

This study demonstrated noticeable differences in how P1s ranked clothing images compared to preceptors and P2-P4s. While there was much agreement for the majority of the images (15 as professional and nine as unprofessional), there was both statistical significance and a medium to high rank biserial correlation for most of these images, demonstrating that P1s tended to rank images as less professional compared to preceptors and P2-P4s with stronger associations showed against P2-P4s. Comparatively, P2-P4s tended to agree with preceptors in their perceptions of all 33 clothing images. All student groups stated they were more influenced by family and friends in the perceptions of professional dress than preceptors did, while P1s reported being influenced by social media more than preceptors and P2-P4s. P2-P4s also reported in the comments section that their preceptors directly impacted their perception of professional dress. In the optional comment section, preceptors and P2-P4s further noted that more casual and comfortable clothing has been accepted in the workplace.

Most published literature on professional attire pertains to patients' perceptions of their healthcare professionals' dress (Cretton-Scott, 2011; Khanfar, 2013; Petrilli 2018), although a comparative study of medical student and instructor perceptions has been conducted by Bramstedt and colleagues (Bramstedt, 2016). Their research surveyed United States and Australian medical students and their instructors to explore their perceptions about appropriate clinical professional attire. The survey included 30 images of sample attire and 16 questions regarding culture and context of clothing and accessories. (Bramstedt, 2016). This study adds to the literature in other healthcare professions by comparing pharmacy preceptors' and student pharmacists' perceptions of professionalism in attire, as well as the factors influencing these perceptions. There was strong agreement among all three groups in classifying 15 images as professional and nine as unprofessional, indicating shared standards regarding certain aspects of professional dress. Blouses and button-up tops were consistently rated as professional across groups.

Significant differences emerged in certain images, with P1 students rating attire more strictly compared to P2-P4 students and preceptors as demonstrated by their lower rank biserial correlation compared to the other groups. For example, footwear appeared to be the most contentious aspect of professional dress, with P1 students' perceptions differing from other cohorts for six of the nine images that had notable discordance. Certain footwear images, specifically sneakers, can be considered more "*casual or comfortable*." A common finding emerged from the comments of P2-P4s and preceptors reporting that more comfortable, casual clothing choices are being accepted in the pharmacy workplace as professional. In their comments, P2-P4s reported their preceptors directly influenced their perceptions of professional dress, which may contribute to this viewpoint. Furthermore, P1s had less work experience than P2-4s and did not have experience with IPPEs or APPEs which may explain this discordance as well. P1s also had less pharmacy-related employment than P2-P4s. This may also contribute to P1s rating more "*casual*" clothing images as less professional compared to other preceptors and P2-P4s. Interestingly, P1 students were less strict in only one case (image 6 – open-toed heel), suggesting that while they tend to err on the side of conservatism, their ratings are not uniformly fixed. However, their lack of pharmacy-related experience may have influenced this distinction as open-toed shoes are generally not acceptable in all pharmacy practice settings. These findings suggest that student pharmacists early in the programme may have more rigid perceptions of professional dress. As students progress through their training and gain real-world experience, their views on professional attire may increasingly align with and become influenced by their preceptors, who may have a more pragmatic understanding of dress standards in their practice settings.

Differences in the perceived influences on professional dress further underscore the gap between student pharmacists and practicing preceptors. In this survey, all students were more likely to cite family and friends while P1s cited social media as shaping their perceptions, whereas preceptors placed greater

emphasis on patients. Comparatively, Bramstedt and colleagues found that osteopathic medical students' perceptions of professional attire stemmed from family and friend influences, whereas their instructors were more influenced by workplace policies (Bramstedt, 2016). Conversely, students, particularly P1s, may rely more on personal networks and societal trends seen on social media due to limited exposure to professional environments. Interestingly, social media was not considered an influential factor in previous studies that evaluated perceptions of professional attire among other health professional students nearly a decade ago (Bramstedt, 2016). This may suggest a shift toward social media influences on professional attire among today's health professional students. A possible hypothesis for this may be a result of the COVID-19 pandemic, when mainstream social media channels dominated information acquisition and social support (Cellini, 2020; Saud, 2020). However, social media's impact on preceptors and P2-P4 students was considered negligible, suggesting that students' perspectives may shift toward more experience-based frameworks as they progress through the pharmacy programme and gain real-world experience. Future investigation is needed to confirm COVID-19's impact on student perceptions of professional dress.

Observations that P2-P4 students' perceptions of professional dress align more closely with those of preceptors may reflect student pharmacists' professional identity formation (PIF). Professional dress is a key component of both the profession's values and the concept of PIF (American Association of Colleges of Pharmacy, n.d.). In the study by Johnson and colleagues, which evaluated reflective essays to understand the phases of PIF, professional dress was most commonly reflected upon in Phase 3 of Baxter-Magolda's domain. In this phase, students begin to internalise the information they experience, interpret statements from authority figures in the context of their internal identity, and choose how and when to apply traits to their own PIF (Johnson, 2016). Alternatively, professional dress may aid student pharmacists in developing their professional identity. In a study by Sorrell and colleagues, first-year medical students were surveyed on how they perceived physician professional attire impacted their confidence levels, performance, behaviours, and identity as future physicians. Students consistently reported that dressing in professional physician attire increased their confidence, motivation, and sense of responsibility toward patient care. Additionally, they felt more respected by patients and other members of the healthcare community (Sorrell, 2020). These findings may reflect students' transformational process of internalising the profession's values and beliefs, resulting in behaviours, such as dressing professionally, that reinforce their sense of belonging to the pharmacy community. This alignment between the perceptions of P2-P4s and preceptors on many of the images further supports this notion, and P2-P4s cited their preceptors as an influential factor in the majority of their comments. However, future studies are needed to confirm this notion and methods sections of those studies should explicitly be framed to investigate this concept.

There are several limitations to note in this study. The first limitation is the low response rate from all participants. Low preceptor response rates may have been related to perceived time commitments, convenience, and competing priorities with administrative, assessment, and/or teaching responsibilities. Furthermore, the preceptors' email listserv may have contained duplicate emails for preceptors or non-active preceptors. This could have impacted the total number of responses from preceptors and, thus, improved the actual response rate if a more accurate number was obtained. For the low student response rate, the survey was solicited at the end of the academic year when P1-P3 students may have been preoccupied with final examinations and project submissions, while P4 students were completing their final rotations, which could have impacted the students' priority to take the survey. Some students may have blocked incoming messages, or their school emails may have been forwarded to other accounts where the survey emails could have been filtered as spam. The susceptibility of the study announcement emails to such filters was not tested. Despite the low response rate, the authors felt that the participants' response rates for all the groups were similar enough to accurately compare the survey results.

Another limitation which may have also impacted the low response rate was the short study period of 14 days. Utilising a one-month study period, like the Bramstedt study (Bramstedt, 2016), might have enhanced the survey response rate. In addition, although all participants received one reminder, the method of this reminder differed with preceptors and P4s receiving the reminder via email, while P1-P3s received the reminder during class time. As a result, non-response bias and selection bias should be considered as limitations, as response rates and recruitment methods differed across groups, and those with stronger views on dress codes may have been more likely to respond. Another potential reason for the low response rates could be survey fatigue, particularly if potential participants frequently receive research participation requests. Furthermore, more self-identified women than men completed the study

(between 60-68% in each group) but this is representative of the profession of pharmacy as the United States Census Bureau reports more 60-62% of the workforce are women (El-Zein, 2024).

Additionally, this study attempted to assess perceptions of professional attire using images of single articles of clothing. However, isolating the perception of professional attire by evaluating only one part of an individual's outfit may be challenging. Expanding on this limitation, it is also impossible to make broad generalisations about appropriate clinical attire, as the clothing images selected for the survey were based on the investigators' experiences and are therefore institution specific. Professional attire standards may vary across regions within the United States and internationally, where cultural attire may be considered professional for student pharmacists. Lastly, the authors did not assess perceptions of professionalism as it relates to other outward forms of expression, such as body art, tattoos, jewelry, or visible piercings. These factors may also influence students' and preceptors' perceptions of professional appearance.

Despite concordance between student pharmacists' and pharmacy preceptors' perceptions of professional attire for most images, many cases revealed differences between the cohorts. For this reason, it may be beneficial to introduce structured discussions on professional dress expectations early in the pharmacy programme, with a focus on workplace standards and patient perceptions. These standards could be further emphasised during skills laboratory activities and simulation-based learning by enforcing a dress code that aligns with those activities. Furthermore, experiential learning opportunities should reinforce an appropriate professional dress code tailored to individual practice areas, bridging the gap between previously discussed professional expectations and real-world standards.

The open-ended comments obtained through the survey were exploratory and were summarised descriptively rather than through formal thematic analysis. Future research using qualitative methods, such as structured thematic analysis, interviews, or focus groups, could provide deeper insight into the factors shaping these perceptions. Additionally, investigating whether these trends are consistent across other healthcare professions may offer a broader perspective on the evolution of professional identity. Establishing standardised guidelines for professional dress, developed collaboratively by educators and practitioners, could help create a more consistent framework for students transitioning into professional roles. By fostering discussions and reinforcing dress expectations throughout pharmacy education, institutions can better prepare students for the realities of professional practice.

Conclusion

Overall, this study highlights that pharmacy preceptors and P2-P4s have similar perceptions when rating clothing images in terms of professionalism, while P1s tended to be stricter with images that may be considered more "*casual*." While students in the early stages of the pharmacy curriculum may hold more stringent expectations, students' perceptions appear to align more closely with preceptors as they progress in their training and gain exposure to real-world practice. Various factors influence preceptors' and students' perceptions of professional dress. Family members, friends, and social media influence students, whereas patients/clients influence preceptors. P2-P4s further noted in the comments that their preceptors influenced their perceptions of professional dress. This study provides insight into how pharmacy students and preceptors at one institution in the United States perceive professional dress in the pharmacy practice setting. Future multi-site studies can provide additional insights as professional dress continues to evolve in the pharmacy practice setting.

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Conflict of interest

The authors declare no conflict of interest.

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Appendix A: Summary of perceptions of the 33 clothing items by group: Complete data set

	Preceptor n, median (IQR) N=142	Student n, median (IQR) N=161	P1 Student n, median (IQR) N=66	P2-4 Student n, median (IQR) N=95	*p*-value (P1, P2-4)*	*p*-value (Preceptor, student)*	*p*-value (P1, P2-4)*	*p*-value (P1, P2, P3, P4)^	*p*-value (Preceptor, P1)*	*p*-value (Preceptor, P2-4)*
Image 1	135, 3 (2, 4)	161, 2 (2, 4)	66, 2 (1, 3)	95, 3 (2, 4)	0.002	0.007	0.002	0.002	<0.001	0.428
Image 2	134, 4 (2, 5)	161, 4 (2, 4)	66, 3 (2, 4)	95, 4 (3, 4)	0.005	0.215	0.005	0.005	0.012	0.893
Image 3	134, 2 (1, 3)	160, 2 (1, 2)	66, 1 (1, 2)	94, 2 (1, 3)	0.005	0.111	0.005	0.023	0.001	0.886
Image 4	133, 2 (2, 3.5)	161, 2 (1, 3)	66, 2 (1, 2)	95, 2 (2, 4)	<0.001	0.137	<0.001	0.003	0.001	0.618
Image 5	134, 3 (2, 4)	161, 3 (2, 4)	66, 2 (1, 4)	95, 3 (3, 4)	0.014	0.143	0.014	0.06	0.62	0.011
Image 6	132, 3 (2, 4)	161, 4 (2, 4)	66, 4 (2, 5)	95, 3 (2, 4)	0.259	0.02	0.259	0.001	0.018	0.114
Image 7	134, 1 (1, 2)	161, 1 (1, 2)	66, 1 (1, 2)	95, 1 (1, 2)	0.055	0.062	0.055	0.126	0.013	0.419
Image 8	134, 2 (1, 2.25)	160, 1.5 (1, 2)	66, 1 (1, 2)	94, 2 (1, 2)	0.013	0.041	0.013	0.006	0.002	0.546
Image 9	134, 1 (1, 2)	161, 1 (1, 2)	66, 1 (1, 2)	95, 1 (1, 2)	0.111	0.352	0.111	0.509	0.097	0.928
Image 10	135, 3 (2, 4)	161, 2 (2, 4)	66, 2 (1, 3)	95, 3 (2, 4)	0.001	<0.001	0.001	<0.001	<0.001	0.043
Image 11	135, 4 (4, 5)	161, 4 (4, 5)	66, 4 (4, 5)	95, 4 (4, 5)	0.123	0.223	0.123	0.222	0.987	0.074
Image 12	134, 5 (4, 5)	161, 5 (4, 5)	66, 5 (4, 5)	95, 5 (4, 5)	0.546	0.197	0.546	0.231	0.535	0.156
Image 13	134, 4 (4, 5)	161, 4 (4, 5)	66, 5 (4, 5)	95, 4 (4, 5)	0.613	0.118	0.613	0.004	0.127	0.267
Image 14	134, 4 (4, 5)	160, 4 (3, 5)	65, 4 (3, 5)	95, 4 (4, 5)	0.068	0.77	0.068	0.051	0.18	0.536
Image 15	134, 5 (4, 5)	160, 4 (4, 5)	65, 4 (4, 5)	95, 5 (4, 5)	0.303	0.653	0.303	0.194	0.322	0.916
Image 16	134, 4 (4, 5)	160, 4 (3, 4)	65, 3 (2, 4)	95, 4 (3, 5)	0.007	0.001	0.007	0.001	<0.001	0.077
Image 17	134, 5 (4, 5)	160, 5 (4, 5)	65, 5 (4, 5)	95, 5 (4, 5)	0.624	0.392	0.624	0.814	0.315	0.626
Image 18	135, 5 (4, 5)	159, 5 (4, 5)	64, 5 (4, 5)	95, 5 (4, 5)	0.275	0.986	0.275	0.765	0.505	0.584
Image 19	133, 2 (1, 3)	159, 1 (1, 2)	65, 1 (1, 1)	94, 1 (1, 2)	0.121	<0.001	0.121	<0.001	<0.001	<0.001
Image 20	134, 5 (4, 5)	159, 5 (4, 5)	65, 5 (4, 5)	94, 5 (4, 5)	0.05	0.276	0.05	0.158	0.039	0.989
Image 21	131, 4 (4, 5)	159, 4 (4, 5)	65, 4 (3, 4)	94, 4 (4, 5)	<0.001	0.032	<0.001	0.001	<0.001	0.831
Image 22	133, 4 (3, 4)	158, 3 (2, 4)	65, 3 (2, 3)	93, 4 (3, 4)	<0.001	<0.001	<0.001	<0.001	<0.001	0.175
Image 23	134, 2 (1, 3)	159, 2 (1, 2)	65, 2 (1, 2)	94, 2 (1, 2)	0.596	0.022	0.596	0.235	0.038	0.08
Image 24	135, 4 (4, 5)	158, 4 (3, 4)	65, 3 (2, 4)	93, 4 (4, 5)	<0.001	0.014	<0.001	<0.001	<0.001	0.856
Image 25	134, 4 (3, 4)	159, 3 (2, 4)	66, 2 (2, 3.25)	93, 4 (2.5, 4)	<0.001	<0.001	<0.001	<0.001	<0.001	0.052
Image 26	134, 5 (4, 5)	160, 4 (4, 5)	66, 4 (4, 5)	94, 4 (4, 5)	0.006	0.045	0.006	0.004	0.002	0.635

	Preceptor n, median (IQR) N=142	**Student n, median (IQR) N=161**	**P1 Student n, median (IQR) N=66**	**P2-4 Student n, median (IQR) N=95**	***p*-value (P1, P2-4)***	***p*-value (Preceptor, student)***	***p*-value (P1, P2-4)***	***p*-value (P1, P2, P3, P4)^**	***p*-value (Preceptor, P1)***	***p*-value (Preceptor, P2-4)***
Image 27	135, 5 (4, 5)	159, 5 (4, 5)	65, 4 (4, 5)	94, 5 (4, 5)	0.044	0.195	0.044	0.013	0.022	0.901
Image 28	135, 5 (4, 5)	159, 5 (4, 5)	65, 5 (4, 5)	94, 5 (4, 5)	0.167	0.111	0.167	0.244	0.036	0.464
Image 29	135, 5 (4, 5)	160, 5 (5, 5)	66, 5 (4, 5)	94, 5 (5, 5)	0.157	0.481	0.157	0.464	0.758	0.188
Image 30	135, 5 (4, 5)	160, 5 (4, 5)	66, 5 (4, 5)	94, 5 (4, 5)	0.339	0.077	0.339	0.205	0.045	0.279
Image 31	135, 2 (2, 3)	160, 2 (2, 3)	66, 2 (2, 3)	94, 2 (2, 3)	0.432	0.582	0.432	0.85	0.343	0.941
Image 32	135, 5 (4, 5)	160, 5 (4, 5)	66, 5 (4, 5)	94, 5 (4, 5)	0.08	0.878	0.08	0.194	0.341	0.313
Image 33	135, 1 (1, 2)	160, 2 (1, 2)	66, 2 (1, 2)	94, 2 (1, 2)	0.977	0.033	0.977	0.103	0.071	0.081

statistics showing count, median (IQR)
**p*-value calculated using Mann-Whitney
^*p*-value calculated using Kruskal-Wallis