






RESEARCH ARTICLE

Exploring the undermined: Pharmacy students' perceptions of their role models' core competencies

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Abstract

Background: As an integrated part of pharmacy education, role modelling is pivotal in fostering desirable professional attributes in students. This study aimed to explore top pharmacist role model competencies as perceived by pharmacy students of different years of the curriculum. **Methods:** A newly developed 14-item questionnaire (The Competencies of Role Models in Pharmacy (CRMP) questionnaire) was distributed among 207 pharmacy students and filled out anonymously, and the results obtained were analysed on SPSS 26 software. The Kolmogorov-Smirnov test was used to check data normality, and Kruskal-Wallis one-way analysis was utilised to assess the variations in CRMP scores based on the students' academic year. **Results:** Teaching skills and professionalism were the most vital attributes selected by pharmacy students, followed by communication skills and laboratory skills. Interestingly, students perceived business and entrepreneurship skills as well as the career status of role models as the least essential competencies. Moreover, notable differences were observed in the overall opinions of students in different academic years, which may be indicative of the dynamic changes in student perspectives as they move forward in their pharmacy programme. **Conclusion:** The competencies of pharmacist role models were assessed and ranked according to their importance as perceived by pharmacy students across different academic years. This information helps gain insight into students' prioritisation of role model competencies and sheds light on the path toward developing future role model training/assessment programmes to improve the quality of pharmacy education.

Introduction

The fundamentals of pharmacy education are inherently tied to professional practice, clinical information, and communication skills (Bradberry *et al.*, 2007). Despite the significance of these domains and their integration into the pharmacy curriculum, it is also of critical importance to take other aspects of this profession into consideration, including accepting values, attitudes, and behaviours, as they are often overlooked in the hidden curricula (Thompson *et al.*, 2008). In this regard, role modelling is an efficient method that helps ingrain the

aforementioned professional attributes into pharmacy students (Benbassat, 2014). Indeed, existing literature suggests that nearly 90% of practitioners can clearly remember their previous role models as the individuals who influenced the formation of their professional identity and helped shape their attitudes (Wright, Wong & Newill, 1997). As further confirmed by research, both the teaching staff and students showed to highly emphasise the importance of role models in learning about professionalism (Schafheutle *et al.*, 2010b) and shaping professional identities (Passi & Johnson, 2016).

As an insightful observation, role modelling is mainly described as students' conscious and/or unconscious imitation of the professional personality and behaviour of educators/supervisors (Jochemsen-Van Der Leeuw *et al.*, 2013). From an observer's perspective, role model figures should be identified and analysed for their luminary attributes that lead to gaining students' trust as people to look up to and learn from (Brown & Treviño, 2014). Role modelling, as a crucial factor of medical education, aims to facilitate student learning and manifest professionalism (Brownell & Côté, 2001). Moreover, successful advancement through transition periods between university classes and practical settings is yet another area where role models can be of effective guidance by actively accelerating the socialisation and integration of students into the pharmacy community (Baldwin *et al.*, 2014). It has been reported that role models acted as motivators for students to adopt new behaviours and encouraged them to set ambitious goals (Morgenroth, Ryan & Peters, 2015). It has also been reported that pharmacy students' exposure to role models can often serve as the main contributing factor in developing their professional identities (Schafheutle *et al.*, 2012). Furthermore, evidence suggests that assessing the competencies of a role model from various perspectives, followed by providing role model development programmes in a faculty, can significantly promote and facilitate the formation of students' professional identity (Srinivasan *et al.*, 2011).

Previously, several competencies have been identified for educators to ensure that medical teachers receive adequate training for their roles (Capobianco & Schultz, 2007; Harris *et al.*, 2007; Srinivasan *et al.*, 2011). For instance, teaching competencies, professionalism, and leadership have been addressed as some of the core teaching competencies of educators and leadership was defined as a specialised teaching competency (Srinivasan *et al.*, 2011). A previous study has highlighted leadership, teaching, administration, research, and clinical knowledge and skills as some of the critical and essential competencies desired for family medicine educators (Harris *et al.*, 2007). Although these results have been highly beneficial in practice, they lack broadness, which, in turn, prevents them from being applicable in many disciplines. Overall, the recent advances in this field and the current understanding of role modelling and its correlation with the formation of professional identity and professionalism show a lack of sufficient data regarding the essential competencies of role models from the perspective of pharmacy students. Hence, identifying these competencies for role models helps pharmacy students critically evaluate the attributes of their role models (Benbassat, 2014) and discover their principal values (Passi & Johnson, 2016). Furthermore, evaluating the perception of pharmacy students of their

role models could provide valuable insight into how desirable role models might be identified or developed. Therefore, this study aimed to investigate the core competencies of role models from the perspective of pharmacy students.

Methods

Design and setting

This descriptive-analytical study was carried out in the school of pharmacy, Ardabil University of Medical Sciences, Ardabil, Iran, in 2019-2020.

This university offers programmes in pharmacy, dentistry, medicine, nursing, and other health professions. The pharmacy curriculum at Ardabil University of Medical Sciences is a six-year, full-time curriculum. Like many other countries, students are required to work in pharmacies upon graduation.

Participants

The study population included all pharmacy students at Ardabil University of Medical Sciences in 2019-2020 (n=246). A convenience sampling method was used to recruit participants, 207 of whom responded and returned the surveys. The study sample excluded foreign students and those who had initiated the course previously in other universities.

Measurement

Since this study is believed to be the first study specifically designed to examine pharmacy teachers as role models, previously validated questionnaires were not available to use. The data collection instrument was prepared by reviewing the previously published scientific literature and studies in role modelling (Paukert & Richards, 2000; Lee, Cholowski & Williams, 2002; Buchel & Edwards, 2005; Côté & Laughrea, 2014; Bartlett *et al.*, 2020; Zeitoun *et al.*, 2020). The Competencies of Role Models in Pharmacy (CRMP) questionnaire was compiled into two sections. The first included demographic features, such as gender, age, and programme entry year (4 items), and the second section consisted of 10 close-ended items about the expected competencies of role models. The questionnaire scale was based on a 4-point Likert scale (1 = less important, 2 = moderately important, 3 = more important, 4 = no idea). An expert panel of five professionals from both pharmacy and medical education fields, each with more than five years of experience in healthcare, reviewed all 14 items in terms of language and phrasing for accuracy and comprehensibility. Afterward, the questionnaire

was sent to eight experts in various disciplines of pharmacy and epidemiology with a request for feedback on the clarity and necessity of all items. They were granted permission to add comments qualitatively on any item. The CRMP questionnaire reliability was established using Cronbach's alpha ($\alpha = 0.71$). The research instrument was a self-administered questionnaire that students answered in class. A brief description explaining the aims and procedures of the research was provided, and a consent form and written copy of the questionnaire were distributed to students individually.

Ethical considerations

The Institutional Review Board (IRB) of Ardabil University of Medical Sciences, Iran, approved this study (<http://ethics.research.ac.ir/IR.ARUMS.REC.1398.270>). The head of the pharmacy college provided signed permission for collecting data from pharmacy students, who were informed that their participation was voluntary and without incentive. The questionnaire was completed anonymously to ensure the confidentiality of the collected data.

Data Analysis

The collected data were analysed using the Statistical Package for the Social Sciences (SPSS) 26, and the level of significance was set at 0.05 for all tests. The mean and standard deviation of scores from all items were calculated separately. The valid percentile and frequency were also calculated. The Kolmogorov-Smirnov test was used to check the normality of test data distribution, and differences in obtained scores among different groups (based on students' year of entry) were also calculated by the Kruskal-Wallis test.

Results

Study sample and related demographics

The questionnaire was distributed to a total of 246 pharmacy students from Ardabil University of Medical Sciences, of whom 207 students completed and returned the questionnaire (response rate = 84.1%). The sample included 108 (52.9%) female and 99 (47.1%) male students. In this study, 19 (9.18%) students were in their first year of studies, 32 (15.5%) in their second year, 34 (16.4%) in their third year, 37 (17.9%) in their fourth year, 40 (19.3%) in their fifth year, and 45 (21.7%) were in their sixth year of studies. Moreover, the mean age of participants was 21.77 ± 2.7 years.

Overall ranking of main role model competencies

Data were collected and analysed to determine key role model competencies perceived by pharmacy students. Of the total 14 role model attributes in the questionnaire, ten competencies were explored, i.e., teaching skills, professionalism, communication skills, laboratory skills, leadership, personal development, teamwork skills, research skills, business and entrepreneurship skills, and career status. According to the results shown in Table I, 187 students, making up 90.3% of the total number of participants, agreed that pharmacy role models are of crucial importance (92.1%). Subsequently, professionalism was chosen as the second most important (89.2%) attribute, followed by communication skills and laboratory skills, with 82.4% and 80.5%, respectively.

Table I: Assessing the expected role model competencies perceived by pharmacy students

Items	Most important	
	Frequency	Valid Percentile
Teaching skills	187	92.1%
Professionalism	182	89.2%
Communication skills	169	82.4%
Laboratory skills	165	80.5%
Leadership skills	152	74.5%
Personal development	139	69.2%
Teamwork skills	132	65.0%
Research skills	128	62.7%
Business and entrepreneurship skills	127	62.0%
Career status	113	55.1%

Comparison of selected competencies by pharmacy students in different years of their studies

After assessing the top selected role model competencies, data were categorised and analysed based on students' study years (Table II). Accordingly, the first highest rank regarding attribute importance was given to either teaching skills or professionalism. The second most important characteristic was chosen

as research skills and laboratory skills by first and second-year students, respectively, while students in other years chose either professionalism or teaching skills. In this study, the Kruskal-Wallis test was performed as a one-way variance analysing model by using SPSS 26. This test was employed to investigate the obtained results from students of different study years. Mean scores and p-values are summarised in Table III.

Table II: Prioritisation of role model competencies selected by pharmacy students from different years of study

	Year 1 (N=19)		Year 2 (N=32)		Year 3 (N=34)		Year 4 (N=37)		Year 5 (N=40)		Year 6 (N=45)	
Competency (%)	Competency (%)		Competency (%)		Competency (%)		Competency (%)		Competency (%)		Competency (%)	
Teaching skills	100	Professionalism	96.9	Teaching skills	90.9	Professionalism	90.6	Teaching skills	92.5	Teaching skills	95.2	
Research skills	94.7	Laboratory skills	93.8	Professionalism	90.6	Teaching skills	89.2	Professionalism	90.0	Professionalism	90.1	
Leadership skills	94.7	Teaching skills	87.5	Communication skills	81.8	Laboratory skills	73.0	Communication skills	87.5	Communication skills	86.4	
Teamwork skills	84.2	Communication skills	87.5	Laboratory skills	72.8	Communication skills	70.3	Laboratory skills	87.5	Laboratory skills	81.8	
Communication skills	78.9	Teamwork skills	84.4	Personal development	65.6	Leadership skills	64.9	Leadership skills	77.5	Leadership skills	77.3	
Business and entrepreneurship skills	73.7	Leadership skills	81.3	Leadership skills	59.4	Business and entrepreneurship skills	62.2	Personal development	71.1	Personal development	75.0	
Personal development	68.4	Research skills	78.1	Teamwork skills	58.4	Research skills	62.2	Teamwork skills	65.0	Business and entrepreneurship skills	61.4	
Professionalism	68.4	Personal development	78.1	Business and entrepreneurship skills	57.6	Career status	56.8	Business and entrepreneurship skills	57.5	Teamwork skills	55.8	
Career status	68.4	Career status	71.9	Research skills	50.0	Personal development	55.6	Research skills	55.0	Research skills	54.5	
Laboratory skills	68.4	Business and entrepreneurship skills	65.6	Career status	39.4	Teamwork skills	54.1	Career status	50.0	Career status	52.3	

Table III: Comparison of scores achieved among pharmacy students based on the study year

Competencies	Year 1 (mean±SD)	Year 2 (mean±SD)	Year 3 (mean±SD)	Year 4 (mean±SD)	Year 5 (mean±SD)	Year 6 (mean±SD)	P-values
Teaching skills	3.00 ± 0.01	2.98 ± 0.33	2.85 ± 0.50	2.89 ± 0.31	2.83 ± 0.67	2.59 ± 0.21	0.62
Laboratory skills	2.68 ± 0.47	2.94 ± 0.24	2.58 ± 0.83	2.65 ± 0.67	2.78 ± 0.69	2.73 ± 0.66	0.12
Professionalism	2.58 ± 0.76	2.97 ± 0.17	2.78 ± 0.75	2.86 ± 0.53	2.80 ± 0.68	2.77 ± 0.71	0.07
Personal development	2.68 ± 0.47	2.78 ± 0.42	2.59 ± 0.61	2.23 ± 0.97	2.55 ± 0.82	2.66 ± 0.71	0.23
Communication skills	2.68 ± 0.74	2.88 ± 0.33	2.70 ± 0.77	2.59 ± 0.76	2.68 ± 0.91	2.86 ± 0.34	0.36
Teamwork skills	2.84 ± 0.37	2.75 ± 0.67	2.41 ± 0.91	2.27 ± 0.96	2.53 ± 0.78	2.35 ± 0.89	0.02*
Research skills	2.95 ± 0.22	2.72 ± 0.58	2.19 ± 0.99	2.32 ± 1.02	2.40 ± 0.81	2.32 ± 0.93	0.001**
Career status	2.58 ± 0.76	2.53 ± 0.84	2.00 ± 1.03	2.27 ± 0.96	2.25 ± 0.89	2.32 ± 0.88	0.13
Leadership skills	2.84 ± 0.68	2.66 ± 0.82	2.50 ± 0.71	2.57 ± 0.68	2.58 ± 0.90	2.66 ± 0.71	0.13
Business and entrepreneurship skills	2.68 ± 0.58	2.34 ± 1.03	2.21 ± 1.08	2.49 ± 0.80	2.23 ± 0.05	2.34 ± 0.98	0.70

*and ** - p values smaller than 0.05 and 0.005

Discussion

As a highly influential and essential factor in healthcare education, role modelling has been constantly employed in higher education to improve the learning and professional development of students (Wright & Carrese, 2002; Pratt Rockmann & Kaufmann, 2006; Goldie *et al.*, 2007; Schafheutle *et al.*, 2010b; Hamilton, 2011; Goldie, 2012; Holden *et al.*, 2012; Worthington *et al.*, 2013; Haider, Snead & Bari, 2016). In medical education, the term role modelling is often defined as unintentional or informal teaching by being an influential example to students in a somewhat regular manner (Kenny, Mann & MacLeod, 2003). Similar to medical students, role modelling is considered to help pharmacy students develop their professional identity and behaviours and is thus a highly effective factor in healthcare-related higher education (Netterström & Kayser, 2008; Passi *et al.*, 2013).

With role modelling actively present in the hidden curriculum, students are often exposed to several role model figures, some of which may lack adequate competencies and potentially serve as negative role models for students (Hafferty, 1998; Bazrafkan *et al.*, 2019). Therefore, understanding students' points of view regarding their desired role model features and their importance gives insight into this phenomenon and further elucidates the path to developing efficient training programmes for role model figures and enhancing their positive attributes (Haider, Snead & Bari, 2016). Efficient role modelling grants students the opportunity to face challenges effectively and gain professional skills as future practitioners (Hammer *et al.*, 2003; Hammer, 2000; Dall'Alba, 2009).

Consistent with the results from several studies, the findings revealed that teaching skills were perceived by pharmacy students as the most important competencies of pharmacy role models (Haider, Snead & Bari, 2016). Moreover, the significant role modelling in teaching was described as "the most potent means of transmitting those intangibles called the art of medicine" (Cruess, 2006). Even though a high number of medical education literature emphasises the critical importance of teaching skills and learning facilitation for role models in the field of medicine (Wright, Wong & Newill, 1997; Yazigi *et al.*, 2006; Burgess, Goulston & Oates, 2015), patient care and clinical skills are also represented as chief role model attributes (Haider, Snead & Bari, 2016), contrary to the findings. An underlying factor that may explain this phenomenon is that undergraduate medical education curricula consist of significant clinical placements, long hospital rotations, and patient-centred education (Wong, 2009). Many medical classes are also located in hospital wards, causing a large portion of learning to take place in clinical settings and thereby improving medical

students' perception of the role model attributes of clinical skills and patient-centred services (Yazigi *et al.*, 2006). In contrast, pharmacy education includes fewer hospital placements and more theoretical-based lessons that lead students to perceive their role models' teaching skills as more critical factors in their learning process as less patient-based learning is involved throughout their courses.

As an essential quality to be ingrained into the student body, professionalism provides students with a set of valuable professional skills that aims to actively prepare them for their future responsibilities as healthcare professionals (Dubai *et al.*, 2019). A proficient role model in pharmacy education is required to possess significant professional skills, including pride in the profession, accountability, commitment to self-improvement and lifelong learning, excellent service orientation, and honesty, among others (Rutter & Duncan, 2010; Hammer *et al.*, 2003). According to existing literature, "patient-facing" pharmacy educators (Schafheutle *et al.*, 2010b) and pharmacists practicing in clinical hospital settings or community pharmacies may also play potentially influential roles in the improvement of students' professional attitudes (Schafheutle, Hassell & Noyce, 2013).

An issue revolving around this phenomenon is the existence of a wide range of overlapping definitions and interpretations and a current lack of one single coherent description that is generally accepted in higher education, thus turning its accurate measurement into a challenging matter (Hammer, 2000; Thurston, Augustine & Lea Bonner, 2018). In this study, professionalism was chosen as the second most principal characteristic of role models, as perceived by pharmacy students. The students participating in this study mainly chose professionalism as either the first or second most important role model characteristic, except for first-year pharmacy students who ranked professionalism in the third level of importance. A possible explanation for this result is that first-year pharmacy students have inadequate acquaintance with the actual nature of their major and insufficient knowledge and awareness of the skills required in real-world working environments. Another contributing factor is that first-year students lack thorough and detailed understanding of "professionalism" due to little or no previous pharmacy-related experiences, further augmented by the various overlapping definitions that have yet to be clearly outlined and explored by students (Dubai *et al.*, 2019).

With 82.4% and 80.5%, respectively, laboratory and communication skills were ranked as the overall third and fourth most vital attributes, following teaching skills and professionalism. Regarding the desired functions of 'modern' pharmacists, it has been reported that

communication lies among the chief values of pharmacists (Wiedenmayer *et al.*, 2006; Noble *et al.*, 2014). Effective communication with patients contributes highly to the quality of practice of pharmacy practitioners (Wallman, Vaudan & Kälvemark Sporrang, 2013). Pharmacy role models may benefit from such skills by enhancing their educatory roles and building effective interpersonal relationships with students while fostering these characteristics in the student body. Excellent communication also helps educatory role models ensure complete understanding of presented data by students through the satisfactory transmission of information (Cuéllar & Ginsburg, 2009).

Besides prescription screening and drug counselling, practising pharmacists often take on various roles in community and hospital pharmacies, such as preparation, compounding, and dispensing. The importance of such roles calls for specific training and experiential learning programmes for undergraduate pharmacy students to help them stimulate real-world practice settings or engage them in actual pharmaceutical practices in pharmacies (Cerulli, 2006; Sari, Hanifah & Mafruhah, 2020). Due to the importance of laboratory skills, several studies have also been conducted to evaluate laboratory skills and training of pharmacy students. Training laboratory skills through experiential learning has often been demonstrated to also improve the communication and clinical skills of pharmacy students along with their laboratory skills (Sari, Hanifah, Mafruhah 2020). In this study, laboratory skills were ranked as the fourth most important characteristic in role models. First-year pharmacy students placed this feature in tenth and last place, indicating that they deemed these skills as rather insignificant in role models. Moving forward to second-year students, it seems that laboratory skills faced an abrupt surge as they climbed up to the second rank in a span of only one year. This observation is explained by an apparent shift in practical laboratory classes for second-year students within the current pharmacy curriculum in Iran, according to which various laboratory classes are held in the second year of the pharmacy programme. This sudden curricular shift from theoretical-based classes to more practical laboratory classes has increased students' perceived importance of these skills, thus placing laboratory skills above teaching skills, as opposed to students in other study years. Moreover, third and fourth-year pharmacy students ranked this feature as the fourth and third most important characteristic, respectively, while fifth and sixth-year students both agreed on the fourth rank of importance, thus indicating a somewhat established level of preference for laboratory skills in the final years of pharmacy studies.

Leadership, personal development, teamwork, and research skills were ranked fifth, sixth, seventh, and eighth, respectively. Among these attributes, the first three were mostly referred to as crucial soft skills that affect most aspects of an individual's personal and professional life and may later also play influential roles in organisation-scale outcomes and development (Schwartz & Pogge, 2000; Carlton *et al.*, 2015). An underlying rationale to explain their rather lower ranks despite their holistic importance may be related, to some extent, to the absence of a clear competency framework for pharmacy students and practitioners in Iran, where the actual value of leadership skills, personal development, and teamwork in practice is elucidated.

Another notable factor is the lack of interdisciplinary education, especially within healthcare programmes, and the relatively limited interactions with students from other majors, subsequently limiting personal development and perspectives of pharmacy students and their perceived importance of teamwork and leadership skills. Such defects in the pharmacy education system require thorough evaluation, as the correlation between interdisciplinary work with soft skills and personal development has been constantly reported in the literature (Frenk *et al.*, 2015; Negandhi *et al.*, 2015; Vogler *et al.*, 2018 Labzina *et al.*, 2019; Abraham, Stewart & Solimeo, 2021). Role modelling has also been shown to improve the development of soft skills in medical students (Reynolds, 1994; Shapiro, 2002; Wright & Carrese, 2003; Joubert *et al.*, 2006) and thus can be employed to explain the value of such skills to pharmacy students and help foster such attributes in them, while acquainting them with their applications in multidisciplinary contexts.

In this study, first-year pharmacy students perceived leadership as the third most important role model attribute, while those closer to graduation (fifth and sixth-year students) placed leadership at the fifth rank of importance. This result is similar to that of teamwork skills, chosen as the fourth important feature by first-year students but downgraded to the eighth position by sixth-year pharmacy students. These findings can be explained by the apparent prioritisation of hard skills and major-related learning over psychosocial growth and soft skill development of students in the Iranian pharmacy education programme.

Interestingly, significant variations were observed in the viewpoints of students in different years of study, potentially indicating that the pharmacy students' perception of pharmacy students regarding core role model values experiences dynamic changes in parallel with advancing through their studies. However, this rapidly changing pattern in their perspectives seems to slow down as students get closer to graduation, as the

four top attributes chosen by fifth and sixth-year students are reported to be in complete consistency. Moreover, only two attributes (teamwork and research skills) were detected to be in slightly different ranks from the viewpoint of fifth and sixth-year pharmacy students, henceforth confirming the fact that students in this study have reached a certain level of stability in their perceptions of key role model competencies as they reach forward to finishing their studies.

Occupying the ninth and tenth places, business and entrepreneurship skills and career status of role models were perceived by the participating pharmacy students to be the least essential attributes. In this study, the career status of role models was the only non-skill-based competency. It was chosen to understand the importance students place on the institutional ranks or positions of their role models and whether they perceived this as an essential competency that demonstrates their role models have the skills and abilities to succeed professionally within an academic institution. The results illustrate the lower value of business-related skills and career status among Iranian pharmacy students in comparison with educatory skills, such as teaching and laboratory skills.

A possible explanation could be the significant amount of attention shifted toward content learning and subsequently much less focus on job market-related skills. Besides, it seems that interdisciplinary business and entrepreneurship skills remain a rather novel concept that has yet to grow out of infancy and be efficiently introduced in healthcare to non-business students. Therefore, unfamiliarity with such notions could be the reason for being regarded as less important. Moreover, job market saturation for pharmacy practitioners has recently led the student body to increasingly gain interest in pursuing postgraduate studies or pharmacy residency programmes and consequently pay less attention to entering the job market. Aside from market saturation and fewer available positions, the tremendous demand for community pharmacy practitioners has resulted in a broad spectrum of potential employees, among whom more experienced graduates have higher chances of being selected. As a result, most undergraduate pharmacy students tend to pay less attention to their role models' career status and business skills.

Strengths and limitations

In contrast with medical education, current pharmacy education literature lacks data and details on desired role modelling competencies. In this regard, the present study aimed to elucidate the preferred attributes of pharmacy role models as perceived by undergraduate pharmacy students. As the growing body of literature

discussing the importance of role modelling focuses mainly on the education of medical students and residents, this study finds strength in addressing role modelling as an influential tool in pharmacy education as a less-investigated topic. Exploring the most critical role model attributes as perceived by pharmacy students, this study also takes into account the differences in perceptions based on students' enrollment year and proposes potential explanations that may justify the obtained results. Moreover, the addressed results and selected role model competencies are also briefly compared with those of medical education role models to provide the readers with a descriptive and in-depth insight on the different satisfactory role model characteristics in a major-based manner. This would further elucidate inter-professional differences and most respected values to help shed light on developing future role model selection, training, and assessment programmes.

It is noteworthy that this study lacks a focused, qualitative analysis regarding the attributes of role models; hence, further research is necessary to unlock new potential opportunities to assess and train future role models in the pharmacy field. This study highlights the need for further pharmacy education investigations and takes a step toward enhancing the overall quality of pharmacy programmes globally. However, this study is limited to a sample of 207 pharmacy students from one university; hence, it requires more extensive research in different locations to clarify the perspectives of pharmacy students in different regions.

Conclusion

Overall, the evaluation of satisfactory role model attributes from the perception of pharmacy students, with a specific focus on year-based enrollment, is believed to enhance the current insight into the needs of pharmacy students and further elucidate the path to designing a constructive programme for training and assessing pharmacy role models. Teaching skills, professionalism, communication skills, and laboratory skills were selected as the most critical competencies for determining the quality of role modelling in pharmacy education. On the other hand, career status and business and entrepreneurship skills were perceived by pharmacy students to be the least important values, likely due to few clinical rotations, intense amounts of theoretical topics, and unfamiliarity of pharmacy students with interdisciplinary concepts, such as entrepreneurship and business-related concepts.

Conflict of interest

The authors declare no conflict of interest.

Source of funding

None to be declared.

Consent to participate

A brief description explaining the aims and procedures of the research was provided, and a consent form and a written copy of the questionnaire were distributed to students.

Contributions

Mahboobeh Mafinejad Khabaz: Conceptualization, Writing and original draft preparation and reviewing. Nastaran Hadizadeh: Conceptualization, Writing and original draft preparation, reviewing and editing. Azadeh Sayarifard: Software, Data analysis. Donia Doostkamal: Methodology. Leyla Rezaeei Shirmard: Methodology, Supervision.

All authors have reviewed and accepted the final manuscript.

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