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## Exploring the effectiveness of pharmacy curriculum in Saudi Arabia in developing leadership skills among pharmacy students from their perspective: A mixed-methods study

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### ABSTRACT

**Introduction:** Leadership is an important component of pharmacy education. This study helps identify the strengths and limitations of the pharmacy curriculum in developing leadership skills among pharmacy students in Saudi Arabia and suggest how to improve the curriculum to better prepare them to become effective leaders in the healthcare profession.

**Methods:** This study employed a mixed-methods research design with a sequential exploratory design. Phase I involved semi-structured interviews with student leaders of pharmacy student clubs/societies from different universities in Saudi Arabia. Interviews were recorded and transcribed verbatim. The written transcriptions were analyzed using thematic analysis. Phase II used a survey questionnaire to collect data from a larger sample of pharmacy students and interns from different universities in Saudi Arabia and the data is mainly presented as frequencies and percentages.

**Results:** Eleven eligible participants were interviewed. Thematic analysis generated 288 codes which were categorized into 17 subthemes. These subthemes were further categorized into five overarching themes: Leadership development and acquisition; Skills and characteristics of effective leaders; Challenge and support for student leaders; Personal growth and benefits of leadership; Vision, goals and responsibilities of student leaders. The findings informed the development of the survey questionnaire which was completed by 484 students/interns. Mixed opinions were received regarding whether the pharmacy curriculum/program is helping or has helped the respondents develop leadership skills as well as whether the college has provided (or is providing) adequate support, resources or opportunities for the development of leadership skills. Eighty-eight per cent of the participants requested that the pharmacy curriculum in their college should include more courses or workshops focused on leadership development. They favoured several options from the listed topics to be included in these courses or workshops of which effective communication was the most prominent.

**Conclusion:** This study highlights that pharmacy curriculum/colleges in Saudi Arabia promote essential leadership skills through various pedagogical approaches and support mechanisms to some extent. However, the students identified that the pharmacy curriculum needs to be revised in order to better prepare them for leadership positions.

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## 1. Introduction

The field of pharmacy is an integral component of the healthcare system, playing a crucial role in patient care and medication management. As healthcare organizations continue to evolve and adapt to meet the needs of patients, it becomes increasingly important for pharmacists to possess strong leadership skills. Pharmacy leaders are essential for driving innovation, managing change, and ensuring the delivery of high-quality pharmaceutical care. Pharmacy education plays a crucial role in preparing pharmacists to meet the evolving healthcare needs of society. Leadership skills are essential for pharmacy students as they progress in their careers, whether they choose to work in community pharmacies, hospitals, or other healthcare settings.

The Center for the Advancement of Pharmacy Education (CAPE) 2013 educational outcomes include a separate subdomain for leadership, and require pharmacy schools to empower students to take responsibility for setting and attaining common goals, regardless of their position (Medina et al., 2013). The 2016 Standards of the Accreditation Council for Pharmacy Education (ACPE) also prioritize the attainment of the CAPE educational outcomes. These outcomes are integrated into the initial four Accreditation Standards, and schools are held responsible for both the inclusion of these standards in their curriculum and the resulting outcomes (Janke et al., 2013; Wase and Lull, 2021). The integration of leadership development into the curriculum of pharmacy schools worldwide is a common practice, often accomplished through a diverse range of educational activities such as workshops, case studies, and experiential learning (Janke et al., 2016; Moore and Ginsburg, 2017; Wilson et al., 2021). Numerous studies have explored the need to cultivate leadership abilities within the realm of pharmacy education. Reed et al. (2019) conducted a systematic review that underscored the prevailing definition of leadership as a process of exerting influence, fostering motivation, and enabling empowerment among individuals in order to collectively attain a shared objective. However, previous studies have also identified a deficiency in leadership abilities among pharmacy students, highlighting the necessity for curriculum modifications that can empower students to initiate transformative actions and excel in providing patient-centred care (Ali et al., 2022).

With the evolving landscape of the pharmacy profession emphasizing patient-centred care and a collaborative healthcare approach in Saudi Arabia, the cultivation of leadership abilities has gained significant importance among pharmacy students. It has been identified that pharmacy students in Saudi Arabia have a significant exposure to clinical and healthcare settings (Gillani and Abdul, 2017). This observation suggests that the pharmacy curriculum in Saudi Arabia effectively prepares students with essential clinical knowledge and abilities. However, it is crucial to investigate whether the pharmacy curriculum in Saudi Arabia adequately cultivates leadership skills in pharmacy students. Currently, there is very limited research in this regard. Hence, there is a need for a comprehensive study to explore the efficacy of the pharmacy curriculum in fostering leadership skills among pharmacy students in Saudi Arabia from their perspective. This research aims to explore, from the pharmacy student perspective, the strengths and limitations of the pharmacy curriculum in Saudi Arabia and suggest how to improve the curriculum to better prepare pharmacy students to become effective leaders in the healthcare profession.

## 2. Methods

### 2.1. Study design

This study employed a mixed-methods research design with a sequential exploratory design and was conducted from December 2022 to June 2023.

### 2.2. Phase I – qualitative

This phase involved semi-structured interviews with student leaders of pharmacy student clubs/societies from different universities in Saudi Arabia. We believed that the club/society leaders were in a very appropriate position to express the impact and role of pharmacy programs in their universities on their selection as leaders, and the development of leadership skills in them and other students. Participants were recruited through convenience sampling and it was ensured that there was proportionally appropriate representation from different regions of Saudi Arabia. An interview guide based on the previous literature was developed in the English language and then translated into the Arabic language in which the interviews were conducted over 10 days. The interview guide comprised 20 open-ended questions in five sections and was designed to explore the issues related to how the pharmacy program in the respective universities helps select the students to be club/society leaders and nurtures leadership skills in them and other students, and prepares them to be future leaders. The interview guide was piloted with three participants and no changes were required to be made to the content of the interview guide. The data of these three participants were included in the analysis. All interviews were audio recorded with the consent of the participants and transcribed verbatim later.

The written transcriptions were analyzed using thematic analysis employing the inductive method (Braun and Clarke, 2006). The first step of the analysis was familiarizing with the qualitative data by reading the transcripts. The two teams of co-authors then manually derived the initial codes from the data independently. The codes were then reviewed and verified with the academic supervisor [MA]. This was followed by the next phase of the analysis, which involved categorizing the codes into potential subthemes and themes independently by the same two teams of co-authors. The subthemes and themes were further reviewed and verified with the academic supervisor [MA]. Any variations in the coding and thematizing processes were resolved by discussion between the two teams and the academic supervisor (Cohen, 1960). The final themes were then refined, defined, and explained by the authors.

### 2.3. Phase II – quantitative

Phase I was followed by the quantitative phase (Phase II) which used a survey questionnaire to collect data from a larger sample of pharmacy students and interns from different universities of Saudi Arabia. This survey excluded the student leaders who participated in Phase I as their responses in the survey might have been affected by their participation in Phase I and introduced bias. A self-administered questionnaire, comprising 18 questions (17 close-ended and one open-ended questions) in four sections, derived from the analysis of qualitative data from Phase I, was developed. Section 1 consisted of demographic questions, Section 2 included questions related to leadership skills acquisition by the students, Section 3 focused on the role and impact of pharmacy programs in the pharmacy colleges on the development of leadership skills in the students, and Section 4 captured the future prospects and career impact of these skills. The questionnaire was piloted with five pharmacy students and minor changes were made to the content of the questionnaire based on their feedback. It was administered via Google Docs and the weblink to complete the survey was sent to the pharmacy students and interns with the help of pharmacy club/society leaders of different universities. Three months were allowed for the data collection with two reminders sent during this period. Descriptive analysis was performed using Microsoft EXCEL (Microsoft Corporation, Albuquerque, NM, USA) and the data from the survey questionnaire is mainly presented as frequencies and percentages. Since this was an exploratory study only and not aimed at investigating the relationship between different factors, inferential analysis was deemed unnecessary.

## 2.4. Ethical considerations

This study was reviewed and approved by the Research Ethics Committee at King Khalid University, Saudi Arabia (Approval number: ECM#2023-2115). Participants were informed about the purpose of the study, their rights as participants, and the confidentiality of their responses. In Phase I, informed consent was taken from the participants prior to the start of the interview recording, whereas in Phase II, it was mentioned in the introduction of the survey questionnaire that the completion of the online questionnaire was considered as their consent to participate in the study. The audio recordings and transcripts from Phase I and data collected from Phase II were kept confidential, stored securely and used only for the purpose of this study.

## 3. Results

### 3.1. Phase I – qualitative

Eleven eligible participants were interviewed and data saturation was found to be achieved with ten interviews. All participants who were approached agreed to be interviewed (Table 1). The average duration of interviews was 24 min (15–30 min). Thematic analysis generated 288 codes which were categorized into 17 subthemes. These subthemes were further categorized into five overarching themes (Table 2). Table 3 shows the specific participant comments supporting each of the themes.

#### 3.1.1. Theme 1 – leadership development and acquisition

This theme involved various ways in which pharmacy students can acquire and develop leadership skills. Mixed opinions were received on whether leadership is a natural-born or an acquired quality. The participants highlighted that factors such as participation in extracurricular activities, attending courses or workshops related to self-improvement, and college support play a role in acquiring leadership positions. Further, these activities contribute to the continuous development of their leadership skills.

#### 3.1.2. Theme 2 – skills and characteristics of effective leaders

The participants addressed the essential skills, traits, and characteristics that define effective leaders from the perspective of the participants. The recurring qualities included qualities such as embracing the points of view of others, responsibility, creativity, adaptability, and emotional intelligence. The importance of personal skills that support the leadership position such as time management, planning, decision-making, and effective communication was also highlighted.

#### 3.1.3. Theme 3 – challenge and support for student leaders

This theme focussed on the challenges pharmacy students in leadership positions face, such as dealing with different personalities, balancing academic and personal life, handling criticism, and financial constraints. The participants also mentioned the support mechanisms they have in place to address these challenges such as support from the

**Table 1**  
Characteristics of the participants from Phase I.

Participant	Gender	Region in Saudi Arabia	Interview duration (min)
Participant 1	Male	Northern	25
Participant 2	Male	Central	30
Participant 3	Male	Central	27
Participant 4	Female	Western	15
Participant 5	Male	Southern	28
Participant 6	Male	Western	27
Participant 7	Female	Central	23
Participant 8	Female	Central	24
Participant 9	Female	Central	18
Participant 10	Male	Eastern	18
Participant 11	Male	Southern	29

**Table 2**  
Themes and associated subthemes from Phase I.

Themes	Associated subthemes	Number of associated codes
Leadership development and acquisition	Leadership is an inherent skill	11
	Leadership is an acquired skill	9
	Experience required to gain leadership position	11
	Factors helped to be a club leader	58
	Embracing others' points of views	1
Skills and characteristics of effective leaders	Personal skills that support the leadership position	16
	College financial support	1
Challenge and support for student leaders	Colleagues support	1
	College staff support	18
	Challenges of the pharmacy club leadership position	5
	Solutions to the challenges	6
	Role of pharmacy program in leadership skills development	16
	Gaps in the pharmacy curriculum	26
	The effect of leadership positions	36
Personal growth and benefits of leadership	Collaboration with experts outside the college	2
	Leader responsibilities towards the team members	14
Vision, goals and responsibilities of student leaders	Vision and mission of the pharmacy club	10

college, academic staff and colleagues. They also discussed the role the college and curriculum can play in further supporting the students in leadership positions and developing leadership skills in other students. Resources provided by the college, including workshops, extracurricular activities, and networking opportunities were highlighted in this regard.

#### 3.1.4. Theme 4 – personal growth and benefits of leadership

The participants delved into the personal growth and benefits experienced by them in leadership positions. Several benefits of leadership on personal growth emerged in the opinion of the participants that included improvement of communication, problem-solving and emotional intelligence skills, increased networking and career opportunities, boosted confidence, and positive influence on student life and academic performance.

#### 3.1.5. Theme 5 – vision, goals and responsibilities of student leader

The participants opined that having a clear vision and specific goals is very important for a leader. They shed light on the responsibilities the leaders should have toward the team members and other students. The participants mentioned that creating a supportive and inclusive environment for club/team members, organizing events and activities for the benefit of the other students and community, ensuring club sustainability, and striving for innovation and uniqueness among competitors are the key responsibilities that generate from having a clear vision and specific goals. According to the participants, skills such as effective task allocation, decision-making processes, and balancing leadership with academics and personal life can help them and leaders fulfil these responsibilities.

### 3.2. Phase II – quantitative

Four hundred and eighty-four students/interns completed the survey, more than half of whom were females (59 %) (Table 4). Most respondents were enrolled in the PharmD program (98 %), and only two percent were from the BPharm program. More than half (73 %) belonged to the age group 21–24 years. With regards to the year of study, the majority of the respondents were 5th-year students (33 %) followed by

**Table 3**  
Themes and selected quotes supporting the themes from Phase I.

Themes
<b>Leadership development and acquisition</b>
<ul style="list-style-type: none"> <li>“I think it is something acquired, however, it could be gained through an interaction with your surroundings and possibly had an impact”. (Participant 4, Line 39–40)</li> <li>“Most of the club leaders agree that leadership skills could be acquired from different kinds of interactions, it could grow and flourish by practising it on various occasions”. (Participant 8, Line 5)</li> </ul>
<b>Skills and characteristics of effective leaders</b>
<ul style="list-style-type: none"> <li>“So, I always make them (the team members) my partner, share the idea together”. (Participant 11, Line 51)</li> <li>“After I became a pharmacy leader club, my life was changed; I learned how to enjoy my time management and make a priority to balance between my study and leadership tasks, also my daily life routine”. (Participant 7, Line 89–93)</li> </ul>
<b>Challenge and support for student leaders</b>
<ul style="list-style-type: none"> <li>Of course, it is not necessary for the students to have almost all the leadership qualities, and he does not have to be a successful leader at the beginning. There are a lot of things which he learns by experiences and facing different situations”. (Participant 10, Line 20–22)</li> <li>“One of the solutions to the leadership challenges is documenting everything”. (Participant 9, Line 26)</li> </ul>
<b>Personal growth and benefits of leadership</b>
<ul style="list-style-type: none"> <li>“Once we hosted *** pharmaceutical company and they clarified the information related to medical representatives in general, it gave me benefit more than some college activities and contacting them was in itself gave me self-confident”. (Participant 1, Line 162–166)</li> <li>“It has had a positive effect which helped me gain several skills I might not have gained from anywhere else in the college, self-confident plus even the relationships with people, and this might give me priority in job applications”. (Participant 10, Line 67–69)</li> </ul>
<b>Vision, goals and responsibilities of student leaders</b>
<ul style="list-style-type: none"> <li>“Our vision is to be unique as a club and invest in the team members and empower them to become useful members of the society”. (Participant 10, Line 30)</li> <li>“As a leader you should present a clear and complete plan to be understandable by all team members.” (Participant 7, Line 109)</li> <li>“Leader should be able to identify strengths and weaknesses of the members in order to allocate suitable tasks to them”. (Participant 5, Line 48)</li> </ul>

interns (27 %) and 4th-year students (19 %). Forty per cent of them had served in any leadership position during the pharmacy program.

Mixed opinions were received regarding whether the pharmacy curriculum/program is helping or has helped the respondents develop leadership skills as well as whether the college has provided (or is providing) adequate support, resources or opportunities for the development of leadership skills (Table 5). Only less than half of the respondents (34 %) had participated in any self-improvement courses or workshops related to leadership development during their pharmacy program as a part of the pharmacy curriculum in their college. Interestingly, 27 % of the students/interns thought that they do not have any such activity in their curriculum. The majority of the respondents (69 %) who had taken part in any extracurricular/volunteer/club activity thought that it helped them develop their leadership skills.

The majority of the respondents (74 %) believed that having strong leadership skills would make them more attractive to potential employers in future careers. Similarly, the majority of them also believed that leadership skills are very important (39 %) or extremely important (41 %) for their future career as a pharmacist. Eighty-eight per cent of them requested that the pharmacy curriculum in their college should include more courses or workshops focused on leadership development. They favoured several options from the listed topics to be included in these courses or workshops of which effective communication was the

**Table 4**  
Demographic characteristics of the participants from Phase II (n = 484).

Demographic characteristics	Number of participants (%)
<b>Age (years)</b>	
20 or under	72 (15 %)
21–24	352 (73 %)
25–29	48 (10 %)
30 or above	12 (2 %)
<b>Gender</b>	
Male	196 (41 %)
Female	288 (59 %)
<b>Pharmacy Program</b>	
BPharm	12 (2 %)
PharmD	472 (98 %)
<b>Year of Pharmacy Program</b>	
1st year	8 (2 %)
2nd year	36 (7 %)
3rd year	60 (12 %)
4th year	92 (19 %)
5th year	160 (33 %)
Internship year	128 (27 %)
<b>Held any leadership positions (e.g., club leader, batch leader) during pharmacy program</b>	
Yes	292 (40 %)
No	192 (60 %)
<b>Region in Saudi Arabia</b>	
Central	184 (38 %)
Northern	39 (8 %)
Western	126 (26 %)
Southern	64 (13 %)
Eastern	73 (15 %)

most prominent (Table 6).

#### 4. Discussion

In Saudi Arabia, pharmacy programs are designed to educate and prepare pharmacy students for their future careers as pharmacists, however, it is not clear if this preparation is contributing to the development of leadership skills in the pharmacy students. The present study aimed to explore the effectiveness of the pharmacy curriculum in developing leadership skills among pharmacy students from their perspective in Saudi Arabia. We chose pharmacy students to explore the curriculum effectiveness in this regard as they are at the direct receiving end of the curriculum and in an appropriate position to provide valuable insight. We conducted a mixed-methods study to explore the effectiveness of the current pharmacy curriculum in Saudi Arabia in developing leadership skills in the students from their perspective and make recommendations to improve this aspect of the curriculum. The mixed-methods approach provided a comprehensive understanding of the students' experiences and perceptions related to leadership development in pharmacy education in Saudi Arabia, contributing to the triangulation of data from Phase I and Phase II. Since the Central region of Saudi Arabia is the most populated region with the highest number of colleges of pharmacy as compared to the other regions, it had a high representation in our sample, both in Phase I and Phase II.

##### 4.1. Leadership development and acquisition

Our findings suggest that pharmacy students in Saudi Arabia acquire leadership skills through a combination of innate abilities and learned experiences. A few previous studies have also suggested that leadership is both a natural talent and an acquired skill (Avolio et al., 2009; Grint,

**Table 5**  
Participants' responses to the statements in Phase II.

Statements	Possible responses	Number of participants (%)
<i>The pharmacy curriculum/program in my college is helping me or has helped me develop my leadership skills</i>	Strongly disagree	80 (17 %)
	Disagree	80 (17 %)
	Neutral	112 (23 %)
	Agree	152 (31 %)
	Strongly agree	60 (12 %)
<i>Have you participated in any self-improvement courses or workshops related to leadership development during your pharmacy program [as a part of the pharmacy curriculum in your college]?</i>	Yes	164 (34 %)
	Not yet	188 (39 %)
	No, the curriculum has no activity like this	132 (27 %)
<i>Have you participated in any self-improvement courses or workshops related to leadership development during your pharmacy program [NOT as a part of the pharmacy curriculum in your college]?</i>	Yes	252 (52 %)
	No	232 (48 %)
<i>How many extracurricular/volunteer/club activities have you participated in during your pharmacy program?</i>	None	76 (16 %)
	1–2	176 (36.%)
	3–4	100 (21 %)
	5 or more	132 (27 %)
<i>Do you believe these activities have helped you develop leadership skills?</i>	Yes	332 (69 %)
	No	44 (9 %)
	Not sure	80 (17 %)
	Not applicable	28 (6 %)
<i>My college has provided (or is providing) adequate support and resources for the development of my leadership skills</i>	Strongly disagree	60 (12 %)
	Disagree	72 (15 %)
	Neutral	152 (31 %)
	Agree	156 (32 %)
	Strongly agree	44 (9 %)
<i>The pharmacy program in my college has provided (or is providing) me with opportunities to practice my leadership skills</i>	Strongly disagree	56 (12 %)
	Disagree	72 (15 %)
	Neutral	152 (31 %)
	Agree	132 (27 %)
	Strongly agree	72 (15 %)
<i>Do you think the pharmacy curriculum in your college should include more courses or workshops focused on leadership development?*</i>	Yes	428 (88 %)
	No	56 (12 %)
<i>Having strong leadership skills will make me more attractive to potential employers in my future career</i>	Strongly disagree	56 (12 %)
	Disagree	16 (3 %)
	Neutral	52 (11 %)
	Agree	160 (33 %)
	Strongly agree	200 (41 %)
<i>How important do you think leadership skills will be in your future career as a pharmacist?</i>	Not at all important	4 (1 %)
	Slightly important	44 (9 %)
	Moderately important	52 (11 %)
	Very important	188 (39 %)
	Extremely important	196 (41 %)

\* Related data are presented in Table 6.

**Table 6**  
Topics the students believed in Phase II should be included in leadership courses/workshops in pharmacy programs.

Topic	Number of participants (%) who selected the topic
Effective communication	320 (66 %)
Problem-solving	308 (64 %)
Time management	308 (64 %)
Decision-making	292 (60 %)
Interpersonal skills	264 (55 %)
Team building and collaboration	268 (55 %)
Emotional intelligence	216 (45 %)
Attention to detail	184 (38 %)
Conflict resolution	176 (36 %)
Adaptability	148 (31 %)
Other (please specify)	

2010; Northouse, 2015). Additionally, participants in our study identified that participation in extracurricular activities, attending courses or workshops related to self-improvement, and college support as factors contributing to acquiring leadership positions and the continuous development of leadership skills. This is consistent with the findings of previous studies that highlighted the importance of experiential learning in leadership development (Conger and Benjamin, 1999; Mumford et al., 2000a; Rosch and Caza, 2012). The pharmacy curriculum should not only focus on technical and clinical knowledge but also incorporate various leadership development strategies. These strategies include problem-based learning, case-based learning, and group projects (Blommel and Abate, 2007; FIP, 2022; Medina et al., 2013). The integration of these pedagogical approaches in the pharmacy curriculum aligns with the recommendations made by international pharmacy organizations such as the International Pharmaceutical Federation (FIP) and the American Association of Colleges of Pharmacy (AACP) (FIP, 2022; Medina et al., 2013).

#### 4.2. Skills and characteristics of effective leaders

The participants in our study identified several qualities that define effective leaders, such as embracing the points of view of others, responsibility, creativity, adaptability, and emotional intelligence. These qualities have also been reflected by Bass and Riggio (2006), Goleman et al. (2002) and Yukl (2013) in their reports, though not from the student perspectives, on leadership skills and characteristics. Moreover, personal skills that support leadership positions, such as time management, planning, decision-making, and effective communication, were highlighted by the participants in our study. The importance of personal skills in effective leadership has also been reiterated in previous studies (Day et al., 2014; Mumford et al., 2000b). Thus, the pharmacy curriculum is a potential opportunity and platform for fostering leadership among students.

#### 4.3. Challenges and support for student leaders

The participants in our study reported several challenges that are faced by pharmacy students in leadership positions, such as balancing academic and personal life, dealing with different personalities, financial constraints, and handling criticism. Previous studies on student leadership have reported similar challenges (Astin and Astin, 2000; Dugan and Komives, 2010; Komives et al., 2006). The participants in our study also highlighted the support mechanisms they have in place to address these challenges, such as support from the college, academic staff, and colleagues. This led to the discussion related to the role of the college and curriculum in further supporting students in leadership positions and developing leadership skills in other students. The importance of a supportive environment in fostering student leadership development has also been reflected in other studies (Astin and Astin, 2000; Komives, 2011).

#### 4.4. Personal growth and benefits of leadership

The participants reported several benefits of leadership on their personal growth, including improvement of communication, problem-solving and emotional intelligence skills, increased networking and career opportunities, boosted confidence, and positive influence on student life and academic performance. This is in line with the findings of previous studies on the benefits of student leadership (Astin and Astin, 2000; Cress et al., 2001). Our findings reveal that pharmacy students who participated in leadership development activities experienced personal growth and benefits that included improved communication skills, enhanced problem-solving abilities and increased self-confidence. Furthermore, the participants in our study recognized the importance of these benefits and experiences in preparing them for their future professional roles as pharmacists.

#### 4.5. Vision, goals, and responsibilities of student leaders

Having a clear vision and specific goals was identified as crucial for effective leadership. The participants discussed the responsibilities leaders should have toward their team members and other students. Creating a supportive and inclusive environment for club/team members, organizing events and activities for the benefit of other students and the community, ensuring club sustainability, and striving for innovation and uniqueness among competitors were identified as key responsibilities. These findings are the reiteration of roles and responsibilities of student leaders reported by [Komives \(2011\)](#) and [Owen \(2012\)](#).

#### 4.6. Implications for pharmacy education in Saudi Arabia

The findings of our study have several implications for pharmacy education in Saudi Arabia. Firstly, there is a need to incorporate more experiential learning opportunities, including extracurricular activities and leadership workshops, into the pharmacy curriculum to enhance leadership development among pharmacy students. Secondly, the curriculum should reinforce the development of personal skills that support leadership positions, such as time management, planning, decision-making, and effective communication. Incorporation of real-life scenarios and case studies in the curriculum will allow the students to apply their leadership skills in practical situations ([Hersey, 2012](#); [Luo and Liu, 2014](#)). Thirdly, pharmacy colleges should provide adequate support and resources for students in leadership positions to address the challenges they face and are expected to face. Lastly, encouraging and promoting a culture of effective leadership within the college environment can help create a supportive and inclusive atmosphere for all the students. This study adds to the growing body of literature on leadership development in pharmacy education locally and internationally. By exploring the effectiveness of the pharmacy curriculum in Saudi Arabia, this study provides valuable insights into the factors that contribute to successful leadership development in pharmacy education and helps to inform future research and practice in this area.

#### 4.7. Limitations

One potential limitation of this study is the reliance on self-reported data, which may be subject to social desirability bias. However, despite this limitation, this study is expected to provide a valuable contribution to the literature on pharmacy education and leadership development.

### 5. Conclusions

This study provides valuable insights into the effectiveness of the pharmacy curriculum in developing leadership skills among pharmacy students in Saudi Arabia. The findings of this study suggest that the pharmacy curriculum and colleges in Saudi Arabia encourage and promote essential leadership skills through various pedagogical approaches and support mechanisms. However, there is room for improvement in the current curriculum to better support leadership development among pharmacy students as our study highlights the importance of incorporating leadership development activities into pharmacy education to prepare graduates for their future professional roles. Further research is warranted to explore additional strategies and support mechanisms that can enhance leadership development in pharmacy education and to explore the long-term impact of these leadership development activities on pharmacy graduates' career success and their ability to contribute to improved patient care and healthcare outcomes.

#### CRediT authorship contribution statement

**Majid Ali:** Conceptualization, Writing – original draft, Writing – review & editing, Visualization, Validation, Formal analysis,

Methodology, Supervision, Resources, Project administration and Software. **Aseel Alsreaya:** Data curation, Writing – original draft, Investigation, Formal analysis, Methodology. **Abdulrahman Alqarzi:** Data curation, Writing – original draft, Investigation, Formal analysis, Methodology. **Yazeed Alzahrani:** Data curation, Writing – original draft, Investigation, Formal analysis, Methodology. **Ibrahim Alhoomood:** Data curation, Writing – original draft, Investigation, Formal analysis, Methodology. **Abdulaziz Alruhaimi:** Data curation, Writing – original draft, Investigation, Formal analysis, Methodology. **Abdulrahman Hijri:** Data curation, Writing – original draft, Investigation, Formal analysis, Methodology. **Ahmed Mobarki:** Data curation, Writing – original draft, Investigation, Formal analysis. **Mohammed Najie:** Data curation, Writing – original draft, Investigation, Formal analysis. **Mohammed Mashyakh:** Data curation, Writing – original draft, Investigation, Formal analysis. **Abdullwahab Bajawi:** Data curation, Writing – original draft, Investigation, Formal analysis.

#### Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT-4 in order to improve the language of the manuscript. After using this tool, the authors reviewed and edited the content again as needed and take full responsibility for the content of the publication.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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#### Authors' contributions

MA conceived, designed and supervised the study. AAlruhaimi and AH conducted the interviews in Phase I of the study. All authors were involved in data collection for Phase II. All authors contributed to the data analysis and interpretation, drafting and critical review of the manuscript and have approved the final draft of the manuscript.

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