

# Cultivating Leadership Attributes In Undergraduate Medical Education: A Mixed Method Study

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## Abstract

**Objective:** This research aimed to train undergraduate medical students through a feasible and achievable program and assess the effectiveness of integrating leadership training into the formal curricula of undergraduate medical education, aiming to enhance the development of leadership attributes and behaviours among medical students.

**Methods:** This Mix-Method study including 60 students was conducted in a private medical college of Pakistan. The study participants were randomly selected. 30 participants were trained through the Student Leadership Development Program, whereas 30 constituted the control group. A series of training sessions were conducted. The Leadership Trait Questionnaire was administered during the study for Self, Peers and Mentors assessment. Quantitative data was analysed using SPSS version 26. Descriptive statistics were applied, and numerical variables were described using mean, median and interquartile ranges. The aggregate of traits was assessed for both leaders and control groups. Results showing p-value < 0.5 were considered statistically significant. Qualitative data was compiled from students' responses to open-ended questions by manual thematic analysis.

**Result:** The results of the study demonstrated that most of the students possessed qualities of effective leaders with similar responses by all three evaluator groups. Traits like articulate, friendly, outgoing, persistent, diligent, trustworthy and sensitive showed significant results ( $p < 0.5$ ) for peers' assessment whereas for mentor scores the results were statistically convincing only for items i.e., Friendly and Self-confident. No statistically significance difference was noted between the overall scores of leaders and control groups. However, data analysis of students' comments to open-ended questions provided information that leadership skills are necessary for successful medical practice and can be learnt with proper guidance given on time. Participants acknowledge that teamwork, communication skills, conflict resolution, and time and stress management as necessary knowledge and skills to develop among undergraduate medical students.

**Conclusion:** This study concluded that leadership skills should be taught and developed at the undergraduate level.

**Keywords:** Leadership, Undergraduate Medical Education.

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## 1. Introduction

Leadership is the ability to guide and inspire individuals, helping them to achieve challenging goals.<sup>1</sup> It encompasses a variety of skills and traits thus providing direction, cultivating collaboration, and motivating others to perform at their best. Effective leadership is a most valued component of medical education that has been increasingly recognized as a key element in the delivery of high-quality medical education, clinical practice, and research.<sup>2</sup> Globally, leadership skills development is recognized as a fundamental aspect of medical education.<sup>3</sup> Various Researchers, advocate for early integration of leadership training to establish a foundation for students to enhance their skills throughout their practical years. Leadership skills

have often been overlooked in medical school curricula and assessment systems leading to a lack of a cohesive framework for its development and assessment.<sup>4</sup> Research suggests that participation in leadership training programs fosters the development of leadership attributes in students.<sup>5,6</sup>

Medical schools in underdeveloped countries like Pakistan currently lack formal leadership training within their curricula. Furthermore, there is a shortage of skilled educational leaders to address the challenges of modern medical education.<sup>7-10</sup> This mixed-methods study, among the first of its kind in Pakistan, builds upon existing literature and aims to lay the foundation for future leadership programs in undergraduate medical education. We recognize that leadership is a complex trait that cannot be objectively measured and is only achieved through practical

experience. Our hypothesis suggests that formal leadership training programs can enhance leadership skills among undergraduate medical students. This study aims to instil leadership attributes in medical students for their capacity building through the Students Leadership Development Program (SLDP).

#### Role of Leadership in Medical Education:

Medical education has undergone diversity due to globalization and the commercialization of institutes, resulting in a shift from traditional to competency-based curricula.<sup>10</sup> This has led to an increased focus on the role of doctors as effective leaders in their fields and communities<sup>11</sup>. Healthcare institutions need competent leaders to face the challenges of the modern world.<sup>11</sup> In 1904, the pioneering empirical research on leadership marked the beginning of efforts to identify qualities distinguishing leaders from non-leaders.<sup>12</sup> These laid the foundation for acknowledging that leadership attributes are developable, identifiable and quantifiable, playing a crucial role in healthcare practice. While educational leadership was not a novel concept, its prominence has surged in the last two decades. Healthcare leadership empowers individuals, producing efficacious and competent leaders to enhance workplace productivity, maintaining professional autonomy and continuous quality improvement for patient safety.<sup>13</sup>

Various efforts have been made to establish leadership as a core competency among undergraduate medical students. Studies have identified physician-specific leadership competencies as a prerequisite for healthcare settings - disclosing professionalism, emotional intelligence, confidence, humility and creativity as important qualities of leaders; whereas self-awareness, communication skills, teamwork and management an integral parts of knowledge and skills among faculty members, administrative and student leaders.<sup>14</sup> The Accreditation Council for Graduate Medical Education (ACGME) mandates the development of physician leaders capable of effective teamwork.<sup>15</sup> Similarly, the UK Department of Health introduced the Medical Leadership Competency Framework (MLCF) in 2008, emphasizing five key competencies for medical students to enhance future healthcare delivery<sup>16</sup>. There is a dire need to identify leadership competencies, integrate them into curricula, and train and periodically assess students.<sup>17-</sup>

<sup>18</sup> Various leadership competencies and skills

identified through the literature review are shown in the pie chart: (Fig.1a)



**Figure 1(a): Leadership Competencies**

#### Leadership Development and Training in Undergraduate Medical Education:

Integrating leadership development is a challenging task.<sup>19</sup> It is important to develop an evidence-based leadership program for students to equip them with the knowledge, skills, and behaviours to become effective leaders. Several studies have explored leadership principles, training resources, and curriculum alignment in medical education. These studies have emphasized the importance of training undergraduate students in medical leadership and management for their future roles as doctors.<sup>16, 20-22</sup> Few of the studies have proposed Student Leadership Development Initiative Models for developing leadership qualities in medical students through modalities like reflective writing, self-management, team management, and experiential learning evaluation.<sup>6, 23-26</sup> Despite efforts, consensus remains elusive regarding curricular content, teaching methods, and evaluation criteria for preparing physician leaders uniformly.

#### Leadership Training of Undergraduate Medical Students in Pakistan:

Many countries have implemented innovative programs and strategies to tackle the issue effectively, providing valuable insights and models that can be adapted to different contexts. However, in our region, a noticeable scarcity of research and documentation explores the unique challenges and solutions within our local setting. These studies emphasize the importance of leadership skills in medical practice, highlighting a gap in Pakistan where clinical proficiency is hindered by a lack of leadership abilities.<sup>7-10, 27</sup> Despite leadership being recognized as

an essential medical competency, it is often not systematically taught throughout medical training due to various constraints.

## 2. Materials & Methods

This mix-method (Sequential Explanatory) study was conducted at –removed for blind review---has been a pioneer and practising a modern integrated, modular curriculum in Pakistan. However, it was observed that leadership skills development has never been addressed at any level of undergraduate medical education. The study was conducted in three phases.

Phase 1: Recruitment and process of consent of the participants by principal investigator.

Phase 2: Student leadership development program implemented through a series of training sessions for six weeks.

Phase 3: Collection of quantitative data followed by qualitative data.

A total number of 60 students voluntarily participated in the study. A non-probability convenient sampling method was employed and students were divided into cases and controls by lottery method. 30 students were selected as cases i.e., Leaders; and 30 as Controls.

Student Leadership Development Program:

A Student Leadership Development Program was developed by a comprehensive literature review under the guidance of experienced faculty. The domains, competencies, and outcomes required for leadership development included were drawn from components of standardized frameworks such as MLCF and other studies. The SLDP was shared with student leaders in an introductory session. A series of sessions were planned for 6 weeks with a minimum session of 2-3 hrs. per week. These sessions were adjusted within their regular teaching modules. A WhatsApp group of leaders was made to communicate session schedules. A total number of five mentors from the faculty were involved. All sessions were interactive followed by video presentations, quizzes, and self-assessment questionnaires to check students' understanding of the topic. Students were given insight into the importance of leadership, its theoretical background, different styles, and associated models. Emphasis was laid on sessions like team-building, communication skills, time and stress management, and conflict resolution. During this time control group was not part of any intervention.

Details on the content of the Student Leadership Development Program (SLDP) ANNEXURE A- (Supplementary Data)

Instruments and Materials:

Quantitative and qualitative data were collected with the help of two different tools.

- Leadership Trait Questionnaire
- Focus Group Discussion

Leadership Trait Questionnaire:

A hard copy of an internationally adapted and validated English version of LTQ was applied to avoid any respondent bias due to the translation of the instrument. LTQ was developed by Peter Northouse, an expert in the field of leadership research, to assess leadership development in medical students. According to Ginzburg et al., the reliability score (Cronbach's alpha) of LTQ was  $>0.8$  for all 14 traits<sup>6</sup>. LTQ was used to measure the leadership skills of the trained (Leaders) and untrained (Control) group. It consists of 14 items relating to leadership traits and attributes that were assessed on a five-item Likert scale. The scale 4 and 5 were taken as agreement; whereas 1, 2 and 3 were combined to formulate a category of disagreement. All students first self-evaluated themselves on LTQ. Afterwards, each student was evaluated by four of their peers and five mentors on the same questionnaire. (Annexure B-Supplementary Data)

Demographics and Response Rate of the Participants:

A total of 60 undergraduate medical students participated in the study, 30 from both first and third year. Out of the 60 participants, 30 underwent a leadership development program while the same number were left untrained. (Fig.1b). The mean age of participants was  $21.2 \pm 1.38$  years. The total number of participants was of equal male-to-female ratio (1:1).

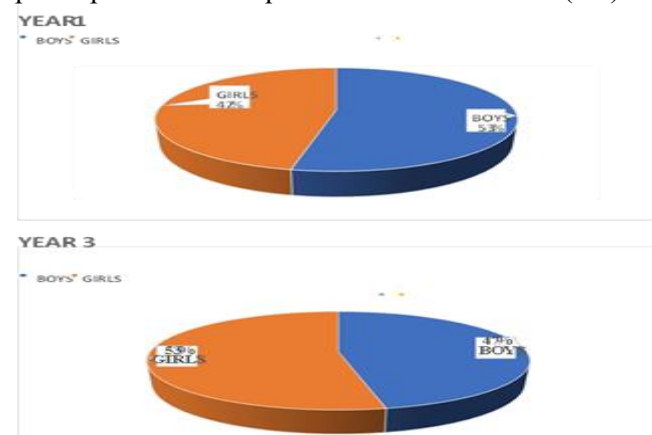
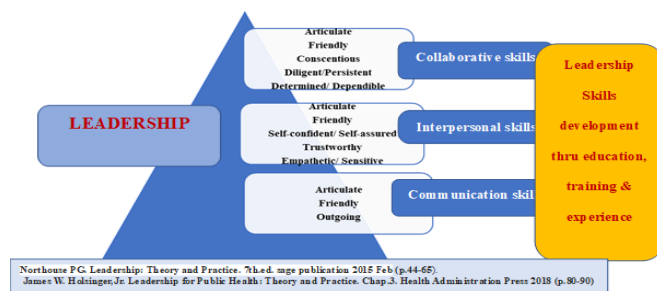


Figure 1(b): Demographic of participants

### Data Collection & Analysis (Quantitative):

The LTQ data was used to evaluate leadership attributes among study participants. For analysis the 14 attributes were divided into three broader skills i.e., Communication skills, Interpersonal skills and Collaborative skills by mentors (Fig.1c). During the data collection, all students conducted self-assessments to evaluate their leadership traits. Later, three groups each of leaders and control participants were formed for the final assessment through task-based projects, with five members in each group. Mentors and peers also used the LTQ to assess various leadership attributes.



**Figure 1(c): Analysis of 14 Traits (LTQ) into Collaborative, Interpersonal & Communication skills**

The data's normality was assessed using the Kolmogorov-Smirnov (K-S) test, which indicated a normality assumption of 50-60%. Given this, a non-parametric Mann-Whitney U test was used to evaluate the significance between variables. The Mann-Whitney U test is effective for comparing two independent groups when normality assumptions are not fully met. A p-value <0.05 was considered significant. For self, peer, and mentor assessments, frequencies, means, medians, interquartile ranges (IQR), and percentages were calculated, with medians being used due to the categorical nature of the data.

### 3. Results

#### Self-Assessment:

A total of 60 responses were collected and analyzed for self-assessment scores. Table 1 demonstrates self-assessment scores on all items concerning the Likert scale. The Self-assessment scores were taken as baseline scores from trained and untrained groups. The majority of students perceived themselves as competent in traits like articulate, friendly, perceptive, trustworthy, sensitive etc. The highest level of agreement was seen in

items “friendly” and “outgoing”, whereas the highest level of disagreement was observed for the item self-assured (Table 1). However, we were interested in quantifying specific traits impacted by our leadership development program so we rated their competence on the same attributes through peers and mentors’ assessment.

#### Peers-Assessment:

After self-assessment, each student was assessed by four peers using the same LTQ, making a total of 240 LTQ score evaluations of the 14 items. The median score of all 14 items for all students on peer assessment was between 4 and 5. The students rated their peers high in various traits. To check the significance of peer scores, an average peer response per trait was calculated and the Mann-Whitney U-test was applied. The six attributes on which students showed competence were “articulate”, “friendly”, “outgoing”, “diligent”, “trustworthy” and “sensitive” with a P-value less than 0.05. Participants showed less competence in attributes like “self-confidence”, “self-assured”, and “trustworthy”. It was observed that > 80% of the respondents agreed that their peers possess leadership traits. The means and standard deviation indicate that there is minimal difference between the data of leaders and control groups (only a 0.1 noticeable difference) Table 2

#### Mentors’ Assessment:

During mentor assessment, a total of five mentors evaluated each student making a total of 300 LTQ score evaluations of the 14 items. To check mentor scores for significance an average mentor response per trait assessing each student was calculated and the Mann-Whitney-U test was applied. On mentor-rated scores, students showed competence in only two traits (“friendly” and “self-confident”) with a p-value less than 0.05. (Table-3)

The peer and mentor assessments were found to better reflect students' performance than a self-assessment of leadership traits. Close observation and alignment between peer and mentor assessments showed that student leaders demonstrated more competence in traits such as “articulate”, “friendly”, “confidence”, “diligence”, “sensitivity”, and “empathy” as compared to the control group. To check inter-rater reliability between peers and mentor scores, Kappa Cohen’s Test was applied. Percent agreement between peers and mentor scores was between 40- 50%. Figures depicting Self, Peer and Mentor assessment are provided in Annexure C (Supplementary Data)

**Table 1: Self-Assessment Score On Ltq With Respect To Leaders(L) And Control(C) (N=60)**

LTQ items Quantitative variables	Participants	Strongly Disagree	Disagree	Disagreement %	Neutral	Agree	Strongly Agree	Agreement %	Mean	Median Interquartile Range	P-Value
Articulate	L	0	2	6.67	10	9	9	60.00	4.20±0.7	4	P >0.05  Non-significant
	C	1	1	6.67	0	17	11	93.33	3.83±1.0	4	
Perceptive	L	0	0	0.00	9	17	4	70.00	3.93±0.9	4	
	C	2	3	16.67	7	11	7	60.00	3.50±0.9	4	
Self-confident	L	2	3	16.67	5	13	7	66.67	3.83±1.0	4	
	C	1	2	10.00	10	7	10	56.67	3.67±1.2	4	
Self-assured	L	2	4	20.00	4	14	6	66.67	3.63±1.0	4	
	C	1	5	20.00	10	9	5	46.67	3.37±1.1	4	
Persistent	L	2	1	10.00	6	17	4	70.00	3.83±0.6	4	
	C	2	2	13.33	6	13	7	66.67	3.53±1.3	4	
Determined	L	0	3	10.00	7	9	11	66.67	4.20±0.8	4	
	C	1	2	10.00	1	15	11	86.67	3.83±1.1	4	
Trustworthy	L	1	1	6.67	5	10	13	76.67	4.27±0.7	4	
	C	2	0	6.67	3	14	11	83.33	3.90±1.2	4	
Dependable	L	0	1	3.33	4	16	9	83.33	4.10±0.7	4	
	C	2	1	10.00	3	11	13	80.00	4.07±1.4	4	
Friendly	L	0	0	0.00	3	15	12	90.00	4.53±0.6	5	
	C	2	0	6.67	4	8	16	80.00	3.97±1.0	4	
Outgoing	L	0	2	6.67	2	12	14	86.67	4.53±0.6	5	
	C	0	2	6.67	3	7	18	83.33	4.10±1.0	4	
Conscientious	L	0	1	3.33	9	12	8	66.67	4.13±0.7	4	
	C	1	1	6.67	4	12	12	80.00	3.87±1.0	4	
Diligent	L	0	2	6.67	7	11	10	70.00	4.20±0.8	4	
	C	2	0	6.67	6	7	15	73.33	3.87±1.2	4	
Sensitive	L	0	1	3.33	4	12	13	83.33	4.10±0.9	4	
	C	1	2	10.00	6	7	14	43.33	4.17±1.0	4	
Empathetic	L	0	4	13.33	6	10	10	53.33	4.13±0.9	4	
	C	0	3	10.00	3	9	15	40.00	3.93±1.1	4	
Mann-Whitney U test was employed for the quantitative variable. Variables are presented as frequency and per cent or median (interquartile range)											

**Qualitative Data Analysis:**

The qualitative part of the study aimed to investigate students' perspectives on the development of leadership attributes. It also helped to supplement the results obtained from the quantitative part. An equal number of leaders and controls were present. Four focus groups were done. Both leaders and control groups were questioned separately. The students from Leader from year 1 were given ID from L1 whereas Leaders from year 3 were given ID L3 (e.g. LI-01-10). Similarly same coding system was used for the Control group(C1-01/C3-04). The responses to open-ended questions were analyzed and manual thematic analysis was done. Codes generated were clustered to create themes for a better understanding of the research objectives. Both inductive and deductive approaches were used to generate themes. Focus group guide provided as Annexure-D

(Supplementary Data) Theme1 - Leadership Acquaintance:

In this student were asked regarding their understanding of leadership, as well as various qualities and traits essential for leadership in the healthcare delivery system.

During the focus group students in the leaders' group predominantly defined a leader as someone who guides their team toward a shared goal. Conversely, students in the control group described a leader as someone who demonstrates confidence takes responsibility, and coordinates effectively with others.

"A leader is someone good at distributing tasks, someone who has good communication skills" ID-C1-01 "A leader inspires his workforce and his team, to do better and works towards a common goal"

ID-L1-06



**Table 2: Percentage of Peer score on LTQ concerning leaders(L) and control(C) groups (N=240)**

LTQ items Quantitative variables	Participants	Strongly Disagree	Disagree	Disagreement %	Neutral	Agree	Strongly Agree	Agreement %	Mean	Median Interquartile Range	P-Value
<b>Articulate</b>	<b>L</b>	0	2.5	1.25	5.0	16.3	26.3	21.3	4.33 ± 0.7	5	<b>P&lt;0.05</b>
	<b>C</b>	0.4	0.4	0.40	7.1	14.6	27.5	21.05	4.37 ± 0.8	5	P>0.05
<b>Perceptive</b>	<b>L</b>	1.3	0.8	1.05	5.8	18.8	23.3	21.05	4.24 ± 0.8	4	P>0.05
	<b>C</b>	0.4	0.8	0.60	9.6	16.3	22.9	19.6	4.21 ± 0.8	4	P>0.05
<b>Self-confident</b>	<b>L</b>	0	0.8	0.40	5	21.7	22.5	22.1	4.32 ± 0.9	5	P>0.05
	<b>C</b>	0.4	0.4	0.40	7.9	18.3	22.9	20.6	4.26 ± 0.8	4	P>0.05
<b>Self-assured</b>	<b>L</b>	0.4	0	0.20	8.3	19.6	21.7	20.65	4.24 ± 0.7	4	P>0.05
	<b>C</b>	0	1.3	0.65	9.6	18.8	20.4	19.6	4.17 ± 0.8	4	P>0.05
<b>Persistent</b>	<b>L</b>	0.4	0.8	0.60	7.1	15.8	25.8	20.8	4.32 ± 0.7	5	P>0.05
	<b>C</b>	0	0.4	0.20	9.6	17.5	22.5	20	4.24 ± 0.7	4	P>0.05
<b>Determined</b>	<b>L</b>	0.4	0.8	0.60	8.3	16.3	24.2	20.25	4.26 ± 0.8	4	P>0.05
	<b>C</b>	0	0.8	0.40	7.5	19.2	22.5	20.85	4.27 ± 0.7	4	P>0.05
<b>Trustworthy</b>	<b>L</b>	0	1.7	1.25	7.1	16.3	25.1	21.2	4.34 ± 0.7	5	<b>P&lt;0.05</b>
	<b>C</b>	0	0	0.00	10.8	16.3	22.9	19.6	4.18 ± 0.8	4	P>0.05
<b>Dependable</b>	<b>L</b>	0.8	0.8	0.80	5.8	19.2	23.3	21.25	4.31 ± 0.8	5	P>0.05
	<b>C</b>	0.4	1.3	0.85	5.4	18.3	24.6	21.45	4.27 ± 0.9	4	P>0.05
<b>Friendly</b>	<b>L</b>	0.4	0.4	0.40	3.3	15.4	30.4	22.9	4.50 ± 0.6	5	<b>P&lt;0.05</b>
	<b>C</b>	0	1.3	0.65	5.0	14.2	29.6	21.9	4.44 ± 0.7	5	P>0.05
<b>Outgoing</b>	<b>L</b>	0.8	2.5	1.65	4.2	16.7	25.8	21.25	4.35 ± 0.8	5	<b>P&lt;0.05</b>
	<b>C</b>	0	2.1	1.05	5	16.3	26.7	21.5	4.28 ± 0.8	4	P>0.05
<b>Conscientious</b>	<b>L</b>	0	1.3	0.65	5.8	18.8	24.2	21.5	4.32 ± 0.7	5	P>0.05
	<b>C</b>	0.4	2.1	1.25	8.3	15.4	23.8	19.6	4.20 ± 0.9	4	P>0.05
<b>Diligent</b>	<b>L</b>	0	0.8	0.40	4.2	17.1	27.9	22.5	4.44 ± 0.7	5	<b>P&lt;0.05</b>
	<b>C</b>	0	0.4	0.20	6.7	17.5	25.4	21.45	4.36 ± 0.7	5	P>0.05
<b>Sensitive</b>	<b>L</b>	0.4	2.9	1.65	5.8	16.3	24.6	20.45	4.33 ± 0.8	5	<b>P&lt;0.05</b>
	<b>C</b>	0	1.7	0.85	9.2	13.8	25.4	19.6	4.31 ± 0.8	5	P>0.05
<b>Empathetic</b>	<b>L</b>	0.4	1.7	1.05	6.3	14.6	27.1	20.85	4.26 ± 0.8	4	P>0.05
	<b>C</b>	0	0.8	0.40	7.9	15.4	25.8	20.6	4.29 ± 0.9	4	P>0.05

The table demonstrates scores of all items concerning the Likert scale. The scores for leaders and controls are presented separately. Mann-Whitney U test was applied to check significance among study variables (P<0.05 is Significant & P>0.05 is non-significant)

### Theme 2 - Leadership Epitome:

Students were asked about leadership skills, and their opinions were gathered regarding the attributes and qualities of a good leader. Student leaders identified various leadership skills and attributes, emphasizing the importance of being hardworking, consistent, humble, motivated, composed, reliable, visionary, tolerant, respectful and open to constructive criticism. They emphasized the significance of empathy as a crucial quality for effective leadership. The control group discussed that a leader personifies empathy, assertiveness, delegation, open-mindedness, integrity, and strong communication skills.

“People won’t listen to you unless you have these attributes of a leader.” ID-C3-10

“A leader should have the knowledge to guide people and when any situation comes, he should be ready to delegate when needed.” ID-L3-04

### Theme 3 - Learning to Lead:

In this study, students were asked if they believe leadership should be incorporated into the undergraduate curriculum. Many students highlighted the importance of introducing leadership education from the first year to build a strong foundation for future development. They argued that early exposure to leadership concepts would better prepare students for leadership roles and enhance their skills over time. According to some:

“Every field has a leader, so addressing it at an undergraduate level is important.” ID-L1-07

“At the undergraduate level, it has more benefits than at the postgraduate level, it’s a skill that should be incorporated as early as possible. ID-C1-06

Students were questioned about their views on including leadership training in the undergraduate curriculum. They unanimously advocate for activity-based approaches as well as integration into extracurricular activities.

**Table 3: Mentor Assessment Scores-(N=300)**

LTQ items Quantitative variables	Participants	Strongly Disagree	Disagree	Disagreement %	Neutral	Agree	Strongly Agree	Agreement %	Mean	Median Interquartile Range	P-Value
Articulate	L	0	2	1.00	7.3	25.3	15.3	20.3	4.09 ± 0.7	4	P > 0.05
	C	0	1	0.50	9.7	23.3	16	19.65	4.08 ± 0.7	4	P > 0.05
Perceptive	L	0	0.7	0.35	8.3	23.7	17.3	20.5	4.15 ± 0.7	4	P > 0.05
	C	0.3	0.7	0.50	12.3	24.7	12	18.35	3.95 ± 0.7	4	P > 0.05
Self-confident	L	0	0.7	0.35	4	24.3	21	22.65	4.31 ± 0.6	5	P < 0.05
	C	0	1	0.50	7	24.7	17.3	21	4.17 ± 0.7	4	P > 0.05
Self-assured	L	0	0.7	0.35	6	30	13.3	21.65	4.12 ± 0.6	4	P > 0.05
	C	0	1.7	0.85	9	25.7	13.7	19.7	4.03 ± 0.7	4	P > 0.05
Persistent	L	0	0.3	0.15	12.7	27.3	9.7	18.5	3.93 ± 0.6	4	P > 0.05
	C	0	1.3	0.65	18	14	6.7	10.35	3.72 ± 0.7	4	P > 0.05
Determined	L	0	0	0.00	14.7	28	7.3	17.65	3.85 ± 0.6	4	P > 0.05
	C	0	1.7	0.85	20.3	21.3	6.7	14	4.16 ± 0.7	4	P > 0.05
Trustworthy	L	0.3	0.7	0.50	20.7	22	6.3	14.15	3.76 ± 0.7	4	P > 0.05
	C	0	2.7	1.35	18.7	21.3	7.3	14.3	3.67 ± 0.7	4	P > 0.05
Dependable	L	0.3	0.7	0.50	26.3	15.3	7.3	11.3	3.57 ± 0.7	3	P > 0.05
	C	0	1.3	0.65	26.3	17.7	4.7	11.2	3.51 ± 0.7	3	P > 0.05
Friendly	L	0	0.3	0.15	4.7	21.3	23.7	22.5	4.37 ± 0.6	5	P < 0.05
	C	0	0.7	0.35	7.7	23	18.7	20.85	4.19 ± 0.7	4	P > 0.05
Outgoing	L	0	0.7	0.35	24	16.7	8.7	12.7	3.67 ± 0.7	4	P > 0.05
	C	0	0.3	0.15	22	19.7	8	13.85	3.71 ± 0.7	4	P > 0.05
Conscientious	L	0	1	0.50	12.3	28.3	8.3	18.3	3.88 ± 0.6	4	P > 0.05
	C	0	1	0.50	14.7	26.3	8	17.15	3.83 ± 0.7	4	P > 0.05
Diligent	L	0	0.3	0.15	17.7	29.3	2.7	16	3.69 ± 0.5	4	P > 0.05
	C	0	1.7	0.85	20.7	22.7	5	13.85	3.62 ± 0.7	4	P > 0.05
Sensitive	L	0	0	0.00	34.3	14.7	1	7.85	3.33 ± 0.5	3	P > 0.05
	C	0	0.3	0.15	36.7	12.7	0.3	6.5	3.26 ± 0.4	3	P > 0.05
Empathetic	L	0	0	0.00	41.3	8.7	0	4.35	3.17 ± 0.3	3	P > 0.05
	C	0	0.3	0.15	41.7	8	0	4	3.15 ± 0.3	3	P > 0.05

The table demonstrates scores of all items concerning the Likert scale. The scores for leaders and controls are presented separately. Mann-Whitney U test was applied to check significance among study variables (P<0.05 is Significant & P>0.05 is non-significant)

“Leadership is practical rather than something to study, students could know the qualities through lectures but the hands-on experience will be a better step towards implementation” ID-C1-05

When queried about the necessity of assessment, students from both groups concurred that assessment is important in identifying areas of improvement.

“I think it should be assessed, in this way we would be able to know where the faults were, also receiving feedback would be good.” ID-L1-03

Theme 4 - Formulating leadership theory into practice: Students were asked whether they believe leadership is important in the field of medicine. Nearly all students affirmed that it is a crucial aspect, emphasizing that effective leadership can significantly impact medical practice, team dynamics, and patient outcomes. Students' feedback regarding the implication of leadership at the undergraduate level emphasized its significance in the medical field. According to one student

“There are a lot of situations where you have to make choices and take decisions so when you have leadership qualities it will be easier for you” ID-L3-01

Students who received leadership training stated that strong leadership skills are essential for guiding teams,

making informed decisions, and driving improvements in healthcare delivery. They emphasized its critical role in clinical settings for doctors, lead staff, nurses, and technicians for enhancing their capabilities. They noted that leadership extends beyond mere guidance, constituting a lifelong skill.

“It will help me in my clinical years. I have seen there is always a team at hospital which works in solving a case together, they present ideas, the leader guides the team as well.” ID-L1-01

Theme 5 - Leadership Capacity Building (Training):

The leaders' group of students was asked about their perspectives on the leadership training they received. Leaders-group conducted a critical assessment of the leadership training they received, with mixed opinions, some praised certain aspects of the training, while others suggested it should have been more practical.

“Overall, it was a nice experience, it helped me in gaining more knowledge about certain aspects of leadership like conflict resolution.” ID-L1-04

Students felt that the training assisted them in recognizing their strengths and weaknesses. Certain sessions, such as self-reflection and leadership styles, were singled out as particularly informative and beneficial.

“It helped in highlighting the qualities I had in me, and how to improve them, make them better and it also highlighted what I needed to improve.” ID-L1-01

**Table 4: Cohen’s Kappa Test:**

LTQ ITEM (Quantitative Variables)	Percentage Agreement %		Measurement Agreement between Peers & Mentors
	Agree	Disagree	
Articulate	91.7%	8.3%	0.059
Perceptive	88.3%	11.7%	0.082
Self-confident	91.2%	8.3%	0.053
Self-assured	86.6%	13.3%	0.038
Persistent	80.0%	20.0%	0.050
Determined	70.0%	30.0%	0.430
Trustworthy	65.0%	35.0%	0.990
Dependable	41.7%	58.3%	0.183
Friendly	96.6%	3.3%	0.001
Outgoing	55.0%	45.0%	0.467
Conscientious	83.3%	16.7%	0.002
Diligent	71.7%	28.3%	0.076
Sensitive	15.0%	85.0%	0.243
Empathetic	5.0%	95.0%	0.010

#### 4. Discussion

The purpose of the study was to identify leadership attributes in students which will help in providing a base for future integration of leadership training in UGME within the context of various underdeveloped countries, particularly Pakistan. We have endeavored to correlate our analysis with prior studies, elucidating unexpected findings and outlining recommendations and practical implications for future research. This will be a pioneer study in which a mixed-method approach has been used. Also, to our limited knowledge this study will be one of the first efforts in this regard as till date, no study has been conducted that has explored perception of student leaders and peers altogether with use of a control group. Leadership is the ability to change vision into reality and is essential to an organisation’s success. Medical education, initially rooted in science, has transitioned from Flexner’s era to competency-based 2,3. Since 2015, the managerial role within the CanMEDS competency framework has evolved into a leadership role, becoming a fundamental competency for graduating doctors<sup>26</sup>. Literature on leadership skills development has identified it as integral to medical practice, consisting of a series of discrete skills that could be taught and learned, and be integrated in UGME to prepare students

as future health professional leaders.<sup>28,29</sup> This is necessary to fulfil the needs of debilitated healthcare structures of underdeveloped countries.<sup>30</sup>

Prior research has indicated that engagement in a leadership training program resulted in its enhanced comprehension as an integral aspect of students’ professional responsibilities.<sup>6</sup> Our study aligns with previous findings, demonstrating the efficacy of our SLDP in fostering diverse leadership skills among undergraduate medical students within the confines of their regular modules. The result of self-assessment scores was similar to those by Ginzburg who explained how the process of self-assessment is challenging and its reliability is highly questionable due to impostor syndrome - a phenomenon characterized by self-doubt and feeling of perceived fraudulence.<sup>6</sup> Like previous studies, in our study, self-assessment scores on the LTQ were composed of validated traits measured on a five-point Likert scale, evaluating leadership skills’ strengths and weaknesses.<sup>6</sup> This approach is also supported by literature emphasizing the importance of trait and behavioural perspectives in leadership.<sup>29</sup> The positive feedback from students in the Leaders-group underscores the significance of developing leadership skills. They concurred that the training of leadership abilities assisted them in recognizing their strengths and areas for improvement. Analysis categorized the 14 attributes into Communication, Interpersonal, and Collaborative skills. Greater teamwork was observed in the leaders’ group as compared to the control groups. Peer and mentor assessments proved more indicative of student performance than self-assessment alone. Elaboration of multiple attributes by leader-groups signified a positive impact of the program, aligning with past studies.<sup>5,6</sup> This underscores the importance of attributes in skill development and the trainability of leadership skills.<sup>6</sup> The trait approach, emphasized by Northouse (2015), has established that leveraging personal core values and strengths enhances interprofessional team functioning and healthcare systems. Our use of LTQ also facilitated the identification of personal leadership attributes and development processes, informing future leadership training recommendations. Unlike previous studies focusing on competency frameworks, our study prioritized leadership attributes crucial for developing communication, collaboration, and interpersonal skills.



Respondents displayed an understanding of various leadership attributes and skills, recognizing the importance of developing them with proper guidance. While short-term effects were observed in trained students' attributes, significant behavioral changes were not noted due to limited training duration. This aligns with Salman et al.'s findings, suggesting that leadership skills improve with practice over time, emphasizing the value of early education.<sup>7</sup> Participants also highlighted benefits such as boosted confidence, capacity building, enhanced communication and collaborative skills and preparation for future leadership roles, echoing findings by Webb et al., Oscar et al., Neeley & Clyne, Alex et al., and John M et al. who underscored the importance of leadership training for students<sup>16,21-24</sup> Our statistically-significant results confirmed that leadership attributes can indeed be enhanced through formal training programs. Focus-group discussions revealed confidence in leadership skills development suggesting integration of leadership topics into pre-clinical teaching and assessment methods such as formative assessments and peer evaluations. A successful learning process was demonstrated by increased confidence in participants' aptitude to apply and utilize the course information. Student leaders demonstrated confidence in their leadership abilities, and were motivated to pursue leadership roles in the future. However, our leadership training program can be revised for improved quality according to participants' feedback by including more hands-on activities in the sessions.

Leadership training is a relatively recent addition to curricula, posing a challenge for healthcare providers. However, integration can be achieved through evidence-based programs. While various approaches have been adopted in recent years a standardized leadership curriculum for undergraduate medical education is still evolving.

## 5. Conclusion

This study offers an initial exploration of students' attributes and perceptions regarding the impact of leadership skills development at the undergraduate level. To date, no study has been conducted that has explored the perception of student leaders, peers and faculty mentors altogether with the use of a control group. Through a mixed-method approach and implementation of the SLDP, various leadership attributes were instilled in the participants. Their perceptions regarding the

importance and impact of leadership skills were examined. The LTQ data facilitated the evaluation of leadership development. Participants affirmed the necessity of leadership skills for successful medical practice, noting their learnability with proper guidance. Despite positive training impacts limitations such as the research's short duration, its single-institute focus, the perspectives of only two student groups being considered, and the targeted population with no pilot study. Including assessors' perceptions would enhance result triangulation.

## Institutional Review Board Approval

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## CONFLICTS OF INTEREST- None

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## Contributions:

H.F, M.N.A.K, M.N, M.D, S.I, M.A.S - Conception of study

H.F, M.N.A.K, M.N, M.D, S.I, M.A.S - Experimentation/Study Conduction

H.F, M.N.A.K, M.N, M.D, S.I, M.A.S - Analysis/Interpretation/Discussion

H.F, M.N.A.K, M.N, M.D, S.I, M.A.S - Manuscript Writing

H.F, M.N.A.K, M.N, M.D, S.I, M.A.S - Critical Review

H.F, M.N.A.K, M.N, M.D, S.I, M.A.S - Facilitation and Material analysis

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