Research Article

Evaluating the Effectiveness of a Transformational-Style Leadership Development Program (LDP) in Fostering Leadership Skills in Medical Students, a Pretest-Posttest Study

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Abstract

Background: Effective leadership is crucial for successful healthcare organizations, and leadership development programs (LDPs) can help physicians develop the necessary skills for this purpose. LDPs aim to build leadership capacities, values, and behaviors, and are essential for addressing challenges in healthcare, such as patient safety and clinician burnout. Different types of LDPs have been described based on different leadership styles.

Objectives: This study aims to evaluate the effectiveness of a transformational-leadership based LDP tailored to medical students.

Methods: A pretest-posttest design was used in this study and 30 students enrolled themselves voluntarily in the leadership program. A comprehensive transformational-leadership style LDP titled "HEALTHLEAD: Transforming Leadership in Medicine" was designed and delivered by the authors. A questionnaire based on the Multifactor Leadership Questionnaire Form 6S (MLQ-6S) was used as the data collection tool and the data were collected at three points in time; before, immediately after, and two months after the program.

Results: Data of 30 participants were analyzed and reported. Repeated measures ANOVA, with time as a within-subject factor, showed a significant effect on mean scores, $F(2, 28) = 27.281$, $p<0.001$, indicating an increase in leadership scores over time. Pairwise comparisons revealed significant mean differences between pretest and posttest (0.586, $p<0.001$) and pretest and two-months follow-up (0.775, $p<0.001$), but a non-significant mean difference between the two-month follow-up and posttest (0.189, $p=0.143$).

Conclusion: The leadership development program "HEALTHLEAD" had a significantly positive impact in fostering leadership skills in medical students. The increase in scores suggests that the program had a comprehensive and lasting effect.

Keywords | transformational leadership, leadership development program, leadership skills.

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Introduction

The cornerstone of a strong, well-established and successful healthcare organization is an effective leadership skillset amongst the physicians that are responsible for upholding the working of the institution.[1] One way to achieve this, is through leadership development programs (LDPs) that are designed primarily to ensure that leaders receive the required education and proficiency training to meet the contemporary developmental needs. LDPs are essentially defined as educational interventions structured in a way so as to recognize and build up on the leadership capacities, values, and behaviors of individuals.[1,2]

Recent challenges in healthcare have made its provision a more complex system with extensive efforts being made to improve patient safety and service improvement.[3] Furthermore, clinicians experience `burnout` whereby they lose their sense of motivation and suffer with depersonalization that

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affects their interactions with patients resulting in poor satisfaction.[4-6] Keeping in view these hurdles, it is imperative to assess the role played by leadership in healthcare for it is "the most influential factor in shaping organizational culture".[7]

Many different types of LDPs have been described, for example, primal leadership that is based on neurological research[8], authentic leadership and authentic followership[9], autocratic leadership, task oriented, laissez-faire and relationship-oriented leadership.[10,11] The two more commonly identified types are transactional and transformational leadership. Transactional leadership is an old school of thought and method where the relationship between the leader and the people is the sole focus. It uses a reward and punishment system to push people to work harder, whereas transformational leadership is more of a proactive type of leadership in which the leader has the ability and power to cater the emotions and enthusiasm of his people. He uses his own charisma and idealized influence to induce stimulation and inspiration among his followers. The leader has good management skills, creates learning opportunities and develops an emotional bond with his followers.[12] In the modern era of LDPs, transformational type is being promoted more.

With the advancement in the medical field and increasing awareness about the importance of incorporation of leadership skills development amongst medical professionals, a number of studies have recently been conducted to evaluate the leadership competency of healthcare providers and also their awareness and interest towards leadership programs. One such study was conducted among the graduates of hospitals associated with Capital Medical University, China where a cross-sectional study was performed with 851 graduates to assess the transformational leadership competency. A group analysis was done using the values from socially responsible leadership scale (SRLS), emotionally intelligent leadership inventory (EILI) and student leadership practices inventory (SLPI). The results showed medium transformational leadership competency but the leaders' values had an effect on the other.[13] Another cross-sectional study was carried out among the medical students of two colleges of Lahore to assess attitude and perception of the students towards leadership training programs. 1204 students filled the questionnaire and it was seen that although the students were aware of the importance of the leadership programs, there was still room for improvement in the provision of training programs by the authorities.[14]

In today's healthcare landscape, effective leadership is critical for fostering innovation, improving patient-outcomes and navigating the intricacies inherent in the healthcare systems. A significant gap exists regarding the scarcity of "transformational leadership" style LDPs particularly tailored to medical students. By employing a pretest-posttest model, this study aims to address this void by evaluating the efficacy of LDPs crafted specifically for medical students. This will enable the policymakers to incorporate "transformational leadership" principles into the medical education curricula and consequently equipping the future physicians with the mindset and skills necessary to lead effectively in an ever-evolving healthcare sector.

Methods

A pretest-posttest quasi-experimental design was used in this study. Ethics approval for the conduction of this research was obtained from the Institutional Review Board (IRB) committee of King Edward Medical University, Lahore. An informed consent was obtained from the participants prior to data collection. The students who enrolled in the course were asked to fill the questionnaire at three points in time; one before the start of the course (pretest), one immediately after the course (posttest), and one after two months (two-month follow-up). The minimum sample size to yield a statistical power of at least 0.8 with an alpha of .05 and a medium effect size (d=0.5) turned out to be 27, as indicated by a power analysis of a one-tailed paired-samples t-test using G*Power software, so a sample size of 30 participants was taken into consideration.

The study was conducted in a medical school of Pakistan, with undergraduate MBBS students as participants. A total of 30 students from various undergraduate levels participated in the study voluntarily. Medical students enrolled in any of the five undergraduate years of MBBS were included, and those students who have attended any sort of leadership course before were excluded.

A comprehensive leadership development program was designed by the authors, tailored specifically to undergraduate medical students. This leadership course titled "HEALTH-LEAD: Transforming Leadership in Medicine" was based on the transformational leadership principles described by B. M. Bass as: idealized influence, inspirational motivation, intellectual stimulation, and individual consideration.[15] This course was designed as a full day intensive program, including interactive workshops, group discussions, case studies and various experimental learning activities. Different sessions were designed to cover all the aforementioned dimensions of transformational leadership. The authors created PowerPoint presentations for each session to cover the following topics:

- **Session I:** "Visionary Leadership: Forging the Path to Tomorrow's Healthcare".
- **Session II:** "Idealized Influence: Inspiring Leadership Beyond Limits".

- **Session III:** "Inspirational Motivation: Igniting Passion for Success".
- **Session IV:** "Intellectual Stimulation: Cultivating Critical Thinkers".
- **Session V:** "Individualized Consideration: Nurturing Team Dynamics".

The detailed course outlines are provided in the Table 1 and the individual PowerPoint slides for each of the sessions are provided in supplementary materials.

A questionnaire based on Multifactor Leadership Questionnaire Form 6S (MLQ-6S) was used to evaluate the leadership skills of the participants before and after the course, as well as in the two-month follow-up. This tool measures the leadership competencies across different dimensions of various leadership styles including transformational, transactional and laissez-faire leadership. We extracted only the Transformational Leadership section from the questionnaire, which consists of a total of 12 items, three each for the four dimensions of transformational leadership as described before.[15] These items employ a likert-like scale in which there are five possible answers: not at all, once in a while, sometimes, fairly often, and frequently, if not always. A study assessing the reliability of this tool reported a Cronbach's Alpha of 0.886 and a Split-half coefficient of 0.854 for the Transformational Leadership section, deeming it suitably reliable.[16]

IBM SPSS Statistics v27 was used for data analysis. The descriptive statistics were calculated and reported as frequen-

Table 1: *Detailed outline of the course "HEALTHLEAD: Transforming Leadership in Medicine".*

Session	Objectives	Outline
I. Visionary Leadership: Forging the Path to Tomorrow's Healthcare.	1. Introduction to various leadership styles and their importance. 2. Introduction to transformational leadership and its relevance in healthcare. 3. Understanding the importance of vision in leadership. 4. Understanding the association of leadership qualities with personal and professional growth in the medical field	**12:00-12:30 PM** • Introduction. • Lecture via PowerPoint slides. • Case-study analysis of various leaders in healthcare.
II. Idealized Influence: Inspiring Leadership Beyond Limits.	1. Embodying exemplary leadership traits and behaviors. 2. Leading by example and inspiring trust and admiration in others. 3. Identifying role models and leadership qualities to emulate.	**12:45-01:30 PM** • Introduction. • Lecture via PowerPoint slides. • Case-study. • Group activity (included two real -life based scenarios).
III. Inspirational Motivation: Igniting Passion for Success.	1. Motivating and inspiring others to achieve common goals. 2. Effective communication techniques for motivating healthcare teams. 3. Inspiring motivation in challenging healthcare scenarios.	**01:45- 02:30 PM** • Introduction. • Lecture via PowerPoint slides. • Role-playing group activity (included two scenarios). • Group discussion on personal experiences of motivation and inspiration in medicine.
IV. Intellectual Stimulation: Cultivating Critical Thinkers.	1. Encouraging innovation and critical thinking in healthcare. 2. Creating a culture of learning and growth within medical teams. 3. Generating innovative solutions to healthcare challenges. 4. Applying critical thinking skills to medical decision-making.	**02:45-03:30PM** • Introduction. • Lecture via PowerPoint slides. • Brainstorming session on various problems faced in healthcare. • Simulation exercise on applying critical thinking skills to medical decision making.
V. "Individualized Consideration: Nurturing Team Dynamics.	1. Recognizing the unique needs and strengths of healthcare team members. 2. Providing personalized support and mentorship to colleagues. 3. Identifying areas for improvement in providing individualized support.	**03:45-04:30 PM** • Introduction. • Lecture via PowerPoint slides. • Case-study analysis on a real -life example of individualized consideration. • Group discussion on challenges and solutions in implementing individualized consideration.

cies, means and standard deviations. To evaluate the differences between the pretest, posttest and two-month follow-up scores, repeated measures analyses of variance (ANOVA) using a general linear model was performed, with time as a within-subject factor.

Results

A total of 30 participants enrolled in the leadership program and completed the pretest, posttest and the two-month follow-up survey. The baseline characteristics of the participants are given in Table 2. According to the results, the pretest mean scores were 2.09 out of 4 and those of the posttest were 2.6772 out of 4, which is an increase of 0.586. Furthermore, the mean score of the two months follow-up turned out to be 2.861, which is a slight increase of 0.189 from the posttest scores. This shows a visible impact of the transformational leadership course "HEALTHLEAD" on the leadership skills of the participants. Moreover, the mean scores of the participants across different dimensions of transformational leadership indicates a significant increase in mean scores after the administration of the course as illustrated in Figure 1.

A repeated measures ANOVA (Analysis of Variance) was performed, with time as a within-subject factor, in order to compare the pretest, posttest and two-month follow-up results. The normality assumption was tested using the Q-

Table 2: *Baseline demographic characteristics of the participants.*

Age (years)	
Mean ± SD	21.57 ± 0.774
Range	20-23
Gender, n (%)	
Male	15 (50)
Female	15 (50)
MBBS Undergraduate Year, n (%)	
1st Year MBBS	0 (0)
2nd Year MBBS	0 (0)
3rd Year MBBS	5 (16.7)
4th Year MBBS	22 (73.3)
5th Year MBBS	3 (10)
Total (n) = 30	

Q plot, which indicated the normal distribution of data as shown in Supplementary Figure 1-3. The Mauchly's Test of Sphericity was used to test the sphericity assumption for repeated measures ANOVA. The test resulted in a Mauchly's W of 0.638, an approximate chi-square of 12.568 and p = 0.002. Owing to the significant results of the test, the degrees of freedom were adjusted using the Greenhouse-Geisser method with ε=0.734. The results of repeated measures ANOVA indicated a significant main effect on mean scores, $F(2, 28) = 27.281$, $p < 0.001$ and $\eta 2 = 0.661$. This shows that the mean leadership scores increased over time after the administration of the leadership development program.

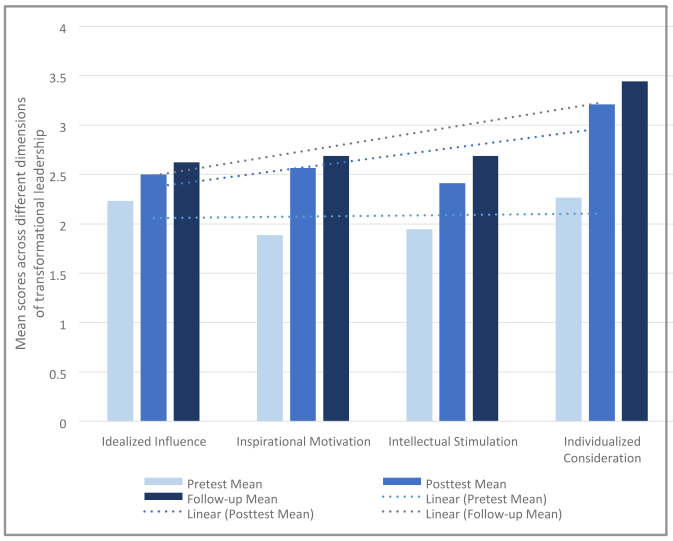

Figure 1: *Changes in mean scores across different dimensions of transformational leadership.*

The pairwise comparisons indicated a statistically significant mean difference of 0.586 between the posttest and the pretest means ($p < 0.001$, S.E. = 0.079, 95% CI [-0.786, -0.386]) and that of 0.775 between the two months follow-up and the pretest means ($p<0.001$, S.E.=0.128, 95% CI [0.449, 1.101]). However, there was a statistically non-significant difference between the two months follow-up and the posttest mean scores (Mean difference = 0.189, p = 0.143, S.E. = 0.091, 95% CI [-0.043, 0.421]). The pairwise comparisons of pretest, posttest and two months follow-up mean scores are depicted in Table 3.

Table 3: *Pairwise comparisons of pretest, posttest and two-month follow-up mean scores*

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	-.586*	.079	.000	-.786	-.386
	3	-.775 *	.128	.000	-1.101	-.449
2	1	.586*	.079	.000	.386	.786
	3	-.189	.091	.143	-.421	.043
3	1	.775*	.128	.000	.449	1.101
	2	.189	.091	.143	-.043	.421

Based on estimated marginal means.
1 = Pretest 2 = Posttest 3 = Two Months Follow-up
*The mean difference is significant at the .05 level.
Adjustment for multiple comparisons: Bonferroni

Discussion

The course developed by the authors: "HEALTHLEAD: Transforming Leadership in medicine" was a comprehensive

course, tailored specifically for undergraduate medical students, with the results showing an increase from the pretest to posttest.

According to the results, there is a statistically significant mean difference between the pre-test and the post-test, as well as between the pre-test and the follow up. This indicates a better result in the improvement of leadership qualities after the LDP intervention, as compared to the improvement between post-test and follow-up, in which an insignificant mean difference was seen. Similarly, if the scores of the individual dimensions of the transformational leadership are compared, it is visible that in case of idealized influence, inspirational motivation, intellectual stimulation, and individual consideration the mean difference between pre-test and post-test is significant showing improvement in each of these dimensions. Similarly, the significant mean difference between pre-test and follow-up also indicates such improvements in the span of 2 months. However, a non-significant difference between post-test and follow-up shows relatively less improvement in the results during the period of 2 months. It is also evident that as compared to the other dimensions, there was a relatively greater increase in the mean score of "individualized consideration", going from 2.0900 in pre-test, to 3.211 post-test. These results are in congruence with various studies which were performed to assess the effectiveness of LDPs. For instance, a meta-analysis in which 200 lab and field studies were reviewed to address whether leadership intervention had a positive impact, and if yes, then to what degree. It was found that the interventions produced a positive outcome of 66%.[17] A systematic review was also conducted over the available data on the effects of LDPs on physicians. Out of the 45 included studies, half of the studies were pre/post intervention designs and positive outcomes were reported in almost all studies. Although most of studies showed impact on self-assessed knowledge and behavioral change, some outcomes were also seen at the system level.[18] Another literature review performed in 2020 also showed positive outcomes with increased communication skills, confidence and knowledge of management in participants after LDP intervention in most of the studies.[19]

Leadership is now viewed as a skill rather than the question of "Are leaders born or made?", and so, it is believed that when given sufficient opportunity and time, individuals are bound to make progress in their leadership skills. Therefore, leadership development programs are now conducted in various occupational areas with our study primarily targeting medical students.[20]

This study has significant implications proving it to be increasingly relevant in the present, complex healthcare landscape. It highlights the importance of including transformational leadership training into the curriculum for undergraduate medical students because by equipping these students with strong leadership skills, medical schools are preparing future physicians to more effectively lead healthcare teams, improve organizational culture, and provide patient safety and satisfaction alongside dealing with their own challenges such as burnout. Our study adopted a comprehensive and collaborative approach to leadership development by focusing on giving students a thorough understanding of the unique challenges and dynamics of leading in the medical profession and thus providing them with leadership skills that are directly applicable to their future careers as physicians. Through the course, emphasis was laid upon the practical application of leadership skills with case studies, simulations, and real-world scenarios giving the students a hands-on approach to translate their skills into real-life situations. Additionally, the course was facilitated by professionals in the healthcare leadership field who brought in their own expertise and valuable insights to the program.

The strengths of this study lies in it being one of the first studies crafted specifically for development of leadership skills in medical students. The sample size was consistent across the three points in time (N=30) that the data was collected in, which eliminates any possibility of the observed results being due to change in the sample. The exclusion criterion of the study included those students who had previously attended any sort of leadership course and this further ruled out any bias pertaining to the already present impact of any prior influence.

It is imperative to acknowledge certain limitations of this study. The sample size used was only 30 participants which is relatively small and could limit the generalizability of the results to a larger population. Furthermore, the study was based on self-reported measures which could introduce bias as it is not possible to assess the accuracy of the data provided by the students themselves who could have been overly critical, or overly generous in their evaluation. There are several recommendations and improvements that may be kept in mind for future studies. Using a larger and more diverse sample may help to better assess the importance and improvement in various qualities and skills after transformational style LDPs. Moreover, it would be more valuable to do a follow-up beyond the two-month mark to assess the sustainability of the long-term effects of the program. Additionally, incorporating objective measures of leadership skills, such as performance evaluations, could provide a more comprehensive assessment of the program's impact on students.

Conclusion

The results of this study suggest that the transformational-style LDP had a significantly positive impact in fostering

the leadership skills of medical students. The findings indicate an increase in mean scores from the pretest to the posttest, as well as in the two-month follow up, with the participants showing an improvement across different dimensions of transformational leadership. The program had an impactful and lasting impact on the leadership skills of the participants.

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Ethical approval: Obtained from IRB of King Edward Medical University.

Authors Contribution:

MS, AAN: Involved in conceptualization of study

AA, AA: Involved in data collection

AHK, AH: Involved in manuscript writing

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