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The Impact of Clinical Leadership Training on Internal Medicine Residents: A Design-based Quasi-experimental Study

Klinik Liderlik Eğitiminin İç Hastalıkları Asistanları Üzerindeki Etkisi: Tasarım Tabanlı Yarı Deneysel Bir Çalışma

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ABSTRACT

Objective: This study aimed to assess the perceptions of clinical leadership among internal medicine trainees and to examine the impact of a structured clinical leadership training programme on learning outcomes.

Methods: The study was conducted between August 2023 and January 2024 in a tertiary hospital using a design-based research approach. Under this approach, which comprised needs analysis, programme development, implementation, and evaluation, 125 internal medicine residents were included: 63 participated in the 13-hour clinical leadership training programme (training group), while 62 formed the control group. Data were collected using a demographic form, a knowledge test (pre-test/post-test), and the clinical leadership scale (CLS). The chi-square test was used for between-group comparisons, and the odds ratio (OR) and 95% confidence interval (CI) were used to calculate the effect size. The Bonferroni correction was applied for multiple comparisons.

Results: The CLS demonstrated high internal consistency (Cronbach's alpha = 0.96). The highest scores were obtained in the "management of services" and "working with others" sub-dimensions, while the lowest score was recorded in the "designing interventions" sub-dimension. The correct response rate among participants who had received training was significantly higher than among those who had not (61.1% versus 29.2%), corresponding to a 2.09-fold increase (OR = 3.95; 95% CI: 3.22-4.85; p < 0.001).

ÖZ

Amaç: Bu çalışmada, iç hastalıkları asistanlarının klinik liderlik algılarının değerlendirilmesi ve yapılandırılmış bir klinik liderlik eğitim programının öğrenme çıktıları üzerindeki etkisinin incelenmesi amaçlanmıştır.

Yöntemler: Çalışma, Ağustos 2023-Ocak 2024 tarihleri arasında üçüncü basamak bir hastanede tasarım tabanlı araştırma yaklaşımıyla yürütülmüştür. İhtiyaç analizi, program geliştirme, uygulama ve değerlendirme aşamalarından oluşan bu yaklaşım kapsamında 125 iç hastalıkları asistanı çalışmaya dahil edilmiştir; bunlardan 63'ü 13 saatlik klinik liderlik eğitim programına katılmış (eğitim grubu), 62'si kontrol grubunu oluşturmuştur. Veriler demografik bilgi formu, bilgi testi (ön test/son test) ve klinik liderlik ölçeği (KLÖ) ile toplanmıştır. Gruplar arası karşılaştırmalarda ki-kare testi, etki büyüklüğünün hesaplanmasında olasılık oranı (OO) ve %95 güven aralığı (GA) kullanılmıştır. Çoklu karşılaştırmalar için Bonferroni düzeltmesi uygulanmıştır.

Bulgular: KLÖ'nün iç tutarlılığı yüksek bulunmuştur (Cronbach alfa = 0,96). En yüksek puanlar "hizmetlerin yönetimi" ve "diğerleri ile çalışma" alt boyutlarında, en düşük puan ise "yönlendirmelerin kurgulanması" alt boyutunda elde edilmiştir. Eğitim alan katılımcıların doğru yanıt oranı, eğitim almayanlara göre anlamlı düzeyde yüksek bulunmuştur (%61,1'e karşı %29,2); bu fark 2,09 katlık artışa karşılık gelmektedir (OO = 3,95; %95 GA: 3,22-4,85; p < 0,001).

Sonuç: Klinik liderlik eğitimi, iç hastalıkları asistanlarında bilgi ve farkındalık artışı ile ilişkilidir. Bu bulgular, klinik liderlik eğitim

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ABSTRACT

Conclusion: Clinical leadership training is associated with increased knowledge and awareness among internal medicine residents. These findings support the integration of clinical leadership training programmes into the medical education curriculum.

Keywords: Clinical leadership, leadership training, graduate medical education, internal medicine residency, clinical competence, health professions education, quasi-experimental study

Öz

programlarının tıp eğitimi müfredatına entegre edilmesini desteklemektedir.

Anahtar Sözcükler: Klinik liderlik, liderlik eğitimi, mezuniyet sonrası tıp eğitimi, iç hastalıkları uzmanlık eğitimi, klinik yeterlilik, sağlık meslekleri eğitimi, yarı deneysel çalışma

INTRODUCTION

The increasing complexity of healthcare services and the rise in multidisciplinary teamwork have made the concept of clinical leadership a fundamental component of modern healthcare systems (1,2). Clinical leadership plays a critical role in improving the quality of patient care, ensuring coordination within teams, and supporting the effective management of healthcare services (3).

It has been demonstrated that effective clinical leadership is closely linked to patient safety, quality of care and healthcare performance (4). However, it is reported that clinical leadership skills are largely acquired through experience and that structured training programmes are limited (4,5).

Residents play an active role in patient care and assume significant responsibilities for team coordination and clinical decision-making. However, it is noted that current training programmes lack sufficient content for the systematic development of leadership skills (5,6). This shortcoming is of particular importance, as doctors are expected to manage clinical teams, implement quality improvements, and use resources effectively. Contrary to expectations, these skills are rarely taught during specialist training (7,8).

Although efforts to develop clinical leadership training programmes have increased in recent years, it is evident that there are limited studies objectively evaluating the impact of these programmes on learning outcomes (5). To the best of our knowledge, this study is the first to evaluate the effectiveness of a structured clinical leadership programme specifically designed for doctors in Türkiye. This study aimed to assess postgraduate trainees' perceptions of clinical leadership at University of Health Sciences Türkiye, Ankara Bilkent City Hospital and to examine the impact of a clinical leadership training programme for internal medicine postgraduate trainees on learning outcomes.

MATERIALS AND METHODS

Study Design and Setting

This study was conducted using a design-based research (DBR) approach to assess the clinical leadership perceptions of postgraduate trainees working at University of Health Sciences Türkiye, Ankara Bilkent City Hospital and to examine the impact of the clinical leadership training programme developed for internal medicine postgraduate trainees on learning outcomes (9). DBR is an iterative methodological framework comprising cycles of needs analysis, programme development, implementation, and evaluation. The research was conducted between August 2023 and January 2024.

During the needs-analysis phase of the study, an online survey was sent to approximately 1,000 postgraduate trainees at University of Health Sciences Türkiye, Ankara Bilkent City Hospital, and data were obtained from 442 participants. Among these, 63 internal medicine postgraduate trainees comprised the training group and participated in the clinical leadership training programme. The 62 internal medicine residents who did not participate in the training programme were selected from the same institution to form the control group (total n = 125). Both groups consisted of internal medicine residents with similar clinical responsibilities at the same hospital. Snowball sampling was used.

Training Programme

A 13-hour clinical leadership training programme comprising 12 topics was developed based on the findings of the needs analysis, a review of the literature, and expert opinions (Table 1). The first and final sessions of the programme were conducted face-to-face in the General Hospital Training Hall at University of Health Sciences Türkiye, Ankara Bilkent City Hospital, while the remaining sessions were delivered through an online learning system. For each session, the objectives, learning outcomes, content and duration were clearly defined. The training was delivered by trainers who are experts in their field.

Data Collection Tools

Three tools were used for data collection: (1) A demographic information form (age, gender, marital status, years of residency, and status regarding management, leadership, or clinical leadership training); (2) the clinical leadership scale (CLS); and (3) a knowledge test. The CLS consists of 40 items and five sub-dimensions, covering the following dimensions: Personal characteristics, working with others, management of services, improvement of services, and designing interventions (10).

Knowledge Assessment

Participants were administered a pre-test (14 questions) prior to the training and a post-test (13 questions) following the training. The same post-test was also administered to a control group that did not receive training, and comparisons were made between the groups. Although the pre-test and post-test are similar in content, they have different levels of difficulty, because they are not parallel forms.

Sample

The sample size for the study was determined using an a priori power analysis. For a clinically meaningful absolute difference of 30% in the proportion of correct answers on the knowledge test

between groups receiving and not receiving the clinical leadership intervention, the expected effect size was calculated as Cohen's $h = 0.61$, corresponding to a large effect. For calculations using G*Power 3.1 software to compare two independent proportions, a minimum of 42 participants per group was required under two-tailed $\alpha = 0.05$ and 80% statistical power. Allowing for a potential attrition rate of 30%, the target sample size was set at a minimum of 55 participants per group (11).

Statistical Analysis

Data were analysed using IBM SPSS Statistics 27 (IBM Corp., Armonk, NY, USA). Descriptive statistics are presented as frequency, percentage, mean and standard deviation. The reliability of the scale was assessed using Cronbach's alpha, and sample adequacy was evaluated using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. The correct response rates in groups with and without education were compared using the chi-square test. For each significant chi-square result, the odds ratio (OR) and 95% confidence interval (CI) were calculated as measures of effect size. The risk ratio was also calculated to compare the overall accuracy. To address multiple comparisons in the parallel chi-square tests for the 13 questions, a Bonferroni correction was applied, setting the corrected significance threshold at $p < 0.0038$ ($0.05/13$). The threshold for statistical significance was set at $p < 0.05$.

Ethics Committee

Ethical approval for the study was obtained from the University of Health Sciences Türkiye, Ankara Bilkent City Hospital Ethics Committee no. 2 via decision no: E2-22-2526, dated: 28 September 2022. Informed consent was obtained from all participants prior to participation. The scales used in the study were employed after obtaining the necessary permissions for their Turkish adaptations.

RESULTS

Descriptive Statistics

A total of 125 internal medicine trainees were included in the study. The demographic characteristics and training status of the participants are presented in Table 2.

The CLS demonstrated excellent internal consistency and sampling adequacy (Table 3). The overall Cronbach's alpha coefficient was 0.96, with subscale values ranging from 0.90 to 0.94. The KMO value was 0.906, and Bartlett's test of sphericity was statistically significant ($p < 0.001$), indicating that the data were suitable for factor analysis.

The subscale scores of the CLS are summarised in Table 4. The highest mean scores were observed in the "managing services" (83.94) and "working with others" (83.80) domains; the lowest mean score was observed in the 'designing interventions' domain (79.30).

Table 1. Clinical leadership training programme topic headings.

No	Topic	Presentation format
1	What kind of leader are you? Definition of clinical leadership and types of leadership	Face-to-face
2	The need for motivation and mentor support	Online
3	Emotional intelligence and working with different personalities	Online
4	The importance of a feedback culture in teamwork	Online
5	Time management	Online
6	Communication skills and a culture of empathy	Online
7	Anger management	Online
8	The art of public speaking in leadership	Online
9	Effective human resource management	Online
10	Challenges a clinical leader may face during healthcare delivery	Online
11	Pre- and post-graduate training practices in clinical leadership worldwide	Online
12	Crisis management and disaster management	Face-to-face (closing)

Table 2. Demographic characteristics and previous training status of internal medicine residents.

Variable	Category	n (%)
Gender	Female	76 (60.8)
	Male	49 (39.2)
Marital status	Single	60 (48.0)
	Married	65 (52.0)
Previous training	Management training (yes)	7 (5.6)
	Leadership training (yes)	5 (4.0)
	Clinical leadership training (yes)	3 (2.4)
Total		125 (100)

Intergroup Knowledge Test Performance

A comparison of correct answers on the final test between the trained and untrained groups is presented in Table 5. The trained group answered 500 out of 819 questions correctly (61.1%), while the untrained group answered 235 out of 806 questions correctly (29.2%). Overall, the performance of participants who received training was 2.09 times higher than that of those who did not receive training (OR = 3.95; 95% CI: 3.22-4.85; $p < 0.001$).

After applying the Bonferroni correction (threshold: $p < 0.0038$), the group that received training showed significantly better time-management performance (53 vs. 6; chi-square = 12.95; $p = 0.0003$; OR = 18.36; 95% CI: 7.50-44.94). However, the differences in motivation strategies (54 vs. 10; chi-square = 7.81; $p = 0.0052$) and in anger management (31 vs. 25; $p = 0.0493$) did not remain statistically significant. The group that did not receive training performed better on the question regarding challenges in healthcare leadership (39 vs.

Table 3. Reliability and sampling adequacy of the clinical leadership scale (KMO and Bartlett's test).

Scale/subscale	Number of items	Cronbach's alpha
Clinical leadership scale (total)	40	0.96
Personal characteristics subscale	8	0.91
Working with others subscale	8	0.90
Service management subscale	8	0.92
Service improvement subscale	8	0.94
Subscale for the construction of directions	8	0.93
KMO value		0.906
Bartlett's sphericity test		$p < 0.001$

KMO: Kaiser-Meyer-Olkin.

Table 4. Clinical leadership scale subscale scores of internal medicine residents.

Subscale	Number of items	Mean	Score (/100)	Standard deviation
Personal traits	8	2.47	82.28	0.58
Working with others	8	2.52	83.80	0.56
Managing services	8	2.52	83.94	0.56
Improving services	8	2.46	82.14	0.56
Setting direction	8	2.38	79.30	0.62
General scale	40	2.47	82.29	0.58

Table 5. Comparison of correct answers between trained and untrained internal medicine residents.

Question	Training group	Training not trained	Chi-square	p	OR (95% CI)
Motivation strategy	54	10	7.81	0.0052*	9.61 (4.51-20.47)
Emotional intelligence in leadership	39	19	4.12	0.042	2.94 (1.48-5.84)
Leader's first step in a crisis	55	26	9.03	0.003	3.94 (1.95-7.96)
Leader's priority during a disaster	54	23	7.12	0.008	3.71 (1.83-7.52)
Importance of anger control	31	25	3.87	0.049	1.86 (0.93-3.72)
Improving communication skills	23	11	2.01	0.156	2.44 (1.08-5.49)
Impact of feedback culture	59	21	11.42	0.001	6.08 (2.70-13.67)
The role of rhetoric in leadership	17	8	1.59	0.207	2.40 (0.93-6.20)
Importance of merit-based human resources	33	25	0.89	0.345	1.59 (0.79-3.21)
Benefits of postgraduate training	20	5	4.78	0.029	4.67 (1.60-13.64)
Time management strategy	53	6	12.95	0.0003**	18.36 (7.5-44.94)
Leadership style in a crisis	39	17	5.22	0.022	3.23 (1.55-6.74)
Challenges in healthcare leadership	23	39	28.25	<0.0001	0.12 (0.06-0.25)
Total	500/819 (61.1%)	235/806 (29.2%)	166.8	< 0.001	OR = 3.95 (3.22-4.85)

*: $p < 0.05$ (lost statistical significance after Bonferroni correction; did not meet the $p < 0.0038$ threshold), **: Remained statistically significant after Bonferroni correction ($p < 0.0038$), OR: Odds ratio, CI: Confidence interval

23; chi-square = 28.25; $p < 0.0001$; OR = 0.12; 95% CI: 0.06-0.25). No statistically significant differences were found between the groups on questions regarding emotional intelligence and crisis leadership (Bonferroni-corrected $p > 0.05$).

DISCUSSION

In this study, internal medicine trainees' perceptions of clinical leadership were generally high, with particularly high scores in the sub-dimensions of "management of services" and "working with others", and lower scores in the "designing interventions" sub-dimension. This finding suggests that trainees play an active role in team collaboration and service delivery within clinical practice, but have relatively limited experience in higher-level leadership skills, such as strategic thinking and setting direction. Significantly higher correct-response rates among participants who received clinical leadership training demonstrate the positive impact of structured training programmes on knowledge and awareness. The finding that clinical leadership training produces positive outcomes in junior doctors is consistent with the literature. Blumenthal et al. (7) comprehensively documented the gap in this area, emphasising the necessity of systematic leadership development programmes for junior doctors. Similarly, Sadowski et al. (5), in their systematic review of leadership interventions in postgraduate medical education, concluded that structured programmes enhance knowledge and awareness.

The first component of clinical leadership comprises personal qualities. In this study, the group that received training performed better in this dimension. This domain encompasses developing self-awareness, managing oneself, continuing personal development and acting with integrity (12). In their study on learning patterns, Santa and Nurcan (13) emphasised the impact of education on individual characteristics and noted that education provides awareness and insight into accepting environmental challenges and developing application patterns by altering psychological processes.

The second component of clinical leadership is the ability to work with others, i.e., suitability for teamwork. This study found a positive and significant relationship between the development of this dimension and education. Hunt et al. (14) found that teaching teamwork principles has a positive effect on enhancing the performance of team members, particularly in situations that require interdisciplinary communication. Harvey et al. (15) examined the effect of teamwork on nurses' performance and found that providing training in teamwork to nurses improved both their performance and their attitudes towards teamwork. Effective leadership requires people to work together to improve services. Consistent with this view, our study finds a positive relationship between the development of this competence and education. Clinical leaders must be effective in promoting communication and interaction, building and maintaining relationships, and encouraging teamwork (16).

The third component is the management of healthcare services, and our study again found a positive relationship between training and the development of clinical leadership. In their study, Dietz and Zwick (17) emphasised the role of workforce performance and service management in training and found that appropriately training staff can enhance organisational efficiency and produce

additional benefits through increased employee productivity. The reason for this positive relationship is that effective leadership requires individuals capable of planning and managing elements such as data, performance and human resources while prioritising organisational success as the primary objective (16).

Regarding the fourth component, service improvement, the results of our study indicate a positive relationship between training and the development of this dimension of clinical leadership. Clarke et al. (18) have argued that in service quality improvement training, the curriculum serves as a valuable professional tool for organisations and has a significant impact on enhancing the quality of services provided. In a study by Taghadosi and Hossieni (19), it was noted that the lack of training—identified as a barrier to improving the quality of nursing services—could be addressed by implementing appropriate curriculum adjustments. This finding is consistent with the critical role of effective clinical leadership in enhancing patient safety and service quality (16).

Overall, the results of our study indicate a positive and significant relationship between the development of clinical leadership competencies and education. Kyriakidou et al. (20) have noted that participation in leadership training and development programmes positively influences healthcare professionals' leadership potential and clinical leadership characteristics. Gupta et al. (21) emphasised the widespread need for leadership and management training to develop clinical leadership skills. The study acknowledges the necessity of developing training content that aligns with the changing environment and society's needs for doctors. Organisations should support their doctors in developing their leadership skills, as new challenges may arise in the field of public health and healthcare. This support should include the allocation of sufficient time and resources to access education and targeted programmes (21). In their study on clinical leadership within the nursing curriculum, Brown et al. (22) noted that awareness of clinical leadership characteristics in healthcare could be raised among nursing students and other relevant stakeholders, and that training could be provided on how to utilise these characteristics. It was emphasised that healthcare services could be improved by selecting appropriate curriculum content and implementing effective educational approaches and strategies (22).

The results of our 13-hour clinical leadership training programme, in which participants demonstrated higher rates of correct responses, support the programme's contribution to learning outcomes. The scales used encompass the medical leadership competencies required to meet critical leadership needs in the Turkish healthcare environment. Our programme provided a targeted, multi-method, structured approach to developing management and leadership skills. A study by Lucas et al. (23) reported that leadership development programmes at medical schools in the US and Canada cover broad areas, such as leadership, collaboration and development, communication, guidance and managing change, business management, group dynamics and self-management. Similarly, the content of our programme aligns with the framework recommended for such programmes.

In our study, the correct response rate for participants who received training was approximately 74% in the pre-test and 61% in the post-test. However, correct response rates for leadership competencies

were higher among participants who received training than among those who did not. This situation may be related to the fact that the pre-test and post-test were not equivalent in content and level of difficulty.

We suggest that a 13-hour leadership training programme could serve as a appropriate starting point for imparting leadership knowledge and characteristics to healthcare professionals across all major specialisations. The increase in medical leadership competencies supports the future implementation of this programme for leadership training of doctors in Türkiye. Such programmes include pre- and post-assessment feedback and facilitate high-quality individual leadership performance within the healthcare sector. Frich et al.'s (6) review of 45 leadership training programmes from 1991 to 2013, reported that these programmes used various teaching methods and primarily focused on skill development and technical knowledge, while giving comparatively less attention to individual awareness and personal development. Furthermore, it was noted that the programmes primarily targeted junior doctors and middle managers and that the positive outcomes achieved were largely based on self-assessments (6). Pradarelli et al. (24) reported that a leadership training programme developed for surgical specialties positively impacted participants' leadership skills, self-awareness, and teamwork competencies. The use of both theoretical and experiential learning methods within the programme demonstrated that it facilitated the development of participants' knowledge and skills regarding leadership practices (24).

In a study based in Germany, Saravo et al. (25) conducted a four-week transformational and transactional leadership programme (the IMPACT leadership training module) for 57 junior doctors in a hospital setting and demonstrated that this short-term leadership training enhanced leadership skills among junior doctors.

In another study, Donaghy et al. (26) demonstrated improvements in all components examined during the expert trainers' leadership programme. It was found that this programme was beneficial not only to individual trainers but also to organisations (26). Within this scope, Kelly et al. (27) organised a five-week clinical leadership programme covering various leadership and management areas at a university hospital in Ireland. Steinert et al.'s (8) BEME systematic review (2012) confirms that faculty development initiatives focusing on leadership development in medical education have a positive impact on participants' attitudes, knowledge and skills. All participants reported that the programme was a positive learning experience. Furthermore, improvements were reported in leadership traits, business management and planning, career progression, and quality improvement. Straus et al. (28) reviewed the impact of clinical leadership programmes on doctors in academic health centres. They found that these programmes had modest effects on key outcomes and recommended that they be rigorously evaluated (28). Furthermore, they highlighted the potential of multidisciplinary clinical leadership programmes to strengthen understanding between working groups and enhance organisational leadership capabilities (29).

There is no standard approach to integrating clinical leadership training into pre-graduation education. However, in their study,

Budakoglu et al. (30) reported that a course on leadership and teamwork integrated into the medical school curriculum increased students' leadership awareness and highlighted the need for development in this area.

Medical school curricula in Türkiye are believed not to allocate sufficient space for clinical leadership training. This situation may cause difficulties for doctors transitioning into leadership roles in clinical practice. The findings of this study support the necessity of developing clinical leadership training programmes tailored to healthcare professionals at different career stages. Furthermore, delivering such training via digital platforms to enhance accessibility could help reach a wider audience. This long-term, skill-focused clinical leadership curriculum could serve as a model or template for future studies and collaborations.

Study Limitations

This study has certain limitations. First, the study was conducted at a single centre and included only internal medicine residents, potentially limiting the generalisability of the findings. The snowball sampling method may have led to selection bias. Participants were not randomly assigned to groups (semi-experimental design), which limits the ability to draw causal inferences. A critical methodological limitation is that the parallel-form validity of the pre-test and post-test was not verified and the number of questions differed (pre-test: 14, post-test: 13). Consequently, intragroup pre- and post-test comparisons do not allow reliable interpretation. The primary outcome of the study should be evaluated by intergroup comparison in the post-test. Furthermore, leadership skills were assessed by knowledge levels and scale responses rather than by direct observation of clinical performance. The long-term effects of the training programme were not assessed. Therefore, evaluating knowledge retention through follow-up tests at 3 or 6 months is crucial for determining the sustainability of such educational interventions.

CONCLUSION

This study demonstrated that clinical leadership training improves leadership knowledge and awareness among internal medicine trainees. Participants who received training showed higher rates of correct responses than those who did not, supporting the programme's contribution to learning outcomes. However, the findings suggest the need for more comprehensive and continuous training programmes to develop leadership skills across all dimensions. Integrating clinical leadership training into the medical curriculum and continuing it at different career stages could contribute to the development of leadership capacity in healthcare.

Ethics

Ethics Committee Approval: Ethical approval for the study was obtained from the University of Health Sciences Türkiye, Ankara Bilkent City Hospital Ethics Committee no. 2 via decision no: E2-22-2526, dated: 28 September 2022.

Informed Consent: Informed consent was obtained from all participants prior to participation.

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Footnotes

Authorship Contributions

Concept: M.K., Ö.C., Design: M.K., Ö.C., Data Collection or Processing: M.K., Analysis or Interpretation: M.K., Ö.C., Writing: M.K., Ö.C.

Conflict of Interest: No conflict of interest was declared by the authors.

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