ORIGINAL ARTICLE

EVALUATING THE RELATIONSHIP BETWEEN TRANSFORMATIONAL LEADERSHIP AND PATIENT SAFETY AT A PUBLIC SECTOR DENTAL HOSPITAL IN KARACHI, PAKISTAN: A CROSS-SECTIONAL STUDY

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ABSTRACT

Objectives: The goal is to identify the key attributes of transformational leadership and explore their connection to patient safety practices as well as the overall performance of dental staff in public sector hospitals in Karachi. Specifically, it aims to assess the relationship between transformational leadership styles and patient safety practices in dental work environments.

Materials and Methods: A cross-sectional study was carried out between October and November 2024 at SIOHS, JSMU, after IRB approval. A sample size of 137 participants was determined, including 3rd and 4th-year BDS students, house officers, and postgraduate trainees. Convenience sampling was employed. Two close-ended questionnaires were used for data collection after obtaining consent.

Results: The final sample included 137 participants, mostly female, aged 21 to 55. Participants consisted of clinical faculty, house officers, resident physicians, and BDS students, most with 1–2 years of experience. Charisma received the highest ratings as a leadership attribute (Mean score=11.95), while Delegation showed the greatest variability (SD=2.63). Responses to the APSQ III patient safety scale generally indicated agreement, although items Q11, Q12, Q13, Q15, Q16, Q17, and Q25 had higher disagreement rates. Pearson's correlation analysis found a significant positive correlation between the Transactional attribute and Error Inevitability ($p < 0.05$) and a significant negative correlation between Vision and Error Reporting Confidence ($p < 0.001$).

Conclusion: A strong patient safety culture develops with transformational leadership, which enhances service quality and decreases preventable errors.

Keywords: Organizational Culture; Leadership; Patient Safety; Patient Satisfaction; Motivation.

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INTRODUCTION

Ensuring patient safety is a top priority in medicine globally, as highlighted by the Institute of Medicine (IOM) in 1999. [1, 2] Ree et al. explain that patient safety culture includes shared and individual values, attitudes, beliefs, competencies, and behaviors, which shape an organization's dedication to health and safety.[3] Medical errors related to patient safety cause about 1,700 deaths each year. [4] A report from Johns Hopkins University estimates that over 250,000 deaths occur annually in the US due to medical errors, making it the third leading cause of death after heart disease and cancer.

In developing countries, patient harm is alarmingly high; up to one in four patients experiences harm, with over 134 million adverse events each year, leading to 2.6 million deaths. [5] Inadequate healthcare services often result from leadership deficiencies. Effective leadership is essential for fostering a culture of safety, as leaders influence and support such a culture. [3, 6, 7]

Transformational leadership, characterized by idealized influence, intellectual stimulation, individual consideration, and inspirational motivation, boosts employee commitment and satisfaction, making it particularly suitable for healthcare's dynamic environment. [6, 8] Ineffective leadership has been associated with increased patient

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safety incidents. [6] Therefore, transformational leadership plays a significant role in shaping patient safety culture and perceived safety levels. [7, 9, 10]

A strong safety culture is linked to better patient outcomes, including higher satisfaction and fewer adverse events. [3] The WHO defines patient safety as the prevention of errors and adverse effects in healthcare. [11] While initial research focused on hospitals, an increasing number of primary care healthcare professionals (83%) require safety culture analysis in these settings. [12] Patient safety in dentistry is still in early stages of development. [13] Despite its significance, patient safety in dental healthcare is often a secondary concern. [14] This study aims to close the knowledge gap regarding how transformational leadership influences patient safety in dentistry in Karachi.

MATERIALS AND METHODS

A cross-sectional study was conducted at JSMU from October to November 2024, after IRB approval. Participants included third and fourth-year BDS undergraduate students, postgraduate trainees, and faculty members of SIOHS. A structured, closed-ended questionnaire was used to gather data from dental students, house officers, and residents. Inclusion criteria included clinical-year BDS

Table No 1: Descriptive Statistics for Leadership Domain Attributes

Leadership Domain	Minimum	Maximum	Mean	Std. Deviation
Charisma	5.00	15.00	11.95	2.19
Social	6.00	15.00	11.86	2.02
Vision	6.00	15.00	11.75	1.97
Transactional	4.00	15.00	11.73	2.44
Delegation	3.00	15.00	11.66	2.63
Execution	3.00	15.00	11.86	2.56

Table No 2: Response Rate Distribution for Items on Patient Safety Scale (APSQ III)

Item	Neutral (N, %)	Disagree (N, %)	Agree (N, %)	Total (N)
Q1	12 (8.8%)	13 (9.5%)	112 (81.8%)	137
Q2	7 (5.1%)	9 (6.6%)	121 (88.3%)	137
Q3	8 (5.8%)	12 (8.8%)	117 (85.4%)	137
Q4	12 (8.8%)	24 (17.5%)	101 (73.7%)	137
Q5	36 (26.3%)	15 (10.9%)	86 (62.8%)	137
Q6	17 (12.4%)	16 (11.7%)	104 (75.9%)	137
Q7	18 (13.2%)	21 (15.4%)	97 (71.3%)	137
Q8	11 (8.1%)	16 (11.8%)	109 (80.1%)	137
Q9	12 (8.8%)	18 (13.2%)	106 (77.9%)	137
Q10	10 (7.4%)	16 (11.8%)	110 (80.9%)	137
Q11	16 (11.8%)	82 (60.3%)	38 (27.9%)	137
Q12	33 (24.3%)	38 (27.9%)	65 (47.8%)	137
Q13	28 (20.6%)	58 (42.6%)	50 (36.8%)	137
Q14	10 (7.4%)	26 (19.1%)	100 (73.5%)	137
Q15	25 (18.4%)	40 (29.4%)	71 (52.2%)	137
Q16	25 (18.4%)	48 (35.3%)	63 (46.3%)	137
Q17	25 (18.4%)	65 (47.8%)	46 (33.8%)	137
Q18	16 (11.8%)	35 (25.7%)	85 (62.5%)	137
Q19	17 (12.5%)	21 (15.4%)	98 (72.1%)	137
Q20	13 (9.6%)	13 (9.6%)	110 (80.9%)	137
Q21	9 (6.6%)	12 (8.8%)	115 (84.6%)	137
Q22	23 (16.9%)	23 (16.9%)	90 (66.2%)	137
Q23	24 (17.6%)	20 (14.7%)	92 (67.6%)	137
Q24	9 (6.6%)	11 (8.1%)	116 (85.3%)	137
Q25	14 (10.3%)	51 (37.5%)	71 (52.2%)	137
Q26	12 (8.8%)	12 (8.8%)	112 (82.4%)	137

Table No 3: Pearson's correlation coefficient values between the leadership and patient safety scores.

	Charisma	Social	Vision	Transactional	Delegation	Execution
Safety Training (ST)	-.066	-0.064	-.021	-.137	-0.145	0.115
Error Reporting Confidence (ER)	-0.013	0.020	-0.23*	0.060	0.024	0.006
Working Hours as an Error Cause (WH)	0.090	0.088	0.031	0.062	0.053	0.089
Error Inevitability (EI)	0.061	0.051	-0.109	0.000**	-0.008	0.046
Professional Incompetence as an Error Cause (PI)	0.174	0.111	0.061	0.048	0.085	0.162
Disclosure Responsibility (DR)	0.175	0.235	0.244	0.231	0.177	0.191
Team Functioning (TF)	-0.038	-0.013	0.016	-0.013	-0.083	-0.082
Patient Involvement in Reducing Error (PE)	0.371	.0363	0.280	0.330	0.316	0.361
Importance of PS in the Curriculum (SC)	0.094	0.163	0.127	0.225	0.183	0.114

*Significant at 0.00101 level; **Significant at 0.05 level

students, house officers, interns, and residents aged 21 or older. Dental auxiliaries and individuals who did not consent were excluded. The total population was 211 individuals; a sample size of 137 was calculated using OpenEpi with a 5% margin of error and 95% confidence level. Convenience sampling was employed.

DATA COLLECTION TOOLS INCLUDED:

Transformational Leadership Survey: 18 statements covering six factors (Charisma, Social, Vision, Transactional, Delegation, Execution), rated from 1 (rarely) to 4 (almost always). Scores range from 18 to 72.

APSQ III: 26-item scale assessing nine patient safety domains on a 1–7 Likert scale, with internal consistency 0.64–0.82. [19] All participants completed the APSQ; senior residents and faculty completed the Transformational Leadership Survey. Questionnaires were distributed and collected after informed consent during participants' free time. Demographics were recorded.

RESULTS

Out of 211 questionnaires received, 137 complete responses were analyzed: 100 females, 37 males, ages 21–55. Participants included 25 clinical faculty, 33 house officers, 19 residents, 28 third-year, and 32 fourth-year BDS students. Most had 1–2 years of experience (n=64). The descriptive statistics for leadership attributes showed mean scores ranging from 11.66 to 11.95, with Charisma scoring the highest at 11.95. Delegation exhibited the greatest variability (SD=2.63), with scores ranging from 3 to 15. See table 1 for details. Table 2 displays the response distribution for each item on the APSQ III patient safety scale, showing the number (N) and percentage (%) of participants who responded as Neutral, Disagree, or Agree for each item (Q1 to Q26). The responses reveal varying levels of agreement, with most participants generally agreeing on most items, except for a few items (Q11, Q12, Q13, Q15, Q16, Q17, Q25) where disagreement rates are higher. The total number of responses per item slightly varies, ranging from 136 to 137. Table 3 shows Pearson's correlation coefficients evaluating the relationship between six leadership attributes (Charisma, Social, Vision, Transactional, Delegation, and Execution) and various aspects of patient safety. The correlations between leadership traits and different patient safety domains include Safety Training (ST), Error Reporting Confidence (ER), Working Hours as a Cause of Errors (WH), among others. Positive correlations were observed between Error Inevitability (EI) and Transactional (0.000), significant at the 0.001 level, while Error Reporting Confidence (ER) and Vision showed a negative correlation (-0.23*), significant at the 0.05 level.

DISCUSSION

Leadership plays a crucial role in shaping the patient safety culture, as seen in nursing and medicine. The leader's responsibility in creating a safe and supportive environment—vital for teamwork and high-quality work—is central. Supporting and motivating staff to accept and report errors as part of the patient safety protocol, which sometimes includes openly sharing adverse events, depends on strong backing from top leadership. This involves empowering staff to communicate effectively within and between operational management levels. As a result, this enhances the quality of care and decreases the likelihood of errors. [20- 22]

Charisma, as a leadership trait, was rated highest by the participants. Meanwhile, the item "I have a good understanding of patient safety issues as a result of my undergraduate medical training" received the most positive responses on the patient safety questionnaire.

This suggests that leaders act as role models for their subordinates by practicing the best patient safety practices. In examining the relationship between leadership qualities and patient safety scores, a positive correlation was found between transactional quality and error inevitability, significant at the 0.05 level. This indicates clear communication and shared understanding between leaders and their teams regarding the inevitability of human error.

When comparing the current findings of the APSQ III questionnaire with those of a local study that examined the knowledge and attitudes of private and public sector dental students regarding patient safety culture, it was observed that the highest-scoring item in the current research related to error inevitability, contrasting with the previous study, where patient involvement in reducing errors scored highest. [21] Another study conducted in Riyadh, KSA, found that "Organizational Learning and Continuous Improvement" had the highest ratings (Mean: 2.48, SD: 0.66). In contrast, a local study in Islamabad reported "Intellectual Stimulation" as the highest-rated factor (86%). [2, 17] In dentistry, the current Transformational Leadership survey questionnaire has not been previously used in the field or in health sciences, although alternative scales have been employed. Past studies that used various scales indicate that transformational leadership directly influences patient safety culture. [7, 17] In our study, charisma was linked to a healthy patient safety culture. Similarly, previous research has shown that individuals in managerial roles tend to have a positive relationship with patient safety ratings and the number of reported incidents. [2]

Comparing different leadership styles with patient safety culture, multiple authors have reported that the transactional leadership style was not associated with a willingness to report errors. In contrast, there was a weak association between transformational leadership and error reporting. [23,24,25] All past findings and current data support that transformational leadership plays a significant role in establishing a patient safety culture in any health science setting. Emphasis should be placed on integrating patient safety into the curriculum as an independent subject in dentistry, and hospitals should be mandated to create, support, encourage, and supervise a patient safety culture within their environments. The cross-sectional design of the study and the small sample size limit the generalizability of the results due to uneven gender distribution and a concentration of participants with 1–2 years of experience. Convenience sampling further restricts this. This could be addressed by using quota sampling and switching to a longitudinal design with random sampling to increase the chances of including a diverse range of participants with varying opinions. The second limitation is that the leadership survey questionnaire assesses only six attributes; other relevant attributes not included in the study might impact patient safety but are left unexplored. To improve the generalizability and applicability of the results, further research should be conducted with a larger, more diverse sample and, potentially, a longitudinal design to validate and expand the findings.

CONCLUSION

A strong patient safety culture develops under transformational leadership, enhancing service quality and reducing preventable errors.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Shah H	✓	✓	×	×	✓	×
Muqri IA	✓	×	✓	✓	✓	×
Urooj I	✓	✓	×	×	×	✓
Ali FM	✓	×	✓	✓	✓	×
Haqqani H	✓	✓	×	×	×	✓
Fatima M	✓	×	✓	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethical Approval:

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