

Nursing Leaders' Emotional Intelligence and Nursing Practice Outcomes: A Cross-Sectional Study in Pakistan

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Article Info:

Received:
(2026-06-17)

Revised:
(2026-09-24)

Approved:
(2026-09-28)

Published:
(2026-09-29)

Abstract

Background: Emotional intelligence (EI) is increasingly recognized as a vital nursing leadership competency, significantly impacting staff well-being and patient safety. However, empirical evidence quantifying this dynamic in Mardan District, Pakistan, remains limited. **Aims:** This study investigated the relationship between nursing leaders' EI and key practice outcomes—specifically job satisfaction, burnout, medication errors, and clinical adherence—across public and private hospitals in Mardan District. **Methods:** A quantitative, cross-sectional correlational design was utilized. The sample comprised 235 participants (39 nursing leaders and 196 staff nurses) across six hospitals. Assessments included the Wong and Law Emotional Intelligence Scale (WLEIS), McCloskey/Mueller Satisfaction Scale (MMSS), Maslach Burnout Inventory-Human Services Survey (MBI-HSS), and a custom clinical outcomes tool. Data were analyzed using descriptive and inferential statistics, including Pearson correlation, ANOVA, and stepwise multiple linear regression, via SPSS Version 26. **Results:** Nursing leaders demonstrated a high average EI ($M = 4.35$, $SD = 0.85$). Leader EI correlated positively with staff job satisfaction ($r = .42$, $p < .01$) and clinical adherence ($r = .35$, $p < .01$), while correlating negatively with burnout ($r = -.38$, $p < .01$) and medication errors ($r = -.31$, $p < .01$). Furthermore, units managed by high-EI leaders reported significantly fewer medication errors and superior hand hygiene compliance ($p < .001$). Empathy ($\beta = .31$) and self-regulation ($\beta = .27$) emerged as the strongest predictors of clinical adherence ($R^2 = .38$). **Conclusion:** Elevated nursing leader EI is significantly associated with improved staff outcomes and patient safety. Implementing targeted EI training programs for nursing leadership in Khyber Pakhtunkhwa, emphasizing empathy and emotional regulation, is strongly recommended.

Keywords: emotional intelligence, nursing leadership, job satisfaction, burnout, patient safety



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Cite this as: Rahim, A. (2026). Nursing Leaders' Emotional Intelligence and Nursing Practice Outcomes: A Cross-Sectional Study in Pakistan. *Journal of Pubnursing Sciences*, 4(03), 123–134. Retrieved from <https://journal.pubsains.com/index.php/jps/article/view/548>

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Introduction

Emotional intelligence (EI) has emerged as an essential skill for healthcare management, playing a pivotal role in employee satisfaction and patient care quality (Lambert, 2021). Defined as the capacity to perceive, understand, manage, and regulate one's own feelings and the emotions of others, EI enables nurse leaders to effectively navigate the emotional complexities of clinical settings (Majeed &

Jamshed, 2020). This competency is especially critical in nursing leadership, where daily pressures—such as staffing shortages, heavy workloads, stress, and the need for rapid decision-making—are prevalent (Saha et al., 2023). Research indicates that the five components of EI significantly enhance communication, conflict resolution, and team cohesion among healthcare professionals (Alwali & Alwali, 2022). Furthermore, nurse managers with high EI are more likely to demonstrate

transformational leadership behaviors, which drive staff performance and organizational engagement (Turjuman & Alilyyani, 2023) while also enhancing person-organization fit (Liu et al., 2023). Conversely, low EI among leaders has been directly linked to decreased team morale, elevated workplace conflict, and higher turnover intentions (Saikia et al., 2024).

Globally, a robust body of literature highlights the multidimensional impact of nursing leaders' EI on staff well-being and clinical outcomes (Alsufyani et al., 2020). Effective conflict management, driven by high leader EI, serves as a crucial mediator that improves nurses' job satisfaction and cultivates a healthier work environment (Soriano-Vázquez et al., 2023; Aseery et al., 2023). Job satisfaction, in turn, mediates the relationship between EI and overall job performance (Chauhan et al., 2022). Beyond satisfaction, leader EI positively influences nurses' psychological empowerment, work engagement, and organizational commitment (Alotaibi et al., 2020; Al-Oweidat et al., 2023). These competencies translate directly into clinical practice; EI has been shown to predict healthcare delivery quality (Oweidat et al., 2024) and has played a critical role in maintaining healthcare worker performance during crises like the COVID-19 pandemic (Alonazi, 2020). Notably, recognizing gender disparities in EI among health managers has also prompted calls for more targeted, gender-specific leadership development programs (Kitsios et al., 2022).

In Pakistan, the nursing profession faces unique and acute systemic challenges, including severe resource shortages, high patient-to-nurse ratios, and intense emotional stress, exacerbated by limited professional development opportunities (Zaman et al., 2021). In this challenging environment, EI has proven a vital protective factor. During the COVID-19 pandemic, EI acted as a buffer against psychological stress for Pakistani nurses engaging in virtual leadership (Alam et al., 2023). Recent national studies confirm that emotional quotient (EQ) positively correlates with leadership effectiveness among healthcare leaders (Babar et al., 2025) and serves as a crucial mitigator against burnout syndrome among clinicians (Badshah et al., 2025). Regionally, within Khyber Pakhtunkhwa (KPK), research indicates that EI correlates negatively with nurse burnout (Ullah et al., 2022) and positively with life satisfaction (Aisha et al., 2024). The foundational importance of EI in this region has also been established across various educational contexts, predicting academic success in undergraduate nursing students (Bibi et al., 2025) and medical students (Zahir et al., 2024), while also influencing job satisfaction among secondary school heads (Suleman et al., 2020).

Despite these regional benchmarks, a significant literature gap remains. Previous studies in KPK have focused mainly on individual psychological outcomes

(such as job satisfaction and burnout) rather than evaluating a broader range of objective nursing practice metrics, such as medication errors and adherence to clinical protocols. Furthermore, no quantitative study has yet investigated the specific impact of nursing leaders' EI on these clinical outcomes in District Mardan—a large, semi-urban area of KPK equipped with a vast healthcare infrastructure network comprising the Mardan Medical Complex, District Headquarters Hospital, and Tehsil Headquarters Hospitals. Without empirical evidence linking leader EI to specific clinical safety indicators and staff well-being in this context, healthcare administrators lack the foundational data needed to design effective leadership development interventions.

Therefore, utilizing a quantitative cross-sectional design, this study aims to explore the association between the emotional intelligence (EI) of nursing leaders and selected indicators of nursing practice outcomes—specifically job satisfaction, burnout, medication errors, and compliance with clinical standards—in public and private hospitals within District Mardan, Khyber Pakhtunkhwa, Pakistan. To achieve this overarching aim, the study investigates several key objectives. First, it assesses the baseline EI profile of nursing leaders in these settings and evaluates whether significant disparities in overall job satisfaction exist between these leaders and their staff. The research also examines the direct correlations between nursing leaders' EI and staff well-being, focusing on staff job satisfaction and burnout levels. The study also evaluates clinical safety by comparing medication error and adverse event rates in units led by high-EI versus low-EI leaders. Ultimately, this research seeks to identify which dimensions of emotional intelligence—self-awareness, self-regulation, motivation, empathy, or social skills—are the strongest independent predictors of positive nursing practice outcomes.

Methods

Research Design and Setting

A quantitative, cross-sectional, correlational design was employed to explore the relationship between the emotional intelligence of nursing leaders and nursing practice outcomes. This unmanipulated observational design is appropriate for examining relationships among variables at a single point in time (Creswell & Creswell, 2018) and aligns with the post-positivist paradigm emphasizing the objective measurement of constructs (Polit & Beck, 2021). The study was conducted across six hospitals in the Mardan District of Khyber Pakhtunkhwa (KPK), Pakistan. To ensure sample representativeness and enable cross-tier healthcare comparisons, the multisite setting included two private hospitals, two public Tehsil Headquarters hospitals, one public secondary facility

(District Headquarters Hospital Mardan), and one public tertiary facility (Mardan Medical Complex).

Population and Sampling

The target population comprised approximately 600 registered nurses (RNs), including nursing leaders (head nurses, ward supervisors, deputy matrons, and matrons) and staff nurses working under their current leaders for at least six months. The sample size was determined using OpenEpi Version 3.0 (Dean et al., 2013). Assuming a population of 600, a 50% response distribution for maximum variability, a 95% confidence interval, and a 5% margin of error, the minimum required sample was 235. To account for a potential 10–15% non-response or incomplete attrition rate, the target sample was increased to 270.

A mixed sampling approach was utilized. Due to their limited numbers, nursing leaders were recruited via purposive sampling. Staff nurses were selected using stratified random sampling, with strata based on clinical areas (medical, surgical, intensive care, emergency, and pediatrics) to ensure proportional representation. Inclusion criteria required participants to hold active registration with the Pakistan Nursing Council and provide informed written consent. Furthermore, leaders must have held a supervisory role for at least one year, and staff nurses must have worked under their current supervisor for at least six months. Nursing students, assistant nurses, and personnel on approved leave during the data collection period were excluded.

Measures

Data were collected using five sections: a demographic questionnaire, three standardised psychometric scales, and a self-developed clinical outcomes tool. All non-native instruments underwent rigorous forward-backward translation into Urdu, following Brislin's (1970) protocol, with a bilingual expert panel ensuring cultural and linguistic equivalence. Demographic Information: A researcher-designed questionnaire collected data on age, gender, marital status, education, professional designation, years of nursing practice, tenure in the current leadership position, hospital type, and clinical unit. Emotional intelligence was assessed using the 16-item Wong and Law Emotional Intelligence Scale/WLEIS (Wong & Law, 2002). It evaluates four dimensions—Self-Emotion Appraisal, Others' Emotion Appraisal, Use of Emotion, and Regulation of Emotion—on a 7-point Likert scale (1 = totally disagree to 7 = totally agree). Total scores range from 16 to 112. The scale has demonstrated strong internal consistency (Cronbach's $\alpha = 0.89$) within the Pakistani nursing context (Andlib et al., 2022). The authors obtained formal written permission

directly from the original developer, Dr. Chi-Sum Wong, for non-profit academic use. Job satisfaction was measured using the 31-item McCloskey/Mueller Satisfaction Scale/MMSS (Mueller & McCloskey, 1990), rated on a 5-point scale (1 = very dissatisfied to 5 = very satisfied). It covers eight subscales, with possible scores ranging from 31 to 155. The MMSS is highly reliable among Pakistani nurses (Cronbach's $\alpha = 0.89$ – 0.92 ; Shaheen & Saeed, 2021). We secured licensing and permission from the Center for Nursing Classification and Clinical Effectiveness, University of Iowa College of Nursing. Burnout was evaluated using the 22-item Maslach Burnout Inventory – Human Services Survey/MBI-HSS (Maslach et al., 1996), which comprises three subscales: Emotional Exhaustion (EE; 9 items), Depersonalization (DP; 5 items), and Personal Accomplishment (PA; 8 items), scored on a 7-point frequency scale (0 = never to 6 = every day). It has proven reliable in the KPK nursing population (Cronbach's $\alpha = 0.87$; Ullah et al., 2022). The researcher purchased an official academic licence from the copyright holder, Mind Garden, Inc. Clinical Practice Outcomes: A researcher-developed section recorded self-reported unit-level adverse events over the preceding three months, specifically measuring hand hygiene compliance percentages and the incidence rates of medication errors, patient falls, and hospital-acquired pressure ulcers.

Validity and Reliability

A three-member expert panel (two nursing faculty members and one Nursing Superintendent) evaluated the content validity of the translated and self-developed instruments. The panel assessed item relevance and clarity, yielding a Content Validity Index (CVI) of 0.92, exceeding the recommended threshold of 0.80 (Polit & Beck, 2021). A subsequent pilot study involving 30 participants (10 leaders, 20 staff nurses; excluded from the main study) confirmed excellent internal consistency across all scales (Nunnally & Bernstein, 1994), yielding Cronbach's alpha coefficients of 0.91 for the WLEIS, 0.90 for the MMSS, and 0.88 for the MBI-HSS.

Data Collection Procedure

The study was conducted between October 2025 and January 2026, following ethical approval from the Institutional Review Board of Elizabeth Rani College of Nursing and Allied Health Sciences, Mardan (Protocol: ERCON/IRB/2025/07), and administrative clearances from all participating hospitals. Data were collected via parallel paper-based and electronic methods. For paper surveys, trained research assistants distributed questionnaires to eligible nurses during off-peak clinical hours, utilizing sealed envelopes for returns to maintain confidentiality. For the electronic format, an anonymous

Google Form was distributed via WhatsApp and included a mandatory electronic consent gateway on the landing page. Written or electronic informed consent was strictly obtained prior to participation, and no personally identifiable information was recorded.

Data Analysis

Data were analyzed using IBM SPSS Statistics Version 26 (IBM Corp., 2019). We excluded questionnaires with >10% missing data. Descriptive statistics (means, standard deviations, frequencies, percentages) summarized demographic and main study variables, while Cronbach's alpha evaluated instrument reliability. Pearson's product-moment correlations assessed the bivariate relationships between emotional intelligence, job satisfaction, and burnout. Group comparisons across emotional intelligence levels were conducted using independent-samples t-tests and one-way analysis of variance (ANOVA) with post hoc Tukey's HSD. We used stepwise multiple linear regression to identify which emotional intelligence dimensions best predicted nursing practice outcomes, and chi-square tests to compare categorical adverse event rates across groups. All statistical tests were two-tailed with the significance level set at $\alpha = 0.05$.

Results

Response rate and participant flow

We invited 305 nursing personnel to participate. Of these, 77.0% ($n = 257$) provided informed consent, and 235 returned fully completed questionnaires. Nursing leaders had a higher response rate (86.7%, $n = 39$) than staff nurses (75.4%, $n = 196$). In accordance with the study methodology, questionnaires with more than 10% missing responses were excluded from the analysis.

Demographic Characteristics

Table 1 summarizes the demographic characteristics of the 235 participants, which included 39 nursing leaders and 196 staff nurses. The estimated overall mean age was 34.53 years ($SD = 8.43$). Nursing leaders were generally older (40.21 ± 8.00 years) compared to staff nurses (33.40 ± 8.07 years). The vast majority of the sample was female (82.6%) and married (72.8%). Regarding educational qualifications, nearly half of the participants held a Diploma (47.2%), followed by those with a BSN (32.3%). A significant proportion of respondents worked in public hospitals (75.7%) rather than private institutions (24.3%). In terms of clinical placements, the participants predominantly worked in Medical (30.6%) and Surgical (24.3%) units, with the remainder distributed across ICU, Emergency, Paediatrics, and other clinical settings.

Table 1. The demographic characteristics of the participants ($n = 235$)

Characteristic	Category	Nursing Leaders ($n = 39$); n (%)	Staff Nurses ($n = 196$); n (%)	Total ($n = 235$); n (%)
Age (years)	Mean $\pm$ SD*	40.21 $\pm$ 8.00	33.40 $\pm$ 8.07	34.53 $\pm$ 8.43
Gender	Male	9 (23.1)	32 (16.3)	41 (17.4)
	Female	30 (76.9)	164 (83.7)	194 (82.6)
Marital Status	Married	33 (84.6)	138 (70.4)	171 (72.8)
	Unmarried	6 (15.4)	58 (29.6)	64 (27.2)
Qualification	Diploma	10 (25.6)	101 (51.5)	111 (47.2)
	BSN	14 (35.9)	62 (31.6)	76 (32.3)
	Post RN	11 (28.2)	28 (14.3)	39 (16.6)
	MSN	4 (10.3)	5 (2.6)	9 (3.8)
Hospital Type	Public	29 (74.4)	149 (76.0)	178 (75.7)
	Private	10 (25.6)	47 (24.0)	57 (24.3)
Clinical Unit	Medical	10 (25.6)	62 (31.6)	72 (30.6)
	Surgical	9 (23.1)	48 (24.5)	57 (24.3)
	ICU	7 (17.9)	33 (16.8)	40 (17.0)
	Emergency	6 (15.4)	27 (13.8)	33 (14.0)
	Paediatrics	4 (10.3)	16 (8.2)	20 (8.5)
	Other	3 (7.7)	10 (5.1)	13 (5.5)

Reliability Analysis

All instruments were pre-tested for internal consistency with Cronbach's alpha before inferential analysis. All alpha coefficients were above the suggested

cut-off of 0.70 (Nunnally & Bernstein, 1994). Overall, the WLEIS score was 0.91, the MMSS was 0.90, and the MBI-HSS was 0.88, indicating excellent internal consistency across all measures.

Table 2. The Cronbach's Alpha Reliability Coefficients of all instruments

Instrument	Subscale	Items (n)	Cronbach's α
WLEIS	Self-Emotion Appraisal	4	0.86
	Others' Emotion Appraisal	4	0.84
	Use of Emotion	4	0.85
	Regulation of Emotion	4	0.87
	Overall WLEIS	16	0.91
MMSS	Extrinsic Rewards	4	0.88
	Scheduling	6	0.86
	Family-Work Balance	3	0.82
	Coworkers	3	0.85
	Interaction Opportunities	4	0.84
	Professional Opportunities	3	0.87
	Praise and Recognition	3	0.86
	Control and Responsibility	5	0.88
	Overall MMSS	31	0.9
MBI-HSS	Emotional Exhaustion	9	0.89
	Depersonalization	5	0.85
	Personal Accomplishment	8	0.84
	Overall MBI-HSS	22	0.88

The EI scores of nursing leaders are compared

Table 3 shows the mean WLEIS scores for all four dimensions of nursing leaders. Nursing leaders in District Mardan had a moderate EI score, with a mean of 4.35 (SD = 0.85) on a seven-point scale. Nursing leaders'

appreciation of their own emotional states was most evident in the self-emotion appraisal dimension (M = 4.82, SD = 0.92). Ability to regulate emotional responses (M = 3.98, SD = 1.15) was the lowest-scoring dimension, suggesting a relative weakness in this sample.

Table 3. The Mean Emotional Intelligence Score of all Nursing Leaders (n = 39)

WLEIS Dimension	M	SD	Min	Max
Self-Emotion Appraisal	4.82	0.92	2.5	6.75
Others' Emotion Appraisal	4.15	1.08	2	6.5
Use of Emotion	4.43	0.96	2.25	6.75
Regulation of Emotion	3.98	1.15	1.75	6.5
Overall Emotional Intelligence	4.35	0.85	2.38	6.56

Job Satisfaction Differences between Nursing Leaders and Staff Nurses

Independent-samples t-tests compared the nursing staff and nursing leaders on the MMSS. As shown in Table 4, nursing leaders reported significantly higher overall job satisfaction (M = 2.92, SD = 0.72) compared to staff nurses (M = 2.64, SD = 0.78), $t(233) = 2.08$, $p = .039$. Extrinsic rewards ($p = .043$), scheduling ($p = .032$), family-

work balance ($p = .028$), praise and recognition ($p = .034$), and control and responsibility ($p = .006$) showed significant between-group differences. No significant differences were found in interaction opportunities ($p = .682$) or coworker relations ($p = .646$). Interestingly, the overall mean for both groups fell in the low-to-moderate range on a five-point scale, indicating general dissatisfaction among the nursing profession in District Mardan.

Table 4. Job Satisfaction Score (MMSS) was compared between nursing leaders and staff nurses

MMSS Subscale	Nursing Leaders (n = 39); Mean ± SD	Staff Nurses (n = 196); Mean ± SD	Mean Difference	t	p
Extrinsic Rewards	2.68 (0.85)	2.35 (0.92)	0.33	2.04	0.043
Scheduling	2.52 (0.92)	2.18 (0.88)	0.34	2.16	0.032
Family-Work Balance	2.71 (0.96)	2.34 (0.94)	0.37	2.21	0.028
Coworkers	3.45 (0.82)	3.38 (0.86)	0.07	0.46	0.646
Interaction Opportunities	3.38 (0.78)	3.32 (0.84)	0.06	0.41	0.682
Professional Opportunities	2.98 (0.88)	2.72 (0.91)	0.26	1.62	0.107
Praise and Recognition	2.84 (0.95)	2.48 (0.97)	0.36	2.13	0.034
Control and Responsibility	2.78 (0.92)	2.32 (0.96)	0.46	2.75	0.006
Overall Job Satisfaction	2.92 (0.72)	2.64 (0.78)	0.28	2.08	0.039

Note: Items on a 5-point Likert scale (1 = very dissatisfied, 5 = very satisfied).

Correlations between Emotional Intelligence and Outcomes of Practice

Pearson's product-moment correlation coefficients were calculated to examine the relationship between nursing leaders' overall EI score and staff nurse practice outcomes. Table 5 shows the results. Staff job satisfaction was moderately positively correlated with leader EI ($r = .42$, $p < .01$); that is, employees' job satisfaction was higher

when their leader had a higher EI. EI was moderately negatively correlated with burnout ($r = -.38$, $p < .01$), indicating that staff members in units with higher EI leader competence reported lower burnout levels. EI was also strongly negatively correlated with medication errors ($r = -.31$, $p < .01$) and strongly positively correlated with clinical adherence ($r = .35$, $p < .01$). All correlations were significant at the 0.01 level.

Table 5. The Correlation between each nursing leader EI and each practice outcome (n=235)

Variable	Overall EI	1	2	3	4
Job Satisfaction (MMSS)	.42**	—			
Burnout (MBI-HSS)	-.38**	-.55**	—		
Medication Errors	-.31**	-.32**	.28**	—	
Clinical Adherence	.35**	.38**	-.26**	-.29**	—

Note. ** $p < .01$ (two-tailed)

Clinical Outcomes by Emotional Intelligence Tertile

Based on leaders' overall WLEIS scores, we divided participants into three tertiles: low EI (n = 78), medium EI (n = 79), and high EI (n = 78). We compared clinical outcome indicators between tertiles using one-way ANOVA. We found statistically significant differences for all five clinical outcome variables (all $p < .001$), as shown

in Table 6. Post-hoc Tukey's HSD tests confirmed that units led by high-EI leaders reported significantly fewer medication errors ($M = 4.15$, $SD = 2.38$), patient falls ($M = 3.15$, $SD = 1.92$), and pressure ulcers ($M = 2.25$, $SD = 1.58$) compared to units led by low-EI leaders ($M = 8.45$, $SD = 3.82$; $M = 5.68$, $SD = 2.75$; $M = 4.32$, $SD = 2.14$, respectively). High-EI and low-EI units also differed significantly in hand hygiene compliance (76.8% vs. 58.2%) and documentation accuracy (79.6% vs. 62.5%).

Table 6. Medical outcomes are compared based on the nursing leader's EI tertile

Clinical Outcome	Low EI (n = 78) M (SD)	Medium EI (n = 79) M (SD)	High EI (n = 78) M (SD)	F	p
Medication Errors (3 months)	8.45 (3.82)	5.72 (2.94)	4.15 (2.38)	32.45	<.001
Patient Falls (3 months)	5.68 (2.75)	4.22 (2.18)	3.15 (1.92)	18.92	<.001
Pressure Ulcers (3 months)	4.32 (2.14)	3.15 (1.82)	2.25 (1.58)	22.14	<.001
Hand Hygiene Compliance (%)	58.2 (14.5)	68.4 (12.8)	76.8 (11.2)	28.56	<.001
Documentation Accuracy (%)	62.5 (15.2)	71.3 (13.4)	79.6 (10.8)	30.12	<.001

Note: One-way ANOVA with Tukey's HSD post hoc test. All between-group differences were significant at the .001 level.

Figure 1 shows how each tertile of nursing leader EI correlates with staff outcomes. The trend was clearly stepwise: Staff nurses working with high-EI leadership had higher job satisfaction scores than those working with medium-EI leaders, who had higher scores than those

working with low-EI leaders. As a result, Burnout scale scores fell as leader EI increased. This trend suggests that there are important improvements in staff wellbeing outcomes associated with relatively small improvements in the EI of nursing leaders.

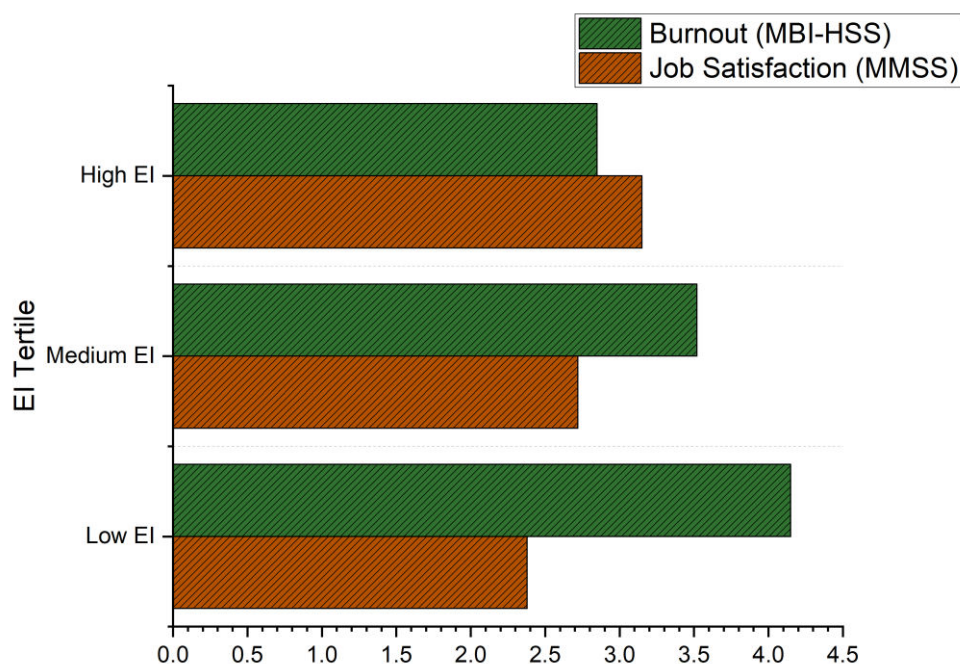


Figure 1. Job Satisfaction and Burnout Scores by Nursing Leader EI Tertile (n=235)

The pattern of clinical safety indicators is similar to that seen in Figure 2. The number of medication errors/unit decreased from 8.45 in the low-EI tertile to 5.72 in the medium-EI tertile to 4.15 in the high-EI tertile, a 50.9% reduction between the lowest and highest EI tertiles, for the 3-month reporting period. Hand hygiene compliance increased from 58.2% in low-EI units to

68.4% in medium-EI units and 76.8% in high-EI units. Overall, Figures 1 and 2 indicate a dose-response relationship between nursing leader EI and staff wellbeing and patient safety outcomes, respectively, with incremental increases in nursing leader EI accompanied by incremental improvements in all measures of staff wellbeing and patient safety.

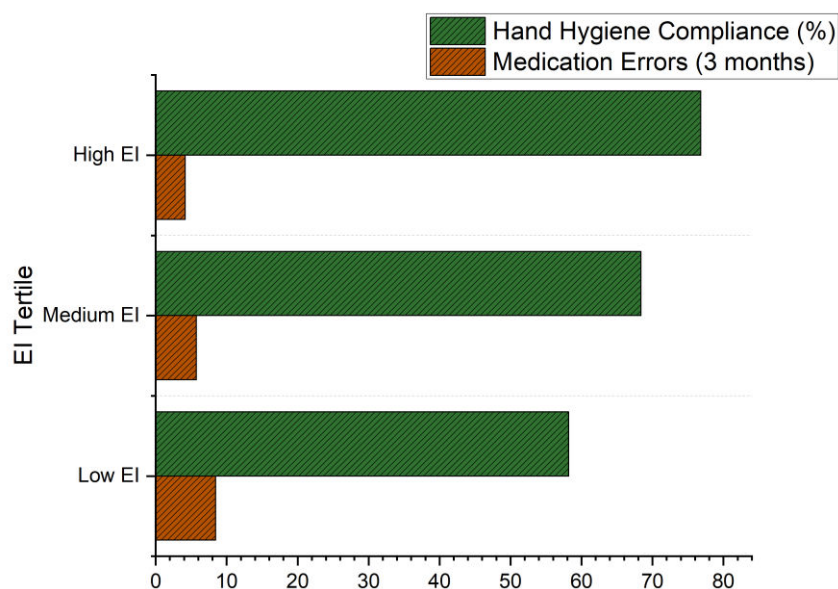


Figure 2. Medication Errors and Hand Hygiene Compliance by Nursing Leader EI Tertile (n=235)

The predictors of positive nursing practice outcomes

Patients' clinical adherence was the dependent variable in the stepwise multiple linear regression model, with the four dimensions of the WLEIS as independent variables. Table 7 reports the final three-step model. In Step 1, empathy was the strongest predictor ($\beta = .42$, $p < .001$) and explained a large amount of variance in clinical

adherence. Self-regulation was added in Step 2 ($\beta = .31$, $p < .001$), and social skills in Step 3 ($\beta = .20$, $p = .011$). We did not include self-awareness and motivation in the final model because they did not meet the inclusion criteria. The final model explained 38% of the variance in clinical adherence ($R^2 = .38$, Adjusted $R^2 = .36$) and was statistically significant, $F(3, 231) = 47.12$, $p < .001$. No multicollinearity issues were present, as the variance inflation factor for all predictors ranged from 1.85 to 2.10.

Table 7. Descriptive statistics for stepwise multiple linear regression of clinical adherence predictors ($n = 235$)

Step	Predictor	B	SE	β	t	p	VIF
1	Constant	2.45	0.32		7.66	<.001	
	Empathy	0.38	0.08	0.42	4.75	<.001	1.85
2	Constant	1.98	0.35		5.66	<.001	
	Empathy	0.32	0.07	0.36	4.57	<.001	1.92
	Self-Regulation	0.28	0.06	0.31	4.67	<.001	1.88
3	Constant	1.65	0.38		4.34	<.001	
	Empathy	0.28	0.07	0.31	4	<.001	2.1
	Self-Regulation	0.24	0.06	0.27	4	<.001	2.05
	Social Skills	0.18	0.07	0.2	2.57	0.011	1.95

Note. $R^2 = .38$, Adjusted $R^2 = .36$, $F(3, 231) = 47.12$, $p < .001$. Variance inflation factor (VIF). Outcome: clinical adherence composite score.

Discussion

This section interprets the present study's findings on emotional intelligence (EI) and nursing practice outcomes. The discussion addresses the research questions and hypotheses, situating the results within existing international evidence and regional data from Khyber Pakhtunkhwa (KP), Pakistan.

Level of Emotional Intelligence among Nursing Leaders

The overall mean emotional intelligence score for nursing leaders in District Mardan was 4.35 ($SD = 0.85$), indicating a moderate level of EI. Among the dimensions, Self-Emotion Appraisal scored highest ($M = 4.82$), while Regulation of Emotion scored lowest ($M = 3.98$). These results align with previous regional studies by Ullah et al. (2022) and Khan et al. (2022), which likewise reported moderate EI among nursing staff in KPK tertiary healthcare settings. The moderate overall EI, particularly the lower scores in Regulation of Emotion, likely reflects the intense emotional demands of clinical leadership—such as staffing challenges and time-sensitive decision-making (Saha et al., 2023). Furthermore, as Zaman et al. (2021) highlighted, formal leadership development programmes are scarce in this region, leaving leaders with few resources to develop emotional regulation strategies. However, because these scores are self-reported, they may

be subject to social desirability bias, and the findings should be interpreted specifically within the semi-urban healthcare context of District Mardan.

Job Satisfaction among Nursing Leaders and Staff Nurses

Overall job satisfaction was significantly higher among nursing leaders than among staff nurses ($M = 2.92$ vs. $M = 2.64$; $p = .039$); however, on a 5-point scale, both scores indicate low-to-moderate satisfaction across the nursing workforce in District Mardan. This aligns with Zaman et al. (2021), who found that nurses in Pakistan generally experience dissatisfaction due to resource constraints, pay, and patient-nurse ratios. A critical analysis of the subscales shows that structural factors (extrinsic rewards, scheduling, work-life balance) drive dissatisfaction more than interpersonal ones (coworker relations). This pattern suggests that while EI can improve workplace climate, organisational policies on remuneration and workload distribution are fundamentally necessary to address the root causes of dissatisfaction, a conclusion supported by Soriano-Vázquez et al. (2023). However, cross-sectional data limit the ability to determine whether leadership status inherently causes higher satisfaction, as other confounding demographic factors may be involved.

Emotional Intelligence and Practice Outcomes

As hypothesised, nursing leader EI showed significant moderate positive correlations with staff job satisfaction ($r = .42, p < .01$) and clinical adherence ($r = .35, p < .01$), and significant moderate negative correlations with staff burnout ($r = -.38, p < .01$) and medication errors (MSE) ($r = -.31, p < .01$). These relationships are well supported in the literature. Al-Oweidat et al. (2023) and Alotaibi et al. (2020) reported positive links between leader EI and nurse engagement, while Ullah et al. (2022) and Badshah et al. (2025) found similar negative correlations between EI and burnout among Pakistani clinicians. High-EI nurse managers likely mitigate staff burnout and improve adherence by managing conflict effectively and fostering emotionally supportive ward climates (Aseery et al., 2023; Oweidat et al., 2024). Nevertheless, while these correlations are robust, they represent associations rather than direct causation. Institutional support systems and hospital culture may also influence both leader EI and staff outcomes.

Clinical Outcomes by Emotional Intelligence Tertile

Units led by high-EI nursing leaders recorded significantly higher scores across all five clinical safety indicators than those with low-EI leaders. Notably, the gradient between the highest and lowest tertiles showed a 50.9% reduction in medication errors and an increase in hand hygiene compliance from 58.2% to 76.8%. These findings align with international studies by Turjuman and Alilyyani (2023) and Alonazi (2020), which link high leader EI to transformational leadership behaviours and superior patient safety outcomes. By extending these metrics to specific safety indicators (Patient Falls, Pressure Ulcers, Documentation Quality) in District Mardan, this study suggests that emotionally intelligent leaders may create a psychological safety net that encourages better adherence to clinical protocols. The observed dose-response pattern supports Hypothesis 3, indicating a strong positive association. However, because clinical outcomes were self-reported rather than extracted from objective administrative data, these figures should be viewed as estimates of perceived safety improvements rather than absolute clinical metrics.

Predictors of Positive Nursing Practice Outcomes
Regression analysis identified empathy ($\beta = .31$) and self-regulation ($\beta = .27$) as the strongest independent predictors of clinical adherence, together accounting for 38% of the variance, with social skills contributing to a lesser extent ($\beta = .20$). The emphasis on empathy aligns with Alwali and Alwali (2022), who linked empathy to enhanced communication and teamwork, while the role of self-regulation supports Majeed and Jamshed's (2020)

theoretical framework on nursing leadership under pressure. In a high-stress clinical environment, leaders who can self-regulate and empathise are better equipped to guide their teams to adhere strictly to clinical guidelines. Consequently, future leadership programmes in this region should prioritise these two specific EI domains. However, the model explains only 38% of the variance, meaning the majority of factors influencing clinical adherence (62%) lie outside leader EI and likely involve systemic variables such as staffing adequacy and resource availability.

Theoretical Contributions

This study provides quantitative baseline data on the EI of nursing leaders in District Mardan, adding a previously missing regional dimension to the literature. It builds on the findings of Ullah et al. (2022) and Badshah et al. (2025) by assessing a broader range of nursing practice outcomes—including medication errors, patient falls, pressure ulcers, hand hygiene compliance, and documentation accuracy—alongside traditional metrics such as job satisfaction and burnout.

Practical Implications

First, the findings provide empirical support for hospital administrators in District Mardan and KPK to invest in EI-based leadership development, focusing on empathy and emotional regulation through reflective practice and mentorship (Turjuman & Alilyyani, 2023). Second, the widespread low-to-moderate job satisfaction highlights a critical need for systemic policy interventions on compensation and workload. Leadership EI alone cannot resolve structural dissatisfaction. Finally, integrating EI training into both pre- and post-registration nursing curricula could proactively build these competencies, as Bibi et al. (2025) support.

Limitations and Future Research

Several limitations must be acknowledged. First, the cross-sectional design limits causal inference; the relationships identified are associative. Second, reliance on self-reported clinical outcomes and adverse events over a 3-month recall period introduces potential recall and social desirability biases. Third, conducting the study in a single district (Mardan) limits the generalisability of the findings across Pakistan, given varying healthcare infrastructures. Fourth, the small sample of nursing leaders ($n = 39$) restricted statistical power for subgroup analyses. Finally, the study did not evaluate staff nurses' EI, so its potential mediating effect remains unknown. Future studies should utilise longitudinal or experimental designs, such as randomised controlled trials of EI interventions, to establish causality. Incorporating multi-

district samples and objective administrative data on clinical outcomes will strengthen validity. Additionally, qualitative research could provide deeper context on how nursing leaders apply EI to real-world clinical challenges.

Conclusion

This quantitative cross-sectional study examined the association between nursing leaders' Emotional Intelligence and nursing practice outcomes in hospitals in District Mardan, Khyber Pakhtunkhwa, Pakistan. The analysis revealed five key findings. First, nursing leaders have a moderate overall level of EI, with Regulation of Emotion identified as the weakest dimension. Second, both leaders and staff reported low to moderate job satisfaction, highlighting systemic workplace challenges. Third, nursing leaders' EI was significantly and positively associated with staff job satisfaction and clinical adherence, and negatively associated with burnout and medication errors. Fourth, units led by high-EI leaders demonstrated notably better clinical safety performance, including higher hand hygiene compliance and fewer reported medication errors. Fifth, empathy and self-regulation emerged as the strongest EI predictors of clinical adherence. Overall, the findings support the research hypotheses and highlight that nursing leaders' EI is a crucial factor associated with staff wellbeing and patient safety outcomes, underscoring the need for targeted EI leadership training alongside structural organisational improvements.

Declaration of Conflicting Interest

The authors declare no conflicts of interest.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Acknowledgment

The authors gratefully acknowledge the participation of 235 nurses from six hospitals in Mardan District, Khyber Pakhtunkhwa (KPK), Pakistan. Their willingness to participate and complete the survey instrument made an important contribution to the successful completion of this study. The authors also sincerely appreciate the faculty members and staff of Abasyn University Peshawar, Pakistan, for their valuable support, assistance, and cooperation throughout the research process.

Author's Contribution

A.R.: conceptualization, methodology, data collection, formal analysis, supervision, writing – review and editing. All authors made substantial contributions to the conception and design of the study, the acquisition, analysis, or interpretation of data, and the drafting or critical revision of the manuscript for important intellectual content; all authors gave final

approval of the version submitted and agree to be accountable for all aspects of the work.

Data Availability Statement

The datasets analysed in this study are available from the corresponding author upon reasonable request, in accordance with the journal's data-sharing policy.

Declaration of Use of AI in Academic Writing

AI-based language and formatting assistance (Claude, Anthropic) was used to help condense and reformat this manuscript for journal submission from the authors' original seminar report. The authors conducted the underlying research design, data collection, statistical analysis, and scientific interpretation. The authors did not use AI to generate, alter, or interpret research data or findings.

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