

Exploring Nurse Leaders' Behaviors in the Qassim Region (KSA): Insights from Multifactor Leadership Questionnaire (MLQ)



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Abstract:

Introduction: Nursing leadership plays a significant role in determining the quality of healthcare, staff performance, and organizational performance. Good nurse administrators influence patient outcomes, team motivation, and workplace culture. This study reviewed leadership practices among nurse administrators in the Qassim Region, Saudi Arabia, using the Multifactor Leadership Questionnaire (MLQ), and sought to examine the connection between leadership behaviors and performance.

Method: The design used in this study was quantitative, cross-sectional, and descriptive. Three hospitals were involved in the study, consisting of 85 nurse administrators. The MLQ-5X Short Form was used to evaluate leadership behaviors, such as transformational, transactional, and passive-avoidant leadership, and leadership outcomes. Descriptive statistics, Pearson correlation, and multiple regression were used to analyze data.

Results: The analysis revealed that the most prevalent style was transformational leadership (mean = 3.83 ± 0.70), followed by transactional (3.25 ± 0.62) and passive-avoidant leadership (2.23 ± 0.66). Transformational leadership was positively correlated with leadership outcomes ($r = 0.804$, $p < 0.001$). Regression analysis revealed it to be the best predictor, explaining 65.6 percent of the variance in outcomes.

Discussion: Leading Saudi nurse leaders predominantly used transformational leadership, which is closely associated with increased staff effort, performance, and satisfaction.

Conclusion: Transformational leadership can be enhanced through targeted training and mentoring, thereby strengthening nurses' leadership capacity and improving patient care quality in Saudi hospitals.

Keywords: Transformational leadership, Nursing leadership, Multifactor leadership questionnaire, Healthcare management, Leadership outcomes, Nurse administrators.

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1. INTRODUCTION

The healthcare system in Saudi Arabia is experiencing crucial positive changes as a result of the country's Vision 2030 program, which aims to transform the nation into a self-sufficient, knowledge-driven economy [1]. Nursing leadership plays a pivotal role in enhancing health equity, improving patient outcomes, and creating a positive workplace [2]. Effective leadership positively influences staff's attitudes and behaviors [3] and addresses employee challenges [4]. Nurse leadership is effective and helps to improve patient quality, nurse satisfaction, and retention, and organizational efficiency, which are crucial elements in clinical decision-making and self-empowerment [5].

Additionally, the importance of nursing leadership extends beyond conventional administrative roles, encompassing transformational leadership styles that inspire and motivate the nursing staff. Goens and Giannotti (2024) [6] showed that transformational leadership has the potential to support nursing staff retention and other positive workplace outcomes. According to this paradigm shift, the need to develop leadership competencies relevant to today's healthcare needs and organizational goals is emphasized.

Besides, recent system reviews have highlighted the intricacy of nursing leadership competencies. Perez-Gonzalez *et al.* [7] reported that consideration of nurses is among the crucial characteristics of leadership. These attributes include emotional intelligence, communication, strategic thinking, and willingness to create collaborative working experiences. These are highly significant competencies in achieving successful leadership development initiatives and succession planning.

Furthermore, the Multifactor Leadership Questionnaire (MLQ) is regarded as one of the most widely used and empirically validated tools for evaluating leadership behaviors in the healthcare environment. The MLQ was originally created by Bass and Avolio (1997) [8] as a model based on the full-range leadership model that includes transformational, transactional, and passive-avoidant forms of leadership. The questionnaire captures nine leadership aspects across these three domains, providing a broad measure of leadership behaviors that directly affect organizational performance and followers. Within the field of nursing, the MLQ has been shown to be specifically applicable for assessing leadership abilities associated with higher-quality patient care, lower staff satisfaction, and organizational performance indicators [9].

Moreover, the application of the MLQ in studies conducted in nursing environments has not only indicated that the instrument effectively differentiates among leadership styles and associated outcomes, but also that it effectively serves its purpose. Transformational leadership factors, as modified for the MLQ, such as idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration, have been particularly significant in measuring nurse leadership. It has been found that nurse leaders with higher scores on

such transformational dimensions provide better work environments, enhance retention rates, and improve patient satisfaction. The ability of the tool to provide self-reports on leadership effectiveness, together with those of followers, makes it feasible to assess leadership effectiveness through 360-degree estimation [10].

Apart from that, the MLQ in nursing leadership and development programs has been practically useful for identifying areas for improvement and measuring leadership progress over time. MLQ has been increasingly accepted by healthcare organizations as part of their leadership competency models and has been used in succession planning, leadership coaching, and leadership performance evaluation [9, 11, 12]. Its standardized format and a large amount of normative data further enable the instrument to be compared and contrasted effectively across environments and cultures; thus, it is well-suited to global nursing research and development efforts. Its psychometric properties, such as strong reliability and validity, have established the MLQ as the gold standard for leader evaluation in nursing practice [9, 11].

In addition, significant concern in nursing research has been raised about how leadership environments influence nurses' motivation to lead. Al Sabei *et al.* [13] reported that supportive nursing leadership environments and related organizational and individual factors affect nurses' motivation to assume leadership roles. This highlights the importance of thorough measurement tools that can quantify leadership performance and its organizational effectiveness.

Also, nursing leadership development is noted to be one of the strategic priorities for healthcare firms globally. Shen and Tucker (2024) [14] highlighted the importance of fostering the development and growth of nurse leaders. Precise evaluation of existing competencies using these programs and identification of the areas where their scope needs enhancement are critical to their success.

However, available instruments to evaluate nursing leadership vary in scope and use. Although there are several instruments, it is necessary to conduct a holistic assessment of their effectiveness across distinct healthcare and cultural contexts [9, 11, 12]. Al Sabei *et al.* [13] emphasized that multiple organizational and individual factors affect the motivation to lead, as demonstrated in their survey with an 80.6 percent response rate among 540 nurses. These motivational factors are critical for identifying prospective leaders and formulating specific interventions aimed at facilitating leadership participation.

This research aimed to examine the effectiveness of nursing leadership evaluation instruments in identifying leadership strengths and areas for development among nursing leaders. The present study will add to the body of evidence confirming the effectiveness of the structured assessment method in the leadership development of nurses. It will inform understanding of the correlation between leadership skills and organizational performance.

2. METHODOLOGY

2.1. Research Design

A quantitative cross-sectional descriptive design was used to examine leadership behaviors of nurse administrators in the Qassim Region, Saudi Arabia [15]. The descriptive approach was chosen to provide comprehensive insights into the prevalence and characteristics of transformational, transactional, and passive-avoidant leadership styles among nurse administrators in the region.

2.2. Setting and Sample

The sample comprised 85 nurse administrators employed at three large public hospitals in the Qassim Region, Saudi Arabia: King Fahad Specialist Hospital, Buraidah Central Hospital, and King Saud Hospital. These respondents were formal leaders or supervisory nurses (*e.g.*, head nurses, unit supervisors) who were responsible for clinical teams.

Furthermore, frontline staff nurses and those reporting to administrators were not considered. This explanation brought out the data on the behaviors of nurse administrators' leadership in particular. The overall response rate stood at 70.8% (85 of 120 targeted administrators).

Additionally, all three hospitals were King Fahad Specialist Hospital (tertiary care hospital), Buraidah Central Hospital (regional medical center), and King Saud Hospital (specialized healthcare facility). Stratified random sampling was used to provide proportional representation among the three hospitals and across the diverse nursing units. Stratification variables were hospital facility, clinical unit type (medical-surgical, critical care, emergency, specialty), and shift pattern (day, evening, night). Participants in each stratum were randomly selected from the employees' roster provided by the nursing administration using computer-generated random numbers.

Moreover, the inclusion criteria included registered nurses with a valid Saudi nursing license, six months of work experience under a nurse administrator, and who volunteered to participate. The exclusion criteria included nurses in administrative or management roles, temporary or agency nurses, nurses on extended leave during the data collection phase, and incomplete survey responses with more than 20% missing data. The 85 nurses constituted the final sample with a response rate of 70.8%. Every hospital was represented in the study, with 43.5 percent of participants at King Fahad Specialist Hospital, 34.1 percent at Buraidah Central Hospital, and 22.4 percent at King Saud Hospital.

2.3. Instrumentation

Nurse administrators' leadership behaviors were measured using the MLQ-5X Short Form, the most widely used and well-researched instrument for measuring leadership behaviors in organizational contexts, specifically in the health industry [9]. This tool comprises a thorough measurement of three leadership paradigms

that constitute the full-range leadership model [8] and has been applied in nursing research [16].

Besides, MLQ-5X Short Form had 45 items based on 25 items that measured several aspects of leadership behavior. Transformational leadership was also measured using 20 items grouped into five important dimensions, with idealized influence attributed (4 items), idealized influence behavior (4 items), inspirational motivation (4 items), intellectual stimulation (4 items), and individualized consideration (4 items). These measurements reflected the extent to which a leader could motivate followers, introduce innovative ideas, deliver tailored support, and serve as a role model [17].

In addition, the scale of transactional leadership consisted of 8 items across 3 scales: contingent reward (4 items) and active management-by-exception (4 items). The use of rewards and corrective measures was evaluated alongside leaders' performance objectives on these scales. Passive-avoidant style leadership was quantified using 4 items that indicate the absence of leadership interventions and decision aversiveness [11].

Furthermore, the instrument also had leadership outcome measures with nine additional items assessing extra effort (3 items), effectiveness (4 items), and satisfaction with the leader (2 items). These results provided valuable insights into the effects of leadership and followers' reactions [10].

Moreover, every item was graded on a 5-point Likert scale, ranging from 0 = not at all to 4 = frequently, if not always. MLQ-5X has been shown to have sound psychometric properties across diverse cultural backgrounds and organizational environments. The instrument's reliability had also been validated in nursing settings, with Cronbach's alpha ranging from 0.74 to 0.94 across various studies on leadership aspects [9].

Finally, it had already been proven that the instrument could be effectively validated in a healthcare setting, and more recent studies had confirmed its structural and predictive validity in nursing [11]. Cross-cultural validation studies have shown that this instrument is applicable across diverse cultural settings, including those of Middle Eastern health facilities [12].

2.4. Translation and Cultural Adaptation

The forward translation of the first language (*i.e.*, the English version of the questionnaire) into a second language (*i.e.*, Arabic), and back-translation of the second language version into the first language version (*i.e.*, back-translation of the Arabic version of the questionnaire into the English version) were conducted by two independent bilingual translators with healthcare backgrounds. When any inconsistencies were found in the translation process, they were addressed through a decision by an expert panel comprising nursing administrators, experienced researchers, and language specialists with expertise in both healthcare terminology and cross-cultural research practices.

Apart from that, cultural applicability and understandability were also tested using pilot procedures with 15 nurses not included in the main study sample. This piloting stage enabled the identification and resolution of any cultural or linguistic issues, ensuring everything was correctly understood in the Saudi nursing context. Content validity was secured through extensive review by an expert panel of five nursing leaders with broad administrative experience and three nursing research faculty with expertise in leadership research. The criteria for adequate content validity, based on the Content Validity Index (CVI) at the item and overall scale levels, were met (I-CVI all items = 0.83, S-CVI = 0.92; excellent level of content validity according to the levels suggested by Polit *et al.* [18]).

2.5. Data Collection Procedures

The methods complied with multiple institutional review boards, including the Qassim Region Research Ethics Committee (QREC), the research ethics committees of all three hospitals, and the regional health affairs directorate of the Qassim Region. Ethical approval was obtained from the QREC. Participants were provided with written informed consent, ensuring voluntary participation, confidentiality, and the right to withdraw without penalty.

Subsequently, MLQ-5X was dispatched in both paper and electronic formats to accommodate participants' preferences and time constraints. Questionnaires were distributed in paper form to administrators *in situ* via nursing administration offices, and a secure online form (Google Forms) was sent to those who preferred to complete it electronically. Data were collected over six weeks. All the answers were anonymous and sent by mail to the research team without any identification to ensure confidentiality. The completion and standardization were monitored by research assistants who covered all three hospitals. Data collection was also conducted by trained research assistants who assisted participants and ensured data consistency.

Subsequently, the questionnaires were placed in safe storage, where no personal information about the respondents was stored. The participants were assigned study identification numbers to track their data; however, their names were not mentioned anywhere during the study. Informed consent was obtained from all participants before data collection. The consent was voluntary, guaranteed confidentiality, included the right to withdraw without penalty, and consent to the publication of aggregated and anonymized information that does not disclose personally identifiable information.

2.6. Data Management and Analysis

The analysis was performed using Python (pandas, scipy, matplotlib). Data cleaning involved range checks, analysis of missing data, and identification of z-score outliers (± 3.29). Visual and statistical tests were performed to assess normality. The analysis of missing data showed that less than 5% of the data were missing

across all variables, and the missingness was entirely random. To address missing values, correlation analyses were performed using pairwise deletion, and regression analyses were performed using listwise deletion to preserve sample integrity [19]. The data set used in the final analysis included 85 complete cases, with only small gaps in demographic variables.

Furthermore, categorical (frequencies, percentages) and continuous variables (means, standard deviations) were obtained using descriptive statistics. Normal distribution was evaluated. Scale reliability was measured using Cronbach alpha coefficients for all MLQ subscales, computed with custom Python functions, item-total correlations, overall reliability assessments with specialized psychometric libraries, and composite reliability coefficients for multi-dimensional constructs.

Moreover, primary analyses of descriptive leadership behavior frequencies and patterns, t-tests on demographic comparisons of leadership styles, and ANOVA on demographic comparisons between leadership styles were all inferential analyses, and Pearson product-moment correlations were used to examine correlations between leadership dimensions. Secondary analyses were conducted using partial correlation with the Pingouin library, controlling for demographic variables. Hierarchical analysis was also performed, including demographic variables as covariates, and effect sizes were thoroughly calculated per Cohen's conventions.

Prior to all analyses, statistical assumptions were rigorously verified using Python statistical functions. Linearity assessment was examined through scatterplot examination using matplotlib; normality testing was evaluated through Shapiro-Wilk tests using scipy.stats and Q-Q plots; homoscedasticity evaluation was conducted through Levene's test and residual plots; independence was verified through visual inspection of residual patterns; and multicollinearity assessment was performed through variance inflation factors calculated using statsmodels with a VIF threshold less than 5.0.

2.7. Reliability and Validity

Heale and Twycross (2015) [20] stated that reliability measures the consistency of a selected measure. Internal consistency reliability was evaluated for all MLQ scales in the current sample using custom Python reliability functions. Different studies have confirmed the reliability of the MLQ by computing Cronbach's alpha. For instance, Braathu *et al.* [21] found from a Norwegian version of the MLQ that internal consistency for measuring transformational and transactional leadership was excellent ($\alpha = 0.93-0.97$), while the value for laissez-faire leadership demonstrated an acceptable internal consistency ($\alpha = 0.88$).

Besides, construct validity was comprehensively evaluated through confirmatory factor analysis using scikit-learn to confirm the theoretical structure of the MLQ instrument, convergent validity assessment through inter-scale correlations, and discriminant validity evaluation through comparison of correlation patterns.

Criterion validity was assessed by examining correlations between MLQ scales and leadership effectiveness ratings, demonstrating expected patterns of associations consistent with theoretical expectations and previous research findings. Construct validity assesses whether the researcher can draw inferences from test scores to the concept under scrutiny. The MLQ was assessed for its homogeneity, convergence, and theoretical evidence, as recommended by Heale and Twycross (2015) [20].

2.8. Ethical Considerations

Ethical approval for the research was given by the QREC before data collection was done (Approval No. H-04-Q-001, Approval Date: July 28, 2025). Thorough ethical safeguards were, however, in place during the study, in line with the QREC provisions and the global ethical standards of research.

The rights of participants included voluntary participation, an express right to non-participation without penalty, no negative effects of non-participation or withdrawal, and absolute preservation of the employment situation and professional relationships.

Confidentiality and data security measures included:

- [1] De-identification of all data and assigning it to unique study codes.
- [2] Safekeeping of consent forms other than the survey data.
- [3] Electronic files restricted and password-protected.
- [4] Hard copy documents in locked cabinets in safe research centers.
- [5] Secure server storage and full backup procedures of digital data.

The entire procedure was conducted in accordance with QREC's data protection and participant confidentiality rules.

The informed consent procedure, which QREC endorsed, involved an elaborate explanation of the study purpose and procedures, the participant's time commitment and expectations, risks and benefits, extensive confidentiality, contact information for questions or concerns, and a simple statement of voluntary participation. Informed consent was written and provided to the participants.

3. RESULTS

The results section presents the key conclusions of the overall analysis of the MLQ-5X data obtained from a survey of 85 nursing leaders at three large hospitals located in Saudi Arabia, including King Fahad Specialist Hospital, Buraidah Central Hospital, and King Saud Hospital. This study has achieved a response rate of 70.8 percent (85 out of 120 potential respondents), providing the study with sufficient statistical power (>0.80) to detect medium effect sizes with a minimum required sample of 84 respondents, as calculated using the power analysis. The data were rigorously processed and cleaned to produce a final shape of (85, 55), as it was used to

calculate the MLQ scale scores and to filter out incomplete answers.

Moreover, the results are logically structured into five detailed areas, including descriptive statistics, reliability analysis, correlation analysis, multiple regression modeling, and demographic comparisons. Descriptive integration of tables is well-planned throughout to demonstrate the important patterns and relationships in the data, and the overall number of tables is used to ensure the brevity and clarity of data presentation, while the analysis covers all findings.

3.1. Sample Characteristics

The ultimate sample comprised 85 individuals, with an average age of 34.2 years ($SD = 5.7$), and an average length of nursing experience was 11.2 years ($SD = 5.2$). The gender representation showed a slight majority of females (58.8%, $n=50$) and 41.2% ($n=35$) males, reflecting the changing gender dynamics of Saudi leadership in nursing roles.

Besides, the nationality distribution showed that 69.4% ($n = 59$) were Saudi nationals and 30.6% ($n = 26$) were non-Saudis, highlighting the multicultural nature of healthcare leadership in the Kingdom. The qualifications held were mostly at the bachelor's level (77.6% had bachelor's degrees); only one participant had a master's and a PhD, and 20% had a diploma qualification. This educational profile aligned with the common top-management patterns in nursing across Saudi health care organizations.

Apart from that, job role analysis showed that 62.4% of participants had held nursing supervisor roles ($n = 53$), 34.1% had held head nurse positions ($n = 29$), and three participants had missing data on their job roles. The best distribution of hospitals was 43.5% to King Fahad Specialist Hospital ($n = 37$), the largest single institutional contribution; 34.1% to Buraidah Central Hospital ($n = 29$); and 22.4% to King Saud Hospital ($n = 19$). The overall demographics represent a heterogeneous but largely mid-career group of nurses working in the dynamic Saudi healthcare setting, which can be used as a representative sample to identify patterns of leadership in this cultural and organizational setting.

3.2. Descriptive Statistics for Leadership Styles and Outcomes

The systematization of leadership styles was conducted using a 5-point Likert scale (1 = not at all, 5 = frequently, if not always), which enabled quantification of leadership behaviors across the three major dimensions. The results of the analysis showed that transformational leadership had the highest average score of 3.83 ($SD = 0.70$), which showed moderately high adoption of transformational behaviors among Saudi nursing leaders. Transformational leadership had the highest mean score (3.83 ± 0.70), followed by transactional leadership (3.25 ± 0.62), and finally passive-avoidant leadership (2.23 ± 0.66).

Table 1. Descriptive statistics for leadership scales (N = 85).

Scale	Mean	SD	Min	25%	50%	75%	Max
Transformational	3.83	0.70	1.40	3.65	3.85	4.10	4.95
Transactional	3.25	0.62	1.38	3.00	3.25	3.50	5.00
Passive-Avoidant	2.23	0.66	1.25	1.75	2.13	2.50	4.63
Leadership Outcomes	4.03	0.76	1.25	3.83	4.17	4.50	5.00

In addition, the mean of transactional leadership behaviors was 3.25 (SD = 0.62), which is moderate interaction with contingent rewards and active management-by-exception. It is important to note that the mean score for passive-avoidant leadership styles was the lowest at 2.23 (SD = 0.66), which means that participants tend to avoid passive-avoidant and passive management-by-exception behaviors. The composite leadership outcomes measure, which included ratings of additional effort, effectiveness, and satisfaction with leadership, averaged 4.03 (SD = 0.76), indicating that ratings of extra effort, effectiveness, and satisfaction with leadership were mainly positive amongst the nursing staff under the leadership of these leaders.

As shown in Table 1, transformational leadership demonstrated the highest mean score among nurse administrators, followed by transactional and passive-avoidant leadership styles.

Mean and SD are the values, observed range. The MLQ-5X Scale scores (0-4) were converted to the reading scale of the present study (1-5); higher scores indicated more occurrences of the behavior/outcome. MLQ-5X subscales: transformational (idealized influence, inspirational motivation, intellectual stimulation, individualized consideration), transactional (contingent reward, management-by-exception active, management-by-exception passive, laissez-faire, extra effort, effectiveness, satisfaction). Abbreviations: SD, standard deviation; MLQ-5X, Multifactor Leadership Questionnaire Form 5X.

3.3. Reliability Analysis

The internal consistency analysis, based on Cronbach's alpha coefficients, indicated varying degrees of reliability across the MLQ scales, with trends largely consistent with earlier international use of the instrument. The transformational leadership scale showed very high reliability ($\alpha = 0.958$, 20 items), indicating high internal consistency, supporting its use in future analyses. Transformational subscales were good to excellent for inspirational motivation ($\alpha = 0.834$), individualized consideration ($\alpha = 0.834$), idealized influence attributed ($\alpha = 0.811$), and intellectual stimulation ($\alpha = 0.750$), showing that they were above acceptable levels.

Additionally, the transactional leadership subscales showed mixed reliability results. There was sufficient reliability in contingent reward ($\alpha = 0.789$) and doubtful reliability in active management-by-exception ($\alpha = 0.681$). Passive management-by-exception was found to have low reliability ($\alpha = 0.507$), which could be due to the cultural

or contextual specificity of Saudi nursing situations, in which passive management styles may be less distinguishable or uniformly applied.

Furthermore, the passive-avoidant subscales showed acceptable-to-questionable reliability, with passive-avoidant having an α of 0.690, indicating adequate internal consistency for this dimension. The reliability of leadership outcome measures was good to excellent, with the highest consistency of effectiveness ($\alpha = 0.834$), extra effort ($\alpha = 0.766$), and satisfaction ($\alpha = 0.768$).

3.4. Correlation Analysis

The Pearson correlation analysis revealed a significant positive correlation between transformational leadership and leadership outcomes ($r = 0.804$, $p < 0.001$). Transactional leadership was also significantly positively correlated with outcomes ($r = 0.615$, $p < 0.001$), which was very large but significantly smaller than the transformational leadership. Passive-avoidant leadership, in contrast, showed weak, insignificant correlations with outcomes ($r = 0.149$, ns), indicating that passive leadership styles played a small role in positive leadership outcomes in this context.

A close analysis of the components of the outcome showed uniform trends across all three dimensions. Extra effort ($r = 0.737$, $p < 0.001$), effectiveness ($r = 0.788$, $p < 0.001$), and satisfaction ($r = 0.733$, $p < 0.001$) were highly correlated with transformational leadership. Extra effort ($r = 0.592$, $p < 0.001$), effectiveness ($r = 0.622$, $p < 0.001$), and satisfaction ($r = 0.517$, $p < 0.001$) were moderately to strongly correlated with transactional leadership. Passive-avoidant leadership had weak, non-significant correlations with all the outcome measures.

3.5. Multiple Regression Analysis

The regression analysis revealed that the model explained 65.6% of the variance in the leadership outcomes ($R^2 = 0.656$, $p < 0.001$). Transformational leadership was the most dominant and important predictor ($\beta = 0.940$, $p < 0.001$) in this model, supporting its central role in influencing the positive outcome of leadership. Surprisingly, passive-avoidant leadership exhibited a low positive coefficient ($\beta = 0.128$), which probably reflects suppression effects, as indicated by the negative zero-order correlation. The coefficient of transactional leadership was negative, though insignificant ($\beta = -0.112$), indicating that, when controlling for transformational leadership, additional transactional behaviors in the positive outcome might not add value incrementally.

Table 2. Multiple linear regression models predicting leadership outcomes from leadership styles (N = 85).

Outcome	R ²	Adj R ²	F	Intercept	β_Transformational	β_Transactional	β_Passive-Avoidant
Extra Effort	0.561	0.545	34.499	0.360	0.876***	-0.054	0.175
Effectiveness	0.632	0.619	46.404	0.539	0.887***	-0.060	0.138
Satisfaction	0.546	0.529	32.455	0.637	1.057***	-0.221	0.072
Outcomes Composite	0.656	0.644	51.543	0.512	0.940***	-0.112	0.128

Note: *** $p < 0.001$; All models significant at $p < 0.001$.

Individual outcome component analyses revealed similar patterns with slight variations. The extra effort model explained 56.1% of variance ($R^2 = 0.561$, Adjusted $R^2 = 0.545$, $F(3,81) = 34.499$, $p < 0.001$) with transformational leadership as the primary predictor ($\beta = 0.876$, $p < 0.001$). The effectiveness model accounted for 63.2% of variance ($R^2 = 0.632$, Adjusted $R^2 = 0.619$, $F(3,81) = 46.404$, $p < 0.001$) with transformational leadership again dominant ($\beta = 0.887$, $p < 0.001$). The satisfaction model explained 54.6% of variance ($R^2 = 0.546$, Adjusted $R^2 = 0.529$, $F(3,81) = 32.455$, $p < 0.001$) with the strongest transformational coefficient ($\beta = 1.057$, $p < 0.001$).

The results of the multiple linear regression analysis predicting leadership outcomes from leadership styles are presented in Table 2.

Separate models were fit for extra effort, effectiveness, satisfaction, and a composite outcomes score. Predictors were transformational, transactional, and passive-avoidant leadership (MLQ-5X). The table reported R^2 , adjusted R^2 , model F statistic, and standardized coefficients (β) with significance. Abbreviations: MLQ-5X, Multifactor Leadership Questionnaire Form 5X.

3.6. Demographic Analyses

Comprehensive demographic analyses examined potential differences in leadership styles and outcomes across various participant characteristics, providing insights into factors that may influence leadership development and effectiveness in Saudi nursing contexts.

Gender comparisons revealed no statistically significant differences across any leadership dimensions or outcomes. Male and female nursing leaders demonstrated similar transformational leadership levels (males $M = 3.76$, $SD = 0.74$; females $M = 3.87$, $SD = 0.67$; $t(83) = -0.692$, $p = 0.491$), transactional leadership (males $M = 3.14$, $SD = 0.67$; females $M = 3.32$, $SD = 0.58$; $t(83) = -1.321$, $p = 0.190$), passive-avoidant leadership (males $M = 2.35$, $SD = 0.70$; females $M = 2.15$, $SD = 0.63$; $t(83) = 1.437$, $p = 0.154$), and leadership outcomes (males $M = 4.09$, $SD = 0.81$; females $M = 3.99$, $SD = 0.73$; $t(83) = 0.543$, $p = 0.589$). These findings suggested that gender did not significantly influence leadership style adoption or effectiveness within this Saudi nursing leadership context.

Analysis of educational levels indicated slight differences in leadership dimensions, but small sample sizes make statistical conclusions difficult. The passive-avoidant score of 2.46 ($SD = 0.60$) was slightly higher than that of bachelor's degree holders ($M = 2.17$, $SD = 0.68$), but not statistically significant. The single members

with master's and PhD degrees had higher scores on transformational leadership, but the very small sample sizes ($n = 1$ each) cannot be statistically compared.

Professional experience showed significant positive correlations with transformational leadership ($r = 0.249$, $p = 0.023$) and leadership outcomes ($r = 0.225$, $p = 0.041$) across years of experience, indicating that more years of nursing experience were associated with greater transformational leadership behaviors and leadership outcomes. Nonetheless, experience did not show any significant correlations with transactional leadership ($r = 0.112$, $p = 0.309$) or passive-avoidant leadership ($r = 0.060$, $p = 0.583$), indicating that experience particularly improved the transformational leadership style, not the other leadership styles.

4. DISCUSSION

This study indicates that transformational leadership is the predominant style of this group of nurse administrators in the Qassim Region, Saudi Arabia, with a mean of 3.83. This is consistent with the integrative review by Goens and Giannotti (2024) [6], which linked transformational leadership to nursing staff retention and other positive workplace outcomes. The high positive relationship between transformational leadership and leadership outcomes ($r = 0.804$, $p < 0.001$) validates the fact that the elements that contribute to the positive leadership outcomes, which include extra effort, effectiveness, and satisfaction, are the elements of transformational behaviors that include idealized influence, inspirational motivation, and individualized consideration.

The regression analysis shows that transformational leadership is the best predictor of leadership outcomes, explaining 65.6 percent of the variance. These findings suggest that transformational leaders can significantly enhance organizational effectiveness through their transformational behaviors. Interestingly, there was a small yet significant positive correlation in transactional leadership ($r = 0.615$, $p < 0.001$), whereas passive-avoidant leadership had no significant impact on leadership outcomes.

Our results affirm Bass's full-range leadership theory, which posits that transformational leadership is the most effective type of leadership for improving employee performance and satisfaction. Nevertheless, our research paper also shows the cultural background of Saudi Arabia, whereby hierarchical organizational frameworks can be conducive to transactional tendencies and inhibit passive leadership.

Even though our findings contribute to the existing literature on nursing leadership, our study has several limitations. The study design is cross-sectional; thus, we cannot establish causal findings, and longitudinal studies are required to assess the long-term impact of transformational leadership on nursing outcomes. Also, the sample, though based on three hospitals in the Qassim Region, might not be applicable to other parts of Saudi Arabia or other global environments.

The effect of leadership training programs on leadership fostering among nurse administrators should also be examined in the future. Moreover, multi-rater feedback (*e.g.*, 360-degree appraisals) will be useful to obtain more detailed information about leadership performance.

5. IMPLICATIONS AND LIMITATIONS

5.1. Implications for Nursing Practice and Policies

The results emphasize the importance of transformational leadership in improving nursing in Saudi Arabia, suggesting that policies should prioritize training programs in inspirational and intellectual stimulation [14]. To illustrate, healthcare organizations may incorporate MLQ-based assessments into leadership development and succession planning initiatives [22, 23]. The positive relationship between experience implies that junior leaders can be mentored, and the gender-neutrality allows an inclusive policy that encourages female promotion.

Theoretically, the risks may be minimized through active intervention training to reduce passive-avoidant behaviors that might compromise patient safety, as observed in similar studies. Policies that require leadership assessments have the potential to enhance effectiveness, which is in line with the healthcare quality objectives of Saudi Vision 2030 [1]. The transactional aspects, though secondary, suggest balanced measures that yield rewards and help maintain performance.

6. LIMITATIONS

The cross-sectional design does not allow inferences of causality: longitudinal research will help to understand the direction of style to outcome. The sample size ($N = 85$) has sufficient power but is hospital-specific and thus is less generalizable to other areas of Saudi Arabia outside the central part. Moreover, this is based on self-reported information from the MLQ, and leaders' self-evaluations may not align with their followers' opinions. Research has consistently demonstrated that supervisors tend to rate their own leadership behaviors more favorably than their staff does, highlighting a potential gap between self-perception and actual behavior [24]. Self-report bias in the MLQ may inflate positive styles, and poor passive subscale reliability ($\alpha < 0.70$) and questionable question validity suggest the need for cultural adaptations. Small subgroups (*e.g.*, PhD $n = 1$) hinder robust demographic analyses, and missing data (*e.g.*, experience $n = 2$) could introduce minor bias. Future research should include multi-rater (360-degree) feedback and broader regional samples to enable comparisons across healthcare systems [25].

CONCLUSION

This study advances knowledge by demonstrating the prevalence of transformational leadership and its strong positive associations with extra effort, effectiveness, and satisfaction among Saudi nursing leaders, answering objectives regarding styles, reliability, and predictors. With means of 3.83 for transformational and 4.03 for outcomes, the results merit publication for highlighting actionable insights in understudied Saudi contexts.

The scientific justification lies in robust correlations ($r = 0.804$) and regression ($R^2 = 0.656$), which are consistent with broader evidence on leadership styles and workforce outcomes in nursing [26]. Applications include leadership workshops to strengthen transformational behaviors, which may support staff retention and other positive workplace outcomes [6]. Recommendations include introducing experience-based mentoring and adopting structured nurse leader competency self-assessment tools [27]. Future work should also consider alignment with global nursing leadership competency frameworks [28], and evaluate how long-lasting interventions influence patient outcomes to improve nursing practice in Saudi Arabia and other countries.

AUTHORS' CONTRIBUTIONS

The authors confirm their contribution to the paper as follows: H.H.: Methodology; M.A.: Data collection; D.A.: Analysis and interpretation of results. All authors reviewed the results and approved the final version of the manuscript.

LIST OF ABBREVIATIONS

MLQ	= Multifactor Leadership Questionnaire
KSA	= Kingdom of Saudi Arabia
CI	= Confidence Interval
p-value	= Probability Value
SD	= Standard Deviation
R^2	= Coefficient of Determination
QREC	= Qassim Region Ethics Committee
IRB	= Institutional Review Board
ANOVA	= Analysis of Variance
N/A	= Not Applicable

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study received ethical approval from the Qassim Region Research Ethics Committee (QREC), Saudi Arabia prior to data collection (Approval No. H-04-Q-001, Approval Date: July 28, 2025).

HUMAN AND ANIMAL RIGHTS

All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Written informed consent was obtained from all participants for the publication of anonymized and aggregated data.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

All data generated or analyzed during this study are included in this published article.

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None.

CONFLICT OF INTEREST

The author(s) declare no conflict of interest, financial or otherwise.

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