RESEARCH

Examining the relationship between nursing staff demographics, work characteristics, and toxic leadership in Saudi Arabia: a cross-section approach

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Abstract

Background Toxic leadership contributes significantly to nursing turnover and workplace dissatisfaction in healthcare settings. Understanding what drives nurses' toxic leadership is critical in formulating interventions that improve workplace conditions and foster a healthier work environment. This study examined the relationship between demographics, work characteristics, and perceived toxic leadership among nurses in working in healthcare settings in Saudi Arabia.

Methods A descriptive cross-sectional survey was conducted with 691 nurses working in various healthcare settings across Saudi Arabia using a convenience sampling method. Data were collected using demographic characteristics and the Toxic Leadership Scale (TLS). Descriptive statistics, t-tests, one-way ANOVA, and multiple regression analysis were used to examine the relationships between demographic factors and toxic leadership ratings.

Results The mean Toxic Leadership Scale score was 103.21, with narcissism scoring highest (71.68), followed by unpredictability (59.42) and self-promotion (59.39). Younger nurses reported higher levels of toxic leadership ($p < 0.001$), females reported more abusive supervision ($p < 0.05$), and single nurses reported higher self-promotion ($p < 0.05$). Nurses with postgraduate education had higher TLS scores ($p < 0.001$), and those with less than 10 years of experience in emergency and medical departments also reported higher scores ($p < 0.001$). Indian nurses had the highest TLS scores ($p < 0.001$), while there were no significant differences based on weekly working hours ($p > 0.05$). Multiple regression analysis ($R^2 = 0.099$, $p < 0.001$) found that non-reference hospital work (B = 2.894, $p < 0.001$), younger age (B = -5.227, $p = 0.045$), postgraduate education (B = 6.015, $p = 0.005$), and non-Saudi nationality (B = 5.009, $p = 0.004$) were significant predictors of higher TLS scores.

Conclusion This study highlights the necessity of implementing specific strategies aimed at mitigating toxic leadership behaviors in hospital settings. Perceived toxic leadership was higher among non-Saudi, younger, educated nurses, staff employed, and those working in specific hospital types. Implementing leadership training, organizational

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reforms, and supportive workplace policies can help reduce the toxic leadership and ultimately improve retention and job satisfaction among nurses.

Keywords Toxic leadership, Nursing, Workplace environment, Leadership effectiveness, Saudi Arabia, Health care personnel, Cross-sectional study

Introduction

Toxic leadership is a widespread organizational challenge that adversely affects workplace dynamics, employee well-being, and institutional success [1]. It encompasses a range of harmful leadership behaviors that hinder organizational agility, reduce efficiency, and lower employee morale [1]. In the healthcare sector, where leadership and teamwork are critical for patient care, toxic leadership can be particularly detrimental. Naeem and Khurram [2] highlighted that toxic leadership significantly contributes to nursing turnover, resulting in staff burnout, dissatisfaction, and ultimately, lower retention in healthcare institutions. Toxic leadership manifests in various forms, including self-admiration, autocracy, self-importance, impulsiveness, and rigid decision making [2]. It is often characterized by micromanagement, intimidation, favoritism, and resistance to feedback [3]. Leaders who exhibit these behaviors prioritize self-interest over employee well-being, fostering an unstable, stressful work environment [5, 6]. Research indicates that toxic leadership contributes to heightened workplace stress, job dissatisfaction, and decreased employee engagement [7]. Traits such as rudeness, incompetence, lack of support, and unethical behavior further exacerbate workplace toxicity, hindering professional growth and team cohesion [8]. Studies suggest that toxic leaders often intimidate, manipulate, and undermine their subordinates, ultimately stifling creativity, innovation, and collaboration in the workplace [9]. Consequently, leadership effectiveness declines, leading to reduced productivity, increased turnover rates, and diminished employee commitment [4, 9]. In healthcare settings, where teamwork is crucial for patient safety, toxic leadership can result in medical errors, heightened stress levels, and poor patient outcomes. Addressing toxic leadership is therefore imperative for ensuring a supportive and high-functioning healthcare environment.

Research has demonstrated the global impact of toxic leadership across industries and cultures. For example, studies in Turkey indicate that healthcare workers experience moderate levels of toxic leadership, with administrative staff being more affected than clinical employees [10–11]. Similarly, in Pakistan's textile industry, toxic leadership has been shown to negatively impact work climate, reduce employee motivation, and lower overall performance [12]. In Ghana, researchers found a notable link exists between toxic leadership and employees' intentions to leave their jobs, with poor leadership behaviors directly contributing to workplace dissatisfaction [13]. Likewise, in Egypt, nurses who reported high levels of toxic leadership exhibited symptoms of psychological distress, including anxiety, burnout, and depression [14]. These international findings highlight the urgent need for leadership reforms and intervention strategies across various professional settings, particularly in healthcare where leadership directly influences service quality.

Despite growing global awareness, toxic leadership in the Saudi Arabian healthcare sector remains largely underexplored. Recent studies have shed light on this phenomenon. A cross-sectional study involving 387 emergency nurses from five major Saudi hospitals revealed high prevalence rates of perceived toxic leadership behaviors, particularly authoritarian (77%), narcissistic (75%), and unpredictable (63%) styles [15]. These toxic behaviors were linked to increased use of dominating and avoiding conflict styles among nurses, as well as decreased effective and normative commitment to their organizations. Nevertheless, similar studies focusing on Saudi nurses and their experiences with toxic leadership in hospital settings remain scarce, and healthcare system operates within a hierarchical structure, where decision-making authority is centralized among senior executives and administrative leaders [3, 4]. This rigid leadership model can foster an environment in which toxic leadership thrives, as employees may be reluctant to report abusive behaviors because of fear of retaliation. Additionally, some nurses often work in high-pressure environments, managing long shifts, heavy workloads, and complex patient care responsibilities, which may increase their vulnerability to the adverse consequences of toxic leadership [11, 13]. Given the rapid expansion of Saudi Arabia's healthcare sector, understanding the prevalence and implications of toxic leadership among nursing staff is crucial. With increasing demand for healthcare services, nurses must navigate stressful working environments that may exacerbate leadership challenges. Studies suggest that high workloads and stressful conditions make employees more susceptible to toxic leadership behaviors, particularly when leaders fail to provide adequate support and guidance [9, 14–15].

Although international studies have extensively explored toxic leadership, research on Saudi Arabia's unique healthcare environment remains limited. The presence of a diverse workforce comprising both Saudi and expatriate nurses adds complexity to leadership dynamics [3, 4]. Cultural diversity, generational

differences, and varying leadership expectations all influence how toxic leadership manifests in hospital settings. Existing studies emphasize the need to examine toxic leadership from a multilevel perspective, considering factors such as demographics and work environment [4, 9]. While studies have explored toxic leadership cultural diversity, Saudi-specific research is lacking, particularly regarding how demographic factors influence nurses' toxic leadership experiences. Understanding how nursing staff demographics and work conditions affect their experiences with toxic leadership is essential for developing targeted interventions that enhance leadership effectiveness and promote a healthier work environment. This study examined the relationship between demographics, work characteristics, and perceived toxic leadership among nurses in working in healthcare settings in Saudi Arabia.

Research questions

1. How do demographic factors (e.g., age, gender, and years of experience) influence nurses' ratings of toxic leadership?
2. How do nurses' education or professional qualifications affect their ratings of toxic leadership?
3. What are the nurses' most reported toxic leadership behaviors in Saudi Arabian healthcare settings?

Methods
Study design
This study used a descriptive cross-sectional approach, which is appropriate for assessing the relationship between nursing staff demographics, work characteristics, and toxic leadership in healthcare settings. This approach enables data collecting at a single point in time, providing a snapshot of the prevalence and patterns of toxic leadership. This study also adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines, ensuring transparency and rigor in reporting.

Setting
The study was conducted at five hospitals (King Saud Hospital in Unaizah, Maternity and Children Hospital in Buraydah, King Fahad Specialist Hospital in Buraydah, Alrass General Hospital, and Buraydah Central Hospital) in the Qassim region. The selected hospitals varied in terms of bed capacity, specialization, and staffing composition, covering general medical care, maternal and pediatric services, and specialized healthcare units. These hospitals were chosen based on their varying healthcare services, patient populations, and nursing staffing levels to ensure a comprehensive representation of nursing experiences.

Participants sample size estimation
The required sample was estimated using the following calculation = $\frac{(Z1-a/2).p(1-p)}{d2}$. The value of $Z1-\alpha/2$ is 1.96 for 5% types I error ($p < 0.05$), P represents the anticipated proportion in the population derived from previous research, and d denotes the absolute error or precision. Considering these factors, a minimum sample size of 690 nurses was determined, with an additional 10% allocated for non-responses; hence, the required sample size was 759 participants.

Inclusion criteria and exclusion criteria
Participants were eligible to participate in this study if they met the following criteria: (a) registered nurses (RNs) currently employed in public or private hospitals in Saudi Arabia, (b) direct patient care providers, (c) nurses with at least six months of work experience in their current hospital setting to ensure familiarity with leadership behaviors, (d) both Saudi and non-Saudi nurses, and (e) nurses who voluntarily agreed to participate. Participants were excluded if they met any of the following criteria: (a) nurses in administrative or managerial roles, (b) non-clinical nurses, or (c) participants who did not provide consent or submitted incomplete responses in the survey.

Sampling and recruitment
A non-probability convenience sampling method was used. Initially, 1407 nurses were recruited from public and private hospitals in the Qassim region. However, only 691 participants agreed to participate in the study, with a response rate of 91% and dropout rate of 9%. To be eligible for participation in this study, nurses were required to meet the following criteria: (1) either male or female nurses who provided direct patient care or were outpatient department nurses, (2) nurses who had previously worked as nurses in Saudi Arabia, and (3) nurses who participated in the study of their own will. The unit managers and clinical resource nurses were disqualified as respondents because they did not directly provide patient care. Moreover, they underwent different work preparations and training.

Study instruments
Demographic and occupational characteristics
The questionnaire included questions on demographic and work characteristics, specifically focused on age, gender, marital status, educational qualifications, years of experience, and present position within the unit.

Toxic Leadership Scale (TLS)
The Toxic Leadership Scale (TLS), developed by Schmidt [16] is a psychometric tool designed to assess destructive leadership behaviors in organizational settings. The

Tool is widely selected for this study due to its established validity and reliability in assessing toxic leadership behaviors in professional settings, including healthcare environments. This scale assesses toxic leadership across five key dimensions, each reflecting specific negative leadership traits. Abusive supervision (α = 0.93) measures demeaning, belittling, or intimidating behaviors exhibited by leaders toward subordinates. Self-promotion (α = 0.91) evaluates leadership tendencies where personal gain is prioritized over team well-being. Narcissism (α = 0.88) identifies excessive self-focus and a lack of empathy in leadership practices. Unpredictability (α = 0.92) assesses erratic and inconsistent behavior, contributing to workplace instability and confusion. Authoritarian behavior (α = 0.89) examines excessive control, micromanagement, and reluctance to empower subordinates [16–17].

A total of 30 items were rated on a 6-point Likert scale, with answers ranging from 1 = "Strongly Disagree" to 6 = "Strongly Agree" to quantify the extent of toxic behaviors, with higher scores indicating more significant toxicity. The scale did not include reversed items, as all questions were framed directly to reflect negative leadership traits. Widely used in research and organizational assessments, TLS has demonstrated strong reliability and validity, helping identify toxic leaders and inform interventions to mitigate their harmful impact on employee morale, turnover, and organizational performance. This instrument is reliable; each of the five scales has high reliability (Abusive Supervision: α=0.93, Authoritarian Leadership: α=0.89, narcissism: α=0.88, self-promotion: α=0.91, Unpredictable Leadership: α=0.92 [16–18]. In the current study, the scale exhibited a significant positive correlation (p < 0.05), with Pearson correlation coefficients ranging between (r = 0.86, p <.05) and (r = 0.34, p < 0.05). Moreover, Cronbach alpha value was highly acceptable (α = 0.975), confirming the scale's validity and reliability. The authorization to use the TLS was sought out and formally approved by the author of the tool via email.

Procedure

Ethical considerations

This study adhered to the ethical guidelines of the Declaration of Helsinki. Ethical approval was obtained from the relevant institutional review board (IRB) of the Ministry of Health Al Qassim Region, Regional Research Ethics Committee (Registration No. H-04-Q-001). All participants provided informed consent before their inclusion in the study. They were guaranteed anonymity, confidentiality of their data, and the right to withdraw from the study at any time without penalty or consequences. To maintain confidentiality and anonymity, no personal identifying information was collected, and the data were analyzed in aggregate form.

Tools validation and reliability

The Toxic Leadership Scale (TLS) has been validated in various health care organizations in the country, with Cronbach's alpha values ranging from 0.82 to 0.96 [19]. Similarly, one study in Egypt [20] found an exceptional Cronbach's alpha (α = 0. 996) after adapting the TLS for Arabic-speaking nurses, further supporting its applicability in assessing toxic leadership in healthcare settings. Additionally, Abdelaliem and Abou Zeid [21] confirmed the scale's robustness (α = 0.90 to 0.996) across Arabic-speaking regions, with Cronbach's alpha values ranging from 0.90 to 0.996, reinforcing its validity and reliability. However, in this study, the English version of the questionnaire was used, as both Saudi and non-Saudi nurses primarily communicate in English in clinical settings. The Content Validity Index (CVI) was calculated for the TLS to assess the content validity. Five experts evaluated each item using a 4-point scale ranging from 1 (irrelevant) to 4 (very relevant). The item-level content validity index (I-CVI) was determined by dividing the number of experts who assessed an item by the total number of experts. The scale-level content validity index (S-CVI) was computed as the mean of the item-level content validity indices (I-CVIs). The resulting CVI scores indicated strong content validity with a score of 0.89. The reliability of the scale was also established through a Pearson correlation test ($r = 0.86$, $p < 0.05$), and Cronbach's alpha was highly acceptable ($α = 0.97$), confirming that the scale was both valid and reliable for the study.

Pilot study

Prior to data collection, pilot study was undertaken with 10% of the nursing staff from the Qassim Hospitals, involving 33 nurses. This pilot study aimed to assess the tools' clarity, comprehensiveness, accessibility, and utility, as well as estimate the time required to complete the questionnaire. Following the pilot test, minor modifications were made to improve wording and question formatting, ensuring ease of understanding for participants. This pilot study confirmed that the scales were precise, applicable, and required no modification. Furthermore, participants provided qualitative feedback, highlighting that the response options were appropriate and reflective of their experiences, further supporting the validity of the instrument.

Data collection

Data were collected between January and September 2022. After obtaining ethical approval, the research team collaborated with head nurses and nursing directors from each hospital ward to outline the study and secure permission for nurses' enrollment in every care unit. Once approval was granted, the research team coordinated with the Human Resources (HR) departments to identify

eligible participants, while ensuring confidentiality. HR provided non-identifiable lists of nursing staff, ensuring a broad representation across hospital units. Following approval from the nursing directors, the researchers developed an online survey, which was disseminated via a secure digital platform such as Google Forms, WhatsApp groups, and other hospital-approved communication platforms. The first page of the questionnaire outlined the study's objectives, data confidentiality measures, and ethical considerations. Participants were required to provide informed consent by selecting an acknowledgment box before proceeding with the survey. To ensure confidentiality and privacy, all survey responses were collected through a secure online platform, with unique access links provided to each participant. Personal identifying information was not collected, and all data were anonymized before analysis, and only the research team had access to the raw data. The design of the online version prevented multiple submissions, preventing multiple questionnaire completions. All the completed questionnaires were included in the data analysis, with access restricted exclusively to the research team.

Data analysis

Data collection in this study was conducted through an online survey, and the data were subsequently coded and processed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics, such as frequencies, percentages, means, and standard deviations, were employed to comprehensively review the study variables. These statistical measures were instrumental in summarizing and characterizing the data. The relationship between demographic factors and the toxic leadership scale was tested based on the data, using different tests as follows: Student's t-test was used to see how different the groups were on average for toxic leadership, one-way ANOVA was used to see how different the groups were on average for toxic leadership, with post-hoc comparisons using the Least Significant Difference (LSD) as a measure of how well the independent variables (demographic factors) predicted the dependent variable (toxic leadership), and a significance level (±) of 0.05 was used to determine statistical significance.

Results

Demographic and work-related characteristics

Table 1 indicates the participants' mean age was 31.52 ± 6.10 years, with the largest age group being 20–29 (38.2%) and 49.2% aged 50 and older. Gender distribution favored females (94.1%) over males (5.9%). Regarding marital status, 42.0% were single and 58.0% married. Regarding education, 81.8% were BSN graduates, 9.4% with college diplomas, 6.2% with certificates, and 2.6% with master's degrees. Experience varied, with 62.8%

Table 1 Descriptive of the study variables ($n = 691$)

	No	%
Age	340	49.2
20–29	264	38.2
30–39	80	11.6
40–49	7	1.0
50+	340	49.2
M ± SD	31.52 ± 6.10	
Gender		
Males	41	5.9
Females	650	94.1
Marital		
Single	290	42.0
Married	401	58.0
Educational Attainment		
Nursing Diploma / Institute	43	6.2
Nursing Diploma / College	65	9.4
BSN Graduate	565	81.8
Master in Nursing	18	2.6
Total years of experience in the current hospital		
< 5	434	62.8
5 - <10	143	20.7
10 < 15	68	9.8
15+	46	6.7
M ± SD	5.09 ± 4.82	
Area of practice		
Emergency Department	192	27.8
Surgical Department	91	13.2
Medical Department	97	14.0
Nursing Administration	178	25.8
Pediatric Department	13	1.9
Outpatient Department	28	4.1
Operating Room	29	4.2
Obstetric Department	7	1.0
Surgical Department	49	7.1
Artificial Kidney Unit	7	1.0
Endoscopy Unit	49	7.1
Nationality		
Saudi	94	13.6
Filipino	183	26.5
Indian	400	57.9
Other	14	2.0
Working hours per week		
< 36	9	1.3
36 - <48	149	21.6
48 - <72	527	76.3
72+	6	0.9
M ± SD	47.95 ± 6.07	
Total years of experience as a nurse		
< 5	171	24.7
5 - <10	307	44.4
10 < 15	108	15.6
15+	105	15.2
M ± SD	8.45 ± 5.73	
Hospital		

Alqarawi *et al. BMC Nursing*   (2025) 24:405

Page 6 of 13

Table 1 (continued)

	No	%
King Saud Hospital	360	52.1
Maternity and Children Hospital	102	14.8
King Fahad Hospital	118	17.1
Al Rass General Hospital	36	5.2
Buraidah Central Hospital	38	5.5
Other	37	5.4

M: Mean; SD: Standard Deviation

having less than five years, 20.7% between 5 and 10 years, 9.8% between 10 and 15 years, and 6.7% with 15 or more years, yielding a mean of 5.09 ± 4.82 years. The Emergency Department had the highest representation (27.8%), followed by the Nursing Administration (25.8%) and the Medical Department (14.0%). Other areas included the Operating Room (4.2%), Outpatient Department (4.1%), Pediatric Department (1.9%), and Obstetric Department (1.0%). The Artificial Kidney and Endoscopy Units each comprised 1.0%. Nationality-wise, 57.9% were Indian, 26.5% Filipino, 13.6% Saudi, and 2.0% other. Most nurses (76.3%) worked 48 to less than 72 h per week, 21.6% worked 36 to less than 48 h, 1.3% less than 36 h, and 0.9% 72 h or more, averaging 47.95 ± 6.07 h per week. Nursing experience revealed 44.4% with 5 to less than 10 years, 24.7% under five years, 15.6% with 10 to less than 15 years, and 15.2% with 15 or more years, averaging 8.45 ± 5.73 years. Most nurses were at King Saud Hospital (52.1%), followed by King Fahad Hospital (17.1%) and Maternity and Children Hospital (14.8%).

The mean scores of the TLS
Table 2 presents that the narcissism had the highest mean percent score (71.68 ± 25.40), suggesting that self-centered and egotistical behaviors were the most prominent toxic traits. Unpredictability (59.42 ± 28.04) and self-promotion (59.39 ± 29.17) had similar mean percent scores, highlighting inconsistent behavior and excessive self-interest as everyday issues. Authoritarian leadership (60.61 ± 26.15) and abusive supervision (56.46 ± 27.98) also showed significant presence, reflecting dominance and mistreatment in leadership styles. The overall Toxic Leadership Scale score (103.21 ± 30.09, mean percent 61.51 ± 24.89) suggests that toxic leadership traits are moderately prevalent, with narcissism as the most dominant characteristic.

Relationship between the toxic leadership scale among nurses and demographic work-related characteristics
Table 3 analyzes the relationship between demographic characteristics and the TLS, revealing key findings. Age is crucial, with younger individuals (20–29 years) reporting higher toxic leadership scores, which decline significantly with age ($p < 0.001$). Gender differences are apparent, as females perceive higher levels of abusive supervision, narcissism, and overall TLS scores than males ($p < 0.05$). Marital status specifically singles, reporting higher scores in self-promotion and unpredictability ($p < 0.05$). Educational attainment also plays a significant role, with a master's in nursing associated with higher TLS scores ($p < 0.001$). Less experienced nurses (under 10 years) report higher TLS scores than their more experienced counterparts ($p < 0.001$), and those with fewer total years of experience perceive higher toxic leadership levels ($p < 0.05$). The Emergency and Medical Departments report the highest TLS scores, while the Obstetric and Artificial Kidney Units report the lowest ($p < 0.001$). Nationality significantly influences scores, with Indian nurses scoring highest, and "other" nationalities scoring lowest ($p < 0.001$). Working hours per week showed no significant differences ($p > 0.05$). Al Rass General Hospital had the highest TLS scores, while King Saud Hospital had the lowest ($p < 0.001$). Overall, demographic factors, especially age, gender, marital status, education, experience, and area of practice significantly influence toxic leadership in healthcare settings.

Factors of toxic leadership among nurses
Table 4 reveals the multiple linear regression analysis identifying factors influencing the TLS among participants. The model accounted for 9.9% of the variance in TLS scores ($R^2 = 0.099$, adjusted $R^2 = 0.087$, F = 8.268, $p < 0.001$), suggesting unmeasured factors may also affect toxic leadership. Working in non-reference hospitals significantly raised TLS scores (B = 2.894, $p < 0.001$), indicating the hospital environment's influence. Age negatively correlated with TLS (B = -5.227, $p = 0.045$), showing younger individuals perceive higher toxic leadership levels. Postgraduate education linked to higher TLS scores (B = 6.015, $p = 0.005$) likely reflects greater awareness of toxic behaviors. Non-Saudi nationality also correlated with elevated TLS scores (B = 5.009, $p = 0.004$), suggesting cultural differences in leadership. Factors like gender, marital status, and nursing experience did not significantly affect TLS scores.

Discussion
This study examined the relationship between nursing staff demographics, work characteristics, and toxic leadership in Saudi Arabian hospitals. This investigation reported several important findings. The findings of this study indicate that toxic leadership among nurses in Saudi Arabia is rated as moderate, consistent with previous studies conducted in Turkey [11] and Saudi Arabia [15], where healthcare professionals reported moderate levels of toxic leadership. This suggests that toxic leadership is a widespread issue across healthcare systems, possibly influenced by cultural, organizational,

Table 2 The mean scores of toxic leadership scale (*n*=691)

Toxic leadership scale	Total score		Mean percent score	
	Mean	**±SD**	**Mean**	**±SD**
Self-Promotion	16.88	5.83	59.39	29.17
Abusive Supervision	22.81	7.83	56.46	27.98
Unpredictability	23.64	7.85	59.42	28.04
Narcissism	19.34	5.08	71.68	25.40
Authoritarian Leadership	20.55	6.28	60.61	26.15
Total mean score of TLS	**103.21**	**30.09**	**61.51**	**24.89**

M: Mean; SD: Standard Deviation

TLS: Toxic Leadership Scale

and managerial structures in different regions. The moderate rating may indicate that while toxic behaviors exist, they are not extreme or dominant, which could be attributed to existing institutional policies, leadership training, or cultural norms that regulate managerial conduct. This finding is also supported by previous study who reported that leaders with moderate leadership skills tend to exhibit high levels of authority, which can create an authoritarian workplace environment [18]. Authoritarian leadership has been linked to reduced job mobility, high cognitive distrust, and increased psychological stress among employees [18]. Similarly, previous research has found that authoritarian leadership negatively impacts employees' willingness to help colleagues by fostering persistent negative thinking and rumination [18–20]. However, studies suggest that psychological ownership—an employee's sense of responsibility and connection to their work—can buffer the negative effects of toxic leadership [18–20]. Given these findings, investing in structured leadership training programs for nursing professionals is essential to reducing authoritarian tendencies and mitigating the negative effects of toxic leadership. Leadership development initiatives that promote transformational, participative, and emotionally intelligent leadership styles can aid in generating a more positive and supportive workplace environment.

The findings of this study indicate that female nurses in Saudi Arabia reported higher toxic leadership level in comparison to male nurses, which aligns with previous studies suggesting that women experience higher workplace toxicity than men [19–22]. Several studies have linked gender-based disparities in workplace experiences to differences in leadership expectations, emotional labor, and exposure to workplace stressors [20–22]. Research has also shown that higher exposure to workplace toxicity can impair emotion regulation, increase emotional intensity, and negatively affect psychological well-being [22–24]. For example, during the COVID-19 pandemic, several studies have reported that female nurses experienced higher burnout, stress, depression, and anxiety, which significantly impacted their mental health and job

performance [25–29]. Burnout not only affects individual well-being, but also influences professional interactions, potentially leading to strained workplace relationships. While burnout does not directly cause toxic leadership, chronic occupational stress and emotional exhaustion may contribute to negative leadership behaviors of toxicity in the workplace [25–26]. The demanding nature of nursing, coupled with gender-specific expectations of caregiving and emotional resilience, may place additional stress on female nurses, making them more susceptible to experiencing or perceiving toxic leadership at work [28–29]. Given these findings, it is essential for healthcare administrations to implement structured support systems for nurses, particularly women, who may be at higher risk of occupational stress and burnout. Initiatives such as mental health programs, leadership coaching, and emotional resilience training can help alleviate psychological distress and reduce the potential for toxic workplace interactions.

This result revealed that single nurses were more susceptible to toxic leadership than their married counterparts, consistent with previous research from different healthcare systems [30]. This also accords with our earlier observations, which showed that single nurses experience higher occupational stress, burnout, and workplace dissatisfaction, which heightens their perceived toxic leadership [25, 28, 31, 38]. This suggests that the association between marital status and toxic leadership is not limited to a single cultural or organizational setting but may be a global trend influenced by workplace stressors, leadership dynamics, and personal coping mechanisms [13, 34, 35]. Research suggests that married nurse's benefit from additional emotional and psychological support from their families, which helps them cope with workplace stress more effectively [32, 33, 35]. In contrast, single nurses may lack external coping mechanisms, leading to greater stress accumulation and an increased tendency to view leadership behaviors negatively [34]. Additionally, burnout has been linked to emotional exhaustion, reduced resilience, and heightened workplace tensions, which could further contribute to single nurses experiencing greater workplace toxicity [36, 37]. While prior research has established burnout as a key predictor of workplace dissatisfaction, this study expands this by showing that single nurses were more vulnerable to the negative effects of toxic leadership due to the absence of external emotional support systems. Given these findings, health care institutions should consider targeted interventions to support single nurses and reduce burnout-related toxic leadership.

This study found that Indian nurses reported higher toxic leadership ratings compared to nurses of other nationalities, a trend observed in prior research on expatriate healthcare workers [34]. It is worth noting that

Table 3 Relationship between demographic characteristics and toxic leadership scale

Demographic characteristics	Self-promotion		Abusive supervision		Unpredictability		Narcissism		Authoritarian leadership		Total scores of TLS	
	M	±SD	M	±SD	M	±SD	M	±SD	M	±SD	M	±SD
Age												
20–29	18.16	5.43	24.33	7.40	25.13	7.47	20.09	4.71	21.69	6.07	109.40	28.22
30–39	16.10	5.86	21.69	8.05	22.68	7.92	18.56	5.32	19.77	6.33	98.80	30.73
40–49	14.21	6.02	20.11	7.71	20.78	7.76	18.51	5.50	18.29	6.14	91.90	30.30
50+	14.57	6.78	22.14	7.40	20.00	10.10	21.29	2.69	19.71	5.31	97.71	30.07
F(p)	13.63*(<0.001*)		9.600*(<0.001*)		9.786*(<0.001*)		5.754*(0.001*)		8.921*(<0.001*)		10.98*(<0.001*)	
Gender												
Males	16.07	7.73	19.95	10.10	21.49	10.41	17.22	6.86	18.10	8.99	92.83	42.37
Females	16.93	5.70	22.99	7.64	23.77	7.65	19.47	4.92	20.70	6.04	103.86	29.07
t(p)	0.697(0.489)		2.417*(0.016*)		1.382(0.174)		2.065*(0.045*)		2.586*(0.010*)		2.283*(0.023*)	
Marital												
Single	17.67	5.57	23.65	7.56	24.42	7.64	19.37	5.06	21.04	6.08	106.15	29.39
Married	16.30	5.96	22.20	7.98	23.07	7.96	19.31	5.10	20.19	6.40	101.07	30.45
t(p)	3.093*(0.002*)		2.413*(0.016*)		2.239*(0.025*)		0.146(0.884)		1.756(0.079)		2.195*(0.029*)	
Educational Attainment												
Nursing Diploma / Institute	13.58	5.97	17.84	8.67	18.40	8.58	16.16	6.50	16.72	6.93	82.70	34.10
Nursing Diploma / College	16.63	6.25	22.18	8.90	22.63	8.92	19.65	5.43	20.43	7.06	101.52	33.69
BSN Graduate	17.07	5.66	23.10	7.41	24.01	7.44	19.52	4.81	20.74	5.99	104.44	28.53
Master in Nursing	19.67	6.84	27.72	9.66	28.11	9.20	20.11	6.21	23.89	7.18	119.50	34.71
F(p)	6.332*(<0.001*)		8.825*(<0.001*)		9.451*(<0.001*)		6.186*(<0.001*)		7.422*(<0.001*)		9.111*(<0.001*)	
Years of experience in the current hospital												
< 5	17.41	5.48	23.31	7.51	24.22	7.49	19.61	4.92	21.17	6.02	105.72	28.51
5 – <10	17.40	6.08	24.05	8.08	24.48	8.15	19.38	5.12	20.79	6.47	106.10	31.55
10<15	13.97	6.23	18.91	8.13	20.13	8.06	17.90	5.60	17.44	6.49	88.35	31.55
15+	14.52	6.00	20.00	7.48	20.67	8.16	18.72	5.41	18.52	6.15	92.43	30.02
F(p)	10.11*(<0.001*)		9.718*(<0.001*)		8.308*(<0.001*)		2.488(0.059)		8.924*(<0.001*)		9.258*(<0.001*)	
Area of practice												
Emergency Department	18.14	5.68	24.07	7.35	24.91	7.37	19.91	4.88	21.77	5.96	108.80	28.55
Surgical Department	15.00	6.97	21.33	9.49	22.07	9.72	18.24	6.76	18.76	7.62	95.40	37.87
Medical Department	18.19	6.21	24.32	8.61	24.68	8.52	19.91	5.50	21.76	6.83	108.86	32.90
Nursing Administration	16.76	5.16	23.11	7.43	23.81	7.37	19.22	4.60	20.47	5.69	103.38	27.43
Pediatric Department	15.23	4.34	19.85	6.30	21.92	5.82	19.38	4.46	19.00	4.45	95.38	21.77
Outpatient Department	14.32	5.23	19.64	7.05	21.50	6.95	19.07	5.33	18.32	5.38	92.86	26.91
Operating Room	16.66	5.52	21.59	7.81	22.69	6.32	20.31	4.58	20.34	5.42	101.59	25.72
Obstetric Department	11.57	3.87	14.57	5.26	16.43	4.69	15.00	2.71	13.43	3.15	71.00	17.83
Artificial Kidney Unit	10.57	4.20	15.43	5.62	16.29	5.22	15.14	3.18	13.29	4.11	70.71	21.47
Endoscopy Unit	17.53	4.82	22.92	5.76	24.35	6.55	20.31	3.22	20.90	5.11	106.00	22.43

Table 3 (continued)

Demographic characteristics	Self-promotion		Abusive supervision		Unpredictability		Narcissism		Authoritarian leadership		Total scores of TLS	
	M	±SD	M	±SD	M	±SD	M	±SD	M	±SD	M	±SD
F(p)	5.096*(<0.001*)		3.725*(<0.001*)		3.106*(0.001*)		2.853*(0.002*)		4.374*(<0.001*)		4.311*(<0.001*)	
Nationality												
Saudi	15.91	7.20	20.04	9.70	21.52	9.53	17.63	6.52	18.60	7.95	93.70	38.24
Filipino	15.48	6.35	21.96	8.24	22.31	8.09	18.50	5.39	19.18	6.28	97.43	32.33
Indian	17.92	4.97	24.06	6.84	24.91	7.01	20.20	4.33	21.73	5.57	108.82	25.31
Other	11.93	4.21	16.71	6.78	18.79	7.89	17.07	5.17	17.64	5.33	82.14	27.21
F(p)	12.54*(<0.001*)		11.33*(<0.001*)		9.682*(<0.001*)		10.39*(<0.001*)		12.23*(<0.001*)		12.94*(<0.001*)	
Working hours per week												
<36	17.78	4.99	22.00	6.48	22.56	6.77	18.67	5.24	19.56	5.75	100.56	26.10
36 - <48	16.78	6.28	21.88	8.51	22.97	8.62	18.91	5.40	19.89	6.84	100.43	32.49
48 - <72	16.87	5.75	23.09	7.67	23.81	7.67	19.47	4.99	20.73	6.12	103.98	29.53
72+	18.33	3.27	22.67	5.24	26.50	4.89	19.00	5.22	21.67	6.15	108.17	23.27
F(p)	0.210(0.890)		0.954(0.414)		0.763(0.515)		0.542(0.654)		0.834(0.475)		0.615(0.605)	
Total years of experience as a nurse												
<5	17.55	5.55	23.48	7.67	24.37	7.68	19.97	4.88	21.13	6.34	106.51	29.42
5 - <10	17.85	5.50	24.14	7.40	24.93	7.47	19.60	4.82	21.50	5.97	108.01	28.38
10<15	14.88	6.32	20.69	8.37	21.52	8.18	18.33	5.66	18.94	6.59	94.35	32.22
15+	15.01	5.85	20.02	7.71	20.85	7.82	18.55	5.33	18.47	5.98	92.90	29.69
F(p)	11.93*(<0.001*)		10.89*(<0.001*)		10.73*(<0.001*)		3.442*(0.017*)		9.386*(<0.001*)		10.97*(<0.001*)	
Hospital												
King Saud Hospital	16.11		5.66		21.86		7.71		22.86		7.66	
Maternity and Children Hospital	17.00		6.21		23.75		8.46		23.53		8.46	
King Fahad Hospital	17.46		5.00		23.28		6.27		24.15		6.84	
Al Rass General Hospital	21.22		6.23		27.97		8.12		28.39		7.78	
Buraidah Central Hospital	17.71		5.51		22.61		7.55		24.18		7.40	
Other	17.11		6.89		23.19		9.61		24.65		9.84	
F(p)	5.852*(<0.001*)		4.717*(<0.001*)		3.676*(0.003*)		2.131(0.060)		4.455*(0.001*)		4.607*(<0.001*)	

M: Mean; SD: Standard Deviation; TLS: Toxic Leadership Scale; F: One way ANOVA test; t: Student t-test

*: Statistically significant at $p \le 0.05$

Table 4 Multiple linear regression analysis showing factor affecting toxic leadership scale ($n = 691$)

	B	Beta	t	p	95% CI	
					LL	UL
Hospital (Other hospitals)	2.894	0.144	3.714*	< 0.001*	1.364	4.424
Age	-5.227	-0.126	-2.008*	0.045*	-10.338	-0.115
Gender (Females)	1.460	0.011	0.253	0.800	-9.878	12.798
Marital (Married)	-0.323	-0.005	-0.129	0.897	-5.227	4.582
Educational Attainment (postgraduate)	6.015	0.115	2.806*	0.005*	1.805	10.224
Total years of experience in the current hospital	0.381	0.012	0.210	0.834	-3.175	3.937
Nationality (Non-Saudi)	5.009	0.125	2.901*	0.004*	1.619	8.399
Years of experience as a nurse	-0.073	-0.002	-0.038	0.969	-3.837	3.690
$R^2 = 0.099$, Adjused $R^2 = 0.087$, F = 8.268*, $p < 0.001$*						

F, p: f and p values for the model; R^2: Coefficient of determination; B: Unstandardized Coefficients; Beta: Standardized Coefficients; t: t-test of significance; LL: Lower limit; UL: Upper Limit; *: Statistically significant at $p \leq 0.05$

expatriate nurses frequently face limited social support, strict regulations, and temporary work permits, which can restrict their professional autonomy and increase workplace stress [34]. These structural constraints may hinder their ability to perform tasks freely, leading to frustration and heightened perceived toxic leadership. Similar patterns have been documented in other recent studies where foreign nurses experienced workplace bias, limited career progression, and exclusion from leadership roles [4, 27, 37, 38]. Additionally, studies from the United Kingdom [34], United States [33], and Middle East [30] suggest that foreign-trained nurses struggle with professional integration and leadership interactions, which may increase perceived workplace toxicity [39]. Furthermore, research in Saudi Arabia highlights that foreign nurses are more vulnerable to workplace bullying and discrimination, which can negatively impact job satisfaction, productivity, and leadership experiences [1, 37]. Edmonson [37] found that expatriate nurses often struggle with cultural adaptation, institutional expectations, and workplace relationships, all of which may reinforce toxic leadership. These findings emphasize the role of systemic workplace challenges in shaping foreign nurses' leadership experiences.

This study found that nurses with a master's degree in nursing reported experiencing higher toxic leadership levels. In line with prior studies indicating that nurses with higher educational attainment are more aware of workplace dysfunction [13, 30]. Advanced education enhances knowledge of leadership principles and organizational dynamics, leading to greater sensitivity to toxic behaviors [22]. However, a disconnect between leadership theory and its practical application in healthcare settings may contribute to frustration when institutional structures fail to support evidence-based leadership [37]. Similar trends have been observed in other healthcare systems, where nurses with advanced degrees report heightened dissatisfaction with leadership owing to increased expectations for ethical decision-making and staff development [39, 40]. These results are in line with those of previous studies that higher-educated nurses are more critical of hierarchical leadership, increasing their perceived workplace toxicity [2, 13, 14, 22]. Likewise, this finding broadly supports the work of other studies in this area that the expectation of deference to senior leadership limits nurses' ability to challenge toxic behaviors, reinforcing stress, and dissatisfaction [10, 13, 14, 30]. Another consideration is that higher-educated nurses often take on leadership roles or additional responsibilities, which may expose them to greater workplace pressures, conflicts, and challenges in managing expectations [10, 13, 14]. The results of this study, along with previous findings, suggest that further investigation is needed to explore how education level influences toxic leadership experiences, and whether specific institutional or cultural factors contribute to these challenges. Future research should explore how leadership styles affect highly educated nurses across various cultural settings to develop strategies for mitigating toxic leadership in nursing practice.

This study found that nurses assigned to emergency and medical departments reported higher levels of toxic leadership, aligning with previous research indicating that toxicity tends to be more prevalent in high-stress medical environments [14, 22, 25]. Emergency and medical departments are among the busiest units in healthcare settings, often characterized by high patient volumes, overcrowding, and a fast-paced work environment [3, 9]. These demanding conditions create persistent pressure and exhaustion among nurses, which can lead to workplace tension, increased conflict, and leadership challenges. The high-pressure nature of these departments may exacerbate toxic leadership behaviors, as leaders may adopt authoritarian or micromanaging styles in an attempt to maintain control over chaotic environments. These results corroborate the ideas of Almazan et al. [9] and Dall'Ora et al. [33], who suggested that staff burnout in emergency and medical units often correlates with dysfunctional leadership styles, leading to negative workplace cultures and higher turnover rates, which require

targeted leadership training, improved staffing policies, and mental health support programs to reduce the toxic leadership effects in emergency and medical departments. Future research should explore how different hospital management strategies impact toxic leadership levels in high-stress healthcare units.

The results from this study also suggest a mild negative correlation between age and toxic leadership ratings, indicating that older nurses reported lower toxicity levels. This is supported by a recent study [30] that found that nurses in the above-middle-age category have lower toxic leadership. This observation may be linked to the idea that novice nurses are still navigating the early stages of their careers and adapting to associated challenges [4, 9]. They may not know how to deal with a situation calmly, which may lead them to become more destructive and toxic to others. This finding relates to another noteworthy study that noted a low negative correlation between toxic leadership and work experience in the current hospital [38–40]. This indicates that the more experienced nurses have in the current hospital, the lower their toxic leadership. However, this finding is contrary to previous studies, which have suggested that senior nurses are better equipped to manage leadership conflicts, reducing their perceived workplace toxicity [10, 22, 30]. This finding is worth noting because senior nurses are more experienced, trained, and used to the routine healthcare processes [10, 22, 30]. If not avoided, they can reduce toxicity in the workplace, as they are skilled enough to mitigate these adverse circumstances. To address this issue, structured mentorship programs, early leadership training, and adaptation strategies are recommended.

Limitations of the study
This study had some limitations that should be considered. First, the application of a convenience sampling technique might restrict the generalizability of the results to a wider nursing community in Saudi Arabia. Future research should employ random sampling to enhance representativeness. Second, the cross-sectional design captures responses at a single point in time, preventing the analysis of changes over time. Longitudinal studies could provide deeper insights into the evolving nature of toxic leadership. Third, self-reported data may be subject to response bias, as participants may overestimate or underestimate their experiences. Incorporating qualitative methods such as interviews or focus groups offers a more comprehensive understanding. Finally, the study was limited to nurses' views and did not include leaders' views or their organizational contributions to toxic behaviors. Further research ought to adopt a multistakeholder approach to create well-rounded and efficient traits of leadership interventional strategies.

Conclusion and recommendations
This study highlights the significant influences of demographic and workplace factors on toxic leadership in healthcare settings. Younger nursing professionals, those with a higher education, non-Saudi nationals, and those working in specific hospital types reported higher levels of toxic leadership. Specific leadership traits, including unpredictability, abusive supervision, and authoritarianism were the most prominent. These results highlight the urgent need for leadership development programs tailored to Saudi Arabia's diverse nursing workforce, organizational policies that mitigate toxic leadership behaviors, and structural reforms to promote a supportive work environment. Future research should focus on exploring qualitative insights into why certain groups, such as women and Indian nurses, perceive higher levels of toxic leadership. In-depth interviews or focus groups could provide valuable understanding of the underlying contributing factors. Moreover, further studies should examine the role of organizational culture and leadership styles across various healthcare settings to better understand their impact on toxic leadership behaviors. Finally, future research should explore longitudinal changes in perceived leadership and interventions that improve nurse-leader relationships in Saudi hospitals.

Nursing implications
Understanding the reasons for toxic leadership is crucial for improving leadership efficiency and minimizing workplace toxicity. This research examines the consequences of toxic leadership on organizational effectiveness, communication, and professionalism, and suggests that primary action is needed to address the identified issues of toxic leadership within healthcare institutions. Training programs should be culturally adapted to accommodate Saudi Arabia's diverse nursing workforce, ensuring that expatriate and local nurses receive equitable leadership support. The existence of defined organizational leadership development models can mitigate toxic leadership behaviors, promote ethical conduct, and enhance interprofessional cooperation among nurses. Likewise, Saudi hospitals should implement leadership development programs tailored to multicultural nursing teams. Given the high toxic leadership scores reported by non-Saudi nurses, structured mentorship programs and culturally sensitive management strategies could improve retention and job satisfaction. This study contributes to the broader discourse on nursing leadership and workplace culture at the local and international levels. Given the hierarchical leadership structures prevalent in Saudi Arabia, tailored interventions must be developed to adapt leadership models that align with cultural expectations while mitigating toxic behaviors. Internationally, these findings highlight the need for comparative studies

across different healthcare systems to develop universal best practices for reducing the impact of toxic leadership on workforce sustainability and patient care quality. By integrating evidence-based leadership strategies, healthcare organizations can foster professionalism, enhance communication, and cultivate a positive organizational culture, ultimately leading to improved patient outcomes and institutional success.

Supplementary Information
The online version contains supplementary material available at https://doi.org/10.1186/s12912-025-03065-1.

Supplementary Material 1

Author contributions
Conceptualization: NA, IA, ASA, CSA and JUA. Formal analysis: NA and ASA. Project administration: IA and IA. Methodology: ASA, CSA, and JUA. Investigation: NA, ASA, and IA. Resources: CSA, JUA, and IA. Visualization: NA, ASA, CSA, and JUA. Draft-writing: NA, IA, ASA, CSA and JUA. Validation: NA, ASA, JUA and IA. All authors read and agreed to the final version of the manuscript.

Data availability
The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
This study was conducted by the ethical standards outlined in the Declaration of Helsinki. Ethics approval was obtained from the relevant institutional review board (IRB) by the Ministry of Health Al Qassim Region, Regional Research Ethics Committee (Registration No. H-04-Q-001). All participants provided informed consent before their inclusion in the study. Participants were assured of their anonymity, the confidentiality of their data, and their right to withdraw from the study without any penalty or repercussions.

Consent for publication
Not applicable.

Clinical trial number
Not applicable.

Competing interests
The authors declare no competing interests.

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