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ORIGINAL RESEARCH

Assessment of Patient Satisfaction With MRI Department Services and Staff in Saudi Hospitals

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Background: Patient satisfaction is a key component of healthcare quality and is essential for improving clinical outcomes. This study was conducted to assess patient satisfaction with MRI services across 10 hospitals in Saudi Arabia, focusing on both department services and staff performance.

Methods: A cross-sectional survey was conducted from July to August 2024 and involved 496 patients at four private and six public hospitals who underwent MRI scans. A structured questionnaire comprising a five-point Likert scale was used to measure patient satisfaction with MRI department services and staff. The data were analyzed using descriptive statistics, Pearson's chi-square test, t-tests, and ANOVA.

Results: The majority of respondents (51.6% female) were 40–49 years of age, and 41.1% held a bachelor's degree. Overall, 92% of patients were either satisfied or very satisfied with MRI department services, particularly with registration efficiency (91.9%) and equipment quality (84.7%). However, satisfaction with waiting times was lower, with 66.1% of patients expressing satisfaction. Regarding MRI staff, 95.9% of patients were either satisfied or very satisfied with the privacy and confidentiality maintained during the procedure. A strong positive correlation ($r = 0.76$, $p < 0.001$) was observed between satisfaction with staff and overall MRI services.

Conclusion: The patients reported high levels of satisfaction with MRI services, particularly with staff professionalism and facility quality. However, waiting times before MRI scans were identified as requiring improvement, particularly in public hospitals. Addressing this issue while maintaining high service standards can enhance patient satisfaction and overall experience.

Keywords: patient satisfaction, MRI services, MRI staff performance, healthcare quality, Saudi Arabia

Introduction

Patient satisfaction is essential for improving clinical outcomes and patient retention and reducing medical malpractice claims. In the context of radiology, understanding patients' satisfaction with magnetic resonance imaging (MRI) services can provide valuable insights into the effectiveness and efficiency of healthcare delivery.[1] The World Health Organization (WHO) has identified patient satisfaction as a core indicator of healthcare quality and has emphasized its role in enhancing overall patient experiences and healthcare delivery.[2]

MRI investigations are critical diagnostic procedures in hospitals.[3] MRI facilities play a major role in influencing patient satisfaction and also face unique challenges due to a diverse mix of patients, procedure-related discomforts and phobias, and examination types ranging from routine imaging to emergency cases.[4,5] To improve patient satisfaction levels, it is essential for service providers to recognize the importance of service quality and delivery, which require knowledge of customer service and patient satisfaction.[6]

Prior research has shown that patients' satisfaction with radiological services is influenced by multiple factors, including waiting times, the professionalism and communication skills of healthcare staff, the quality of information provided to patients, and the comfort and cleanliness of healthcare facilities.[7–10] A study conducted at Fayoum University Hospital in Egypt found that overall patient satisfaction with radiological services was 75%, with lower satisfaction levels reported for registration process efficiency and waiting times.[10] Similarly, research in Ethiopia showed that younger patients and those with lower education levels tend to report higher satisfaction with radiological services.[11]

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Patients' perceptions of services and facilities are key indicators of quality outcomes. Therefore, evaluations of these factors offer opportunities for enhancements of healthcare services, including the strategic development of hospital plans.[12] Considering this, a cross-sectional survey was used in the present study to assess patient satisfaction with MRI services in Saudi Arabia. The primary aim was to assess patient satisfaction with MRI services across various hospitals in Saudi Arabia based on demographic variables and patient experiences. This would allow for identifying key improvement areas and providing actionable insights to enhance the quality of MRI services, thereby ensuring that they meet patients' expectations and needs.

Methodology

Study Design

This questionnaire-based cross-sectional study was conducted in July and August 2024 at 10 hospitals across Saudi Arabia, including two university hospitals, one National Guard hospital, three public hospitals under the Ministry of Health, and four private hospitals. These hospitals were chosen to represent the country's major healthcare sectors in seven provinces: Riyadh, Makkah, the Western Region, Asir, Hail, Jizan, and Albaha. This geographic and demographic diversity allowed for capturing patient experiences from a broad range of healthcare settings in Saudi Arabia. The cross-sectional study design was adapted from Wahed et al's study in Egypt.[10]

Participants

The target population for this study comprised patients who had undergone MRI scans in the selected hospitals. The eligibility criteria included patients aged 18 years or older who were able to provide informed consent. The exclusion criteria included patients with cognitive impairments that hindered survey completion and those who were unable to communicate in Arabic or English.

Questionnaire Design

The survey consisted of three main sections: Demographic Information, Department Services, and MRI Staff, as detailed in the Appendix 1. It was used to collect comprehensive data on participants' age, gender, education level, employment status, frequency of MRI scans, and hospital type. With respect to department services, the questionnaire was used to evaluate the ease of reaching the MRI department, efficiency of registration and scheduling, waiting times, report receipt times, facility comfort and cleanliness, and perceived equipment quality. Additionally, the MRI staff section focused on the friendliness and professionalism of MRI staff, the quality of information provided, and confidentiality and privacy during MRI procedures. Participant responses were measured using a five-point Likert scale, with options ranging from "very satisfied" to "very dissatisfied", which enabled a thorough evaluation of patient satisfaction across multiple dimensions of MRI services.

Sample Size

The sample size was calculated using the Raosoft sample size calculator based on an estimated population of 900 patients over a two-month period across the 10 hospitals. This estimate was derived from an average daily patient turnover of 30 patients per hospital. With a 95% confidence level and a 5% margin of error, the required sample size was determined to be 270 participants. The questionnaire was shared with 800 patients (approximately three times the estimated sample size, anticipating a 30–40% response rate), and 496 valid responses were ultimately collected, which exceeded the minimum sample size requirement.

Data Collection

Data were collected through a self-administered questionnaire provided to patients after their MRI scans. A quick-response (QR) code was distributed so that patients could complete the survey electronically on their mobile devices. Hard copies of the questionnaire were available for participants who preferred paper-based surveys. Participation was voluntary, and participants were assured of the confidentiality and anonymity of their responses.

Ethical Considerations

This study complies with the principles outlined in the Declaration of Helsinki. Ethical approval for this study was obtained from King Khalid Medical City, Riyadh (King Saud University) (No. E-24-8869). Informed consent was obtained from all participants prior to survey administration. Confidentiality and anonymity were guaranteed.

Data Analysis

The collected data were analyzed using SPSS version 26.0 (IBM, Chicago, USA). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used for the demographic and survey response variables. The Pearson chi-square test was used to analyze categorical data, specifically to compare patient satisfaction across various items. Student's *t*-test and a one-way analysis of variance (ANOVA) were used to compare mean satisfaction scores across sociodemographic groups. Post-hoc analyses were performed where necessary. Additionally, Pearson's correlation coefficient was used to determine the linear relationship between satisfaction with MRI department services and staff performance. The internal consistency of the questionnaire was evaluated using Cronbach's alpha, with the significance level set at $p \leq 0.05$.

Results

Sociodemographic Characteristics

This study included 496 participants from 10 hospitals in Saudi Arabia. The sociodemographic characteristics of the participants are presented in Table 1. The largest age group was 40–49 years old (33.9%), followed by 30–39 years (27.4%), 18–29 years (20.2%), and those aged 50 and above (18.5%). Regarding education, 41.1% of the participants held a bachelor's degree, 25.0% had completed a primary or secondary education, 12.9% held a diploma, 8.1% had a master's degree, 6.5% had a doctorate, and 6.5% had no formal education. Most participants were employed (54.8%), and the others were unemployed (4.0%), students (11.3%), homemakers (14.5%), retired (6.5%), or self-employed (8.9%). In terms of MRI scan frequency, 43.5% of the participants were undergoing their first MRI at the time of the study, while 37.9% had undergone 2–3 MRI scans, and 18.5% had more than three scans. Lastly, 70.2% of participants were from public hospitals, while 29.8% were from private hospitals.

Table 1 Distribution of Participants' Sociodemographic Characteristics and Other Study Variables

Characteristic	No. (%)
Age group	
18–29 years	100 (20.2)
30–39 years	136 (27.4)
40–49 years	168 (33.9)
50 years and above	92 (18.5)
Gender	
Male	240 (48.4)
Female	256 (51.6)
Education level	
None	32 (6.5)
Primary-secondary	124 (25.0)
Diploma	64 (12.9)
Bachelor's degree	204 (41.1)
Master's degree	40 (8.1)
Doctorate	32 (6.5)

(*Continued*)

Table 1 (Continued).

Characteristic	No. (%)
Employment status	
Employed	272 (54.8)
Unemployed	20 (4.0)
Student	56 (11.3)
Retired	32 (6.5)
Homemaker	72 (14.5)
Self-employed	44 (8.9)
How many times undergone an MRI scan	
First time	216 (43.5)
2–3 times	188 (37.9)
More than 3 times	92 (18.5)
Type of sector	
Private	148 (29.8)
Public	348 (70.2)

Patient Satisfaction With MRI Department Services and Staff

The study participants were asked to assess MRI department services (7 items) and MRI staff (3 items) on a five-point scale (very satisfied, satisfied, neutral, dissatisfied, and very dissatisfied).

For the item "Ease of directions in the hospital to reach the MRI department", 50% of participants reported being very satisfied, and 35.5% were satisfied; these responses were statistically significantly higher than the other responses on the scale ($p < 0.0001$). Regarding the item "Efficiency and speed of the registration process at the MRI department", 50.8% responded that they were very satisfied, while 41.1% were satisfied, both of which were statistically significantly higher than other responses ($p < 0.0001$). Similarly, very satisfied and satisfied comprised the majority of ratings for three additional items, "Appropriateness of the appointment scheduling for MRI scans", "Cleanliness of the MRI facility", and "Perceived quality of the MRI equipment" (75%, 96.8%, and 84.7%, respectively), which were highly statistically significant compared to other responses (all $p < 0.0001$). For the remaining two items related to MRI services, namely "Waiting period before undergoing the MRI scan" and "Time taken to receive the report after the MRI scan", 66.1% and 80.6% of participants, respectively, reported being very satisfied or satisfied, and these responses were statistically significantly higher than other responses ($p < 0.0001$ for both) (Table 2).

Table 2 Distribution and Comparison of Participants' Responses for Items Related to MRI Department Services and MRI Staff

Item	Response: n (%)					X^2 -value	p-value
	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied		
MRI services							
Ease of directions in the hospital to reach the MRI department	248 (50.0)	176 (35.5)	52 (10.5)	20 (4.0)	–	274.84	< 0.0001
Efficiency and speed of the registration process at the MRI department	252 (50.8)	204 (41.1)	24 (4.8)	16 (3.2)	–	358.45	< 0.0001
Appropriateness of the appointment scheduling for MRI scans	216 (43.5)	156 (31.5)	60 (12.1)	56 (11.3)	8 (1.6)	288.19	< 0.0001
Waiting period before undergoing the MRI scan	148 (29.8)	180 (36.3)	88 (17.7)	60 (12.1)	20 (4.0)	169.81	< 0.0001

(*Continued*)

Table 2 (Continued).

Item	Response: n (%)					X^2 -value	p-value
	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied		
Time taken to receive the report after the MRI scan	188 (37.9)	212 (42.7)	76 (15.3)	12 (2.4)	8 (1.6)	373.68	< 0.0001
Cleanliness of the MRI facility	252 (50.8)	228 (46.0)	12 (2.4)	4 (0.8)	–	436.64	< 0.0001
Perceived quality of the MRI equipment	224 (45.2)	196 (39.5)	76 (15.3)	–	–	74.77	< 0.0001
MRI staff							
Treatment and respect by the MRI staff	288 (58.1)	188 (37.9)	16 (3.2)	4 (0.8)	–	460.13	< 0.0001
Privacy and confidentiality during the scan	320 (64.5)	168 (33.9)	8 (1.6)	–	–	294.45	< 0.0001
Communication of the MRI staff with patients about the procedure	240 (48.4)	136 (27.4)	76 (15.3)	44 (8.9)	–	179.87	< 0.0001

Participants rated their interactions with MRI staff highly, with 95.9% of them (58.1% very satisfied and 37.8% satisfied) expressing satisfaction with the respect and treatment they received. This result was statistically significant ($p < 0.0001$). Privacy and confidentiality during MRI procedures were also highly valued, and 98.4% of participants (64.5% very satisfied and 33.9% satisfied) reported high satisfaction ($p < 0.0001$). Additionally, 82.3% of the participants (48.4% very satisfied and 33.9% satisfied) were satisfied with the MRI staff's communication regarding the procedures, and this result was also statistically significant ($p < 0.0001$) (Table 2).

Satisfaction Across Demographic Groups

Table 3 presents a comparison of the mean values for MRI department services and MRI staff based on the characteristics of the study participants. The analysis revealed statistically significant differences between the mean values for MRI department services based on education level, frequency of MRI scans, and type of hospital sector. The mean values were significantly higher among participants with no formal education than those with educational qualifications ($F = 4.022$, $p = 0.001$). However, a post-hoc test indicated no significant differences between the mean values for specific pairs of education levels. When considering the frequency of MRI scans, the mean values were significantly higher among participants undergoing their first MRI than those who had undergone more than three scans ($F = 4.327$, $p = 0.014$).

Table 3 Comparison of the Mean Values of the Participants' Responses for MRI Department Services and MRI Staff Based on Their Sociodemographic Characteristics and Other Study Variables

Characteristic	MRI Department Services			MRI Staff		
	Mean (SD)	t-value / F-value	p-value	Mean (SD)	t-value / F-value	p-value
Age group						
18–29	28.80 (4.9)	0.718	0.542	13.40 (2.1)	2.316	0.075
30–39	29.67 (4.0)			13.62 (1.5)		
40–49	29.38 (4.2)			13.17 (1.8)		
50 and above	29.61 (4.6)			13.04 (2.0)		
Gender						
Male	29.67 (4.7)	1.296	0.195	13.18 (2.0)	−1.529	0.127
Female	29.16 (4.0)			13.43 (1.7)		

(*Continued*)

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Table 3 (Continued).

Characteristic	MRI Department Services			MRI Staff		
	Mean (SD)	t-value / F-value	p-value	Mean (SD)	t-value / F-value	p-value
Education level						
None	30.62 (5.3)	4.022	0.001	14.00 (1.7)	3.560	0.004
Primary/secondary	29.58 (4.6)			13.29 (1.6)		
Diploma	30.68 (4.7)			13.68 (2.2)		
Bachelor's degree	29.25 (3.7)			13.15 (1.9)		
Master's degree	27.20 (4.2)			12.60 (1.6)		
Doctorate	28.62 (4.8)			13.87 (1.5)		
Employment status						
Employed	29.67 (4.2)	0.702	0.622	13.50 (1.7)	5.696	< 0.0001
Unemployed	29.20 (3.9)			13.60 (1.4)		
Student	29.14 (5.1)			13.86 (1.8)		
Retired	29.62 (5.8)			12.50 (2.3)		
Homemaker	28.67 (4.0)			13.05 (1.7)		
Self-employed	29.18 (4.2)			12.36 (2.5)		
How many times undergone an MRI scan						
First time	30.01 (4.5)	4.327	0.014	13.48 (2.0)	8.944	< 0.0001
2–3 times	29.03 (4.0)			13.78 (1.4)		
More than 3 times	28.74 (4.4)			12.89 (1.8)		
Type of hospital						
Private	30.08 (3.3)	2.254	0.025	13.16 (1.8)	−1.195	0.233
Public	29.11 (4.7)			13.37 (1.9)		

Regarding hospital sector, the mean values were significantly higher among participants from private hospitals than those from public hospitals ($F = 2.254$, $p = 0.025$). No statistically significant differences were observed between the mean values of MRI department services based on other participant characteristics, including age group, gender, and employment status.

For the mean values of MRI staff ratings in relation to the characteristics of study participants, statistically significant differences were observed when considering education level, employment status, and the number of times participants had undergone an MRI scan. Regarding education level, the mean values were higher among participants with no formal education than among patients with other education levels ($F = 3.560$, $p = 0.004$). However, a post hoc analysis revealed no significant differences across pairs of education levels. In terms of employment status, the mean values for MRI staff were significantly lower among participants who were retired or self-employed ($F = 5.696$, $p < 0.0001$). Post hoc testing showed no significant differences across the other employment categories (employed, unemployed, student, and self-employed). Further, significantly higher mean values were found among participants who were undergoing an MRI scan for the first time or who had undergone 2–3 MRI scans than those who had undergone more than three MRI scans ($F = 8.944$, $p < 0.0001$). No statistically significant differences were found between the mean ratings for MRI staff when considering the other variables, including age group, gender, and hospital sector type (Table 3).

Internal Consistency of Survey Items

The internal consistency of the survey items was assessed using Cronbach's alpha. The reliability of items related to MRI department services was high, with a Cronbach's alpha of 0.849 (95% CI: 0.827–0.868). The Cronbach's alpha values for each of the seven items were also high if an item was deleted, ranging from 0.876 to 0.885. Similarly, MRI staff-related items demonstrated high internal consistency, with an alpha value of 0.801 (95% CI: 0.769–0.830). The Cronbach's alpha values for each of the three items also indicated high reliability (0.870–0.883) if an item was deleted (Table 4).

Table 4 Internal Consistency of MRI Department Services and MRI Staff Items

Item	Mean (SD)	Correlated item Total Correlation	Cronbach's Alpha if item deleted
MRI services			
Ease of directions in the hospital to reach the MRI department	4.31 (0.8)	0.652	0.878
Efficiency and speed of the registration process at the MRI department	4.40 (0.7)	0.669	0.878
Appropriateness of the appointment scheduling for MRI scans	4.04 (1.1)	0.599	0.885
Waiting period before undergoing the MRI scan	3.76 (1.1)	0.711	0.876
Time taken to receive the report after the MRI scan	4.13 (0.9)	0.566	0.885
Cleanliness of the MRI facility	4.47 (0.6)	0.699	0.879
Perceived quality of the MRI equipment	4.30 (0.7)	0.577	0.884
All items			0.849
MRI staff			
Treatment and respect by the MRI staff	4.53 (0.6)	0.634	0.882
Privacy and confidentiality during the scan	4.63 (0.5)	0.652	0.883
Communication of the MRI staff with patients about the procedure	4.15 (0.9)	0.758	0.870
All items			0.801

Correlation Between MRI Services and Staff Ratings

As shown in Figure 1, a positive correlation was observed between satisfaction with MRI staff and department services ($r = 0.76$, $p < 0.001$). Patients who rated MRI staff highly also tended to express high satisfaction with MRI department services, which indicates the importance of interpersonal interactions in influencing overall patient satisfaction.

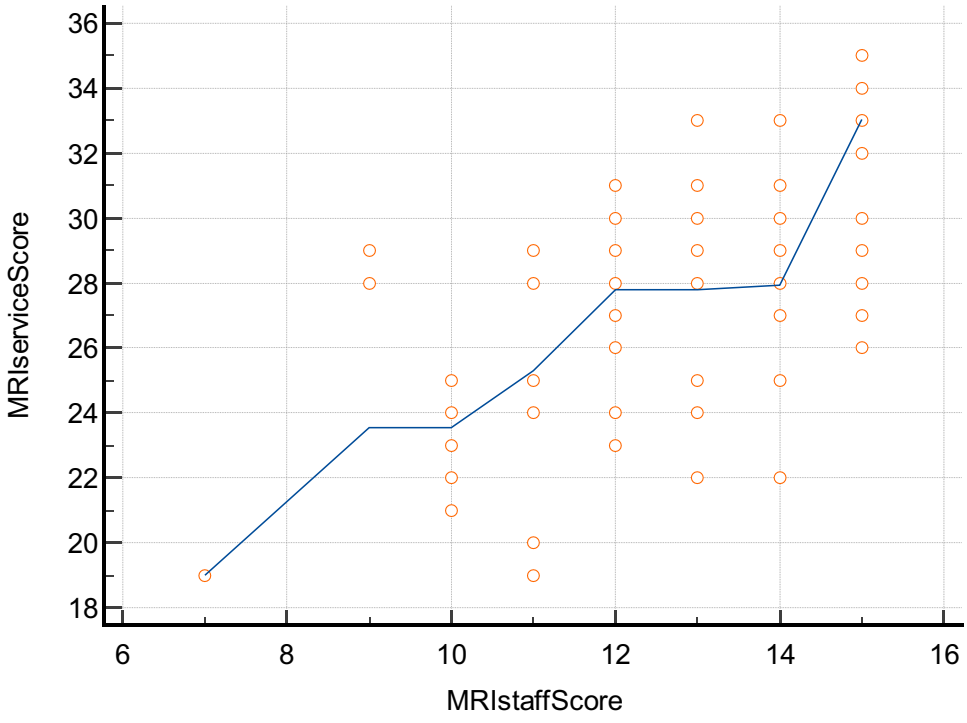

Figure 1 Correlation between MRI department services and MRI staff satisfaction scores. This scatter plot depicts the positive correlation ($r = 0.76$, $p < 0.001$) between patient satisfaction with MRI staff and MRI department services across 496 participant responses. Higher satisfaction with staff, including communication, privacy, and professionalism, was associated with increased overall satisfaction with MRI department services.

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Discussion

This study was conducted to assess patient satisfaction with MRI services in various hospitals across Saudi Arabia, focusing on demographic influences and specific components of MRI services. Overall, the findings demonstrated a high level of patient satisfaction across multiple aspects of MRI services and MRI staff, with very satisfied and satisfied being the majority of responses for most items.

Patient satisfaction was notably high for aspects such as the efficiency of the registration process, cleanliness of MRI facilities, and perceived quality of MRI equipment. For instance, 96.8% of participants were either very satisfied or satisfied with the cleanliness of MRI facilities, which aligns with Wahed et al's report of cleanliness being a significant driver of patient satisfaction in radiological services.[10] Further, the perceived quality of MRI equipment was rated positively by 84.7% of respondents, suggesting that technological infrastructure is well-maintained and contributes significantly to patient satisfaction.[13] Thus, maintaining high standards of facility cleanliness and equipment quality can directly enhance patient satisfaction and should remain a priority for healthcare providers.

Waiting times and the efficiency of report delivery were highlighted by a considerable proportion of respondents as areas of concern. Specifically, 66.1% of participants were satisfied with the waiting times, indicating that there is room for improvement, as a notable minority expressed dissatisfaction. This finding is consistent with prior research by Hudson et al, in which the impact of waiting times on patients' perceptions of healthcare quality was emphasized.[6] Long waiting times can increase patient anxiety and negatively influence the overall healthcare experience; this highlights the need for streamlined procedures.[14–16] Addressing these inefficiencies can significantly enhance patient satisfaction and the overall effectiveness of MRI services.

The statistical analysis demonstrated significant differences in satisfaction based on the participants' education level, type of hospital (private versus public), and number of MRI scans. Participants with higher education levels generally reported lower satisfaction levels than those with lower education levels or no formal education. This finding is in line with the results of a study in Ethiopia, which showed that those with lower education levels tend to report higher satisfaction with radiological services.[11] This may reflect differing expectations regarding healthcare services: individuals with higher education levels might have more knowledge about healthcare standards and thus have higher expectations. Therefore, healthcare providers should consider tailoring their communications and managing expectations based on patients' educational backgrounds. Participants from private hospitals had higher satisfaction scores than those from public hospitals. This result might reflect differences in resources, staffing, or service quality between the sectors. Moreover, participants undergoing their first MRI reported higher satisfaction, possibly due to differing expectations or unfamiliarity with the process. This suggests that expectation management plays a significant role in patient satisfaction, particularly for repeat patients who may have high standards based on previous experiences.

The findings of this study have several important implications for healthcare providers and policymakers. First, the results emphasize the need for targeted improvements in reducing waiting times and enhancing report delivery speed. To improve patient satisfaction, hospitals should consider adopting more efficient appointment scheduling systems, such as digital solutions for appointment management, automated reminders, and reduced bottlenecks in the MRI workflow. Such strategies are in line with recommendations from other studies[7,17–19] and may help address the issues related to waiting times identified in the present study. In addition, the findings showed that the interpersonal communication skills of MRI staff were crucial determinants of patient satisfaction. The respect shown by MRI staff and their treatment of patients were highly rated, underscoring the importance of empathy and effective communication in healthcare. Enhancing these skills through targeted training programs can further improve patient experiences. Notably, Mulisa et al highlighted the role of staff–patient communication in determining overall satisfaction with radiological services.[11] Hospitals should implement regular workshops and training sessions to ensure that MRI staff are equipped to handle patient interactions in a positive and empathetic manner.[20] The study findings also showed that satisfaction was higher among patients treated in private hospitals than among those treated in public hospitals. This finding suggests that the best practices in private sector MRI services could be beneficially adopted by public hospitals. These practices may facilitate better resource allocation, improved appointment scheduling, and enhanced patient-centered services.

While this study provides valuable insights into patient satisfaction with MRI services, it is not without limitations. The cross-sectional design limits the ability to infer causation, and the use of convenience sampling may affect the

generalizability of the results to the broader population. Future researchers should employ a longitudinal approach to assessing changes in patient satisfaction over time and investigate the effectiveness of specific interventions aimed at improving patient experiences. Incorporating qualitative methods, such as in-depth interviews or focus groups, could provide richer insights into patient perspectives and help identify areas for further improvement.

Conclusion

The findings of this study highlight the high level of patient satisfaction with MRI services in Saudi Arabia, particularly in aspects related to staff professionalism, facility cleanliness, and equipment quality. However, areas such as waiting times and report delivery efficiency require targeted attention. Improving these areas, especially by drawing from best practices in the private sector, can enhance patient experiences and satisfaction. The findings also underscore the importance of continuously assessing and improving healthcare services to meet patients' needs and expectations. In sum, a holistic approach that includes reducing waiting times, enhancing communication, and adopting best practices from high-performing sectors is essential for achieving optimal patient satisfaction with MRI services.

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Disclosure

The authors declare that this research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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