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IMPACT OF RADIOLOGY PROFESSIONALS' COMMUNICATION ON PATIENT SATISFACTION: A DESCRIPTIVE CROSS- SECTIONAL STUDY

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Abstract

Background

Communication in diagnostic radiology is a key, but understudied, driver of patient experience. We examined how specific professional–patient communication practices relate to satisfaction among patients undergoing imaging in a large public hospital in Pakistan.

Methods

We conducted a descriptive cross-sectional study in the Radiology Department of Mardan Medical Complex (July–November 2024). Using convenience sampling, 385 consecutive patients (mean age 37.2 ± 11.4 years; 51.9% male) completed a structured questionnaire covering demographics, procedure type, communication practices, and satisfaction. Satisfaction was dichotomized as "satisfied" (≥60% score) vs "not satisfied" (<60%). Associations between communication items and satisfaction were tested with chi-square (α=0.05).

Results

Across modalities (CT 29.1%, ultrasound 20.8%, MRI 19.5%, fluoroscopy 16.9%, X-ray 13.8%), 70.4% (271/385) of patients were satisfied overall. Reported communication practices varied: explanation before the procedure (72.2%), being asked about concerns (50.9%), friendly tone (90.9%), encouragement to ask questions (43.4%), comfort asking questions (63.9%), clarification of next steps (56.1%), and attentiveness (70.1%). Risk information was rarely provided (0.5%). Satisfaction was significantly higher when patients received an explanation (238/278 satisfied vs 31/107; p<0.001), had their concerns solicited (173/196 vs 96/189; p<0.001), perceived a friendly tone (267/350 vs 83/35; p<0.001), were encouraged to ask questions (159/167 vs 110/218; p<0.001), felt comfortable asking questions (236/246 vs 33/139; p<0.001), had next steps clarified (205/216 vs 64/169; p<0.001), and experienced staff attentiveness (265/270 vs 4/115; p<0.001). Providing risk information showed no detectable association with satisfaction (p=0.35), likely due to near-absence of disclosure.

Conclusions

Specific, interpersonal elements–clear explanations, soliciting concerns, a friendly tone, active encouragement, clarity on next steps, and attentiveness–show strong, consistent associations with patient satisfaction in radiology. Standardized

communication protocols and staff training should prioritize these behaviors, alongside addressing the notable gap in risk communication. Multicentre and longitudinal studies are warranted to test causality and generalizability.

INTRODUCTION

Patient satisfaction is a core indicator of healthcare quality and a defining aim of patient-centred care (alongside safety, effectiveness, timeliness, efficiency and equity) (1,2). Within imaging services—often characterized by technology-dense environments, brief encounters, and high throughput—communication is a dominant determinant of how patients perceive quality, understand procedures, and engage with follow-up plans (3–5). Conceptual frameworks from the Institute of Medicine and the World Health Organization emphasize that people-centred communication is not limited to information transfer; it requires empathetic dialogue, eliciting concerns, checking understanding, and clearly outlining next steps in a culturally sensitive manner (1,6).

In radiology, patient-centred communication has moved "up the agenda" as a prerequisite for value-based imaging (3,4,7). Reviews and expert guidance highlight specific behaviours—plain-language explanations, encouragement to ask questions, discussion of risks and potential discomforts, and signposting of the care pathway—that improve the patient experience and may reduce downstream errors (3,4,8,9). Conversely, communication failures (e.g., unclear preparation instructions, ambiguous result hand-offs, or delayed critical result notification) are linked to workflow inefficiency, dissatisfaction, and patient harm (9). Embedding structured, patient-centred interactions into routine radiology practice is therefore viewed as an essential quality strategy, not an optional enhancement (3,7).

Empirical evidence suggests that better communication reduces procedure-related anxiety and improves comprehension. Randomized and quasi-experimental studies in MRI settings show that preparatory information delivered via video or phone, and child-friendly audiovisual materials, significantly diminish pre-scan anxiety and improve cooperation (10–12). Systematic reviews of non-pharmacologic interventions administered before diagnostic imaging echo these benefits across adult populations (13). Reduced anxiety is not merely a comfort outcome; it can lessen motion artefact, decrease the need for repeat imaging or sedation, and thereby conserve resources—aligning with value-based care principles (7,13).

The imperative for effective communication is particularly salient in low- and middle-income country (LMIC) settings, where crowded public facilities, variable health literacy, and language diversity can magnify barriers to understanding. Evidence from Pakistan and comparable contexts indicates that interpersonal behaviours—respect, responsiveness, and clear explanations—are strongly associated with satisfaction and intention to reuse services, including diagnostic care (14–16). Radiology departments that implement service-excellence initiatives emphasizing communication, attitude, and responsiveness report measurable gains in patient experience (15). Yet gaps remain: risk/benefit discussions and explicit "what happens next" explanations are inconsistently provided, despite their importance for informed participation in care (3–5,8).

Against this backdrop, we investigated how specific communication practices by radiology staff—pre-procedure explanation, solicitation of concerns, encouragement and comfort around questions, clarity about next steps, perceived friendliness, attentiveness, and disclosure of risks—relate to patient satisfaction in a large public hospital in Pakistan. We hypothesised that these discrete, observable behaviours would be positively associated with overall satisfaction. By focusing on concrete actions that can be translated into training and workflow prompts, our study aims to inform practical, scalable communication standards for imaging departments operating under real-world constraints (3,4,7,9).

MATERIAL AND METHODS

Study Setting

The study was conducted in the radiology departments of Mardan Medical Complex, Mardan. This facility was selected as it serves a diverse patient population and offers a comprehensive range of radiological services, making it an ideal setting for

assessing patient-professional communication dynamics.

Study Duration

The research investigation spanned a period of four months, from July to November 2024. This timeframe was strategically chosen to ensure adequate sample collection while accounting for seasonal variations in patient flow and department workload patterns.

Study Design

A descriptive cross-sectional study design was implemented using a validated pre-designed questionnaire. This methodology was selected to capture a comprehensive snapshot of patient experiences and satisfaction levels regarding communication with radiology professionals during their diagnostic procedures.

Sample Size

The sample size was determined using the World Health Organization (WHO) calculator, incorporating standard statistical parameters. With a 95% confidence interval, 5% margin of error, and 50% population proportion, the calculated sample size was 385 patients. This sample size ensures adequate statistical power while maintaining feasibility within the study timeframe.

Sampling Technique

A non-probability convenient sampling technique was employed for participant selection. This approach was chosen considering the study setting's operational dynamics and patient flow patterns, allowing for efficient data collection while maintaining representativeness of the target population.

Sample Selection

Inclusion Criteria

The study included patients who had undergone radiographic examinations and demonstrated the ability to understand and respond to survey questions about their experience. Both male and female patients were eligible for participation, ensuring gender representation in the study population.

Exclusion Criteria

The study excluded patients with cognitive impairment to ensure reliable response collection. Additionally, patients who underwent emergency radiographic procedures with minimal pre-procedural communication were excluded, as were sedated or unconscious patients, to maintain data quality and validity.

Data Collection Procedure

The data collection process began after obtaining formal approval from the Internal Graduate Study Committee of Mardan Medical Complex, Mardan. A comprehensive written application detailing the study purpose, along with the questionnaire, was submitted to the head of the radiology departments. All ethical considerations were thoroughly reviewed with the department head to ensure compliance with institutional guidelines. Patient privacy and confidentiality measures were established and maintained throughout the study. Data collection involved direct interaction with patients, where questionnaire items were explained thoroughly after obtaining individual consent. The questionnaire was structured into two main sections: demographic information and patient experience assessment.

Statistical Analysis

Data analysis was conducted using SPSS version 27.0 statistical software. For continuous variables such as age, mean and standard deviation were calculated. Categorical variables, including gender and yes/no response questions, were analyzed using frequencies and percentages. The findings were presented through tables, charts, and graphs to enhance visual interpretation. The relationship between various communication practices and patient satisfaction levels was examined using chi-square tests, providing insights into significant associations between these variables.

RESULTS

In this study, a total of 385 patients were included. The maximum age of patients was 69 years, the minimum age was 14 years, and the mean age was 37.21 ± 11.41 years as shown in Table

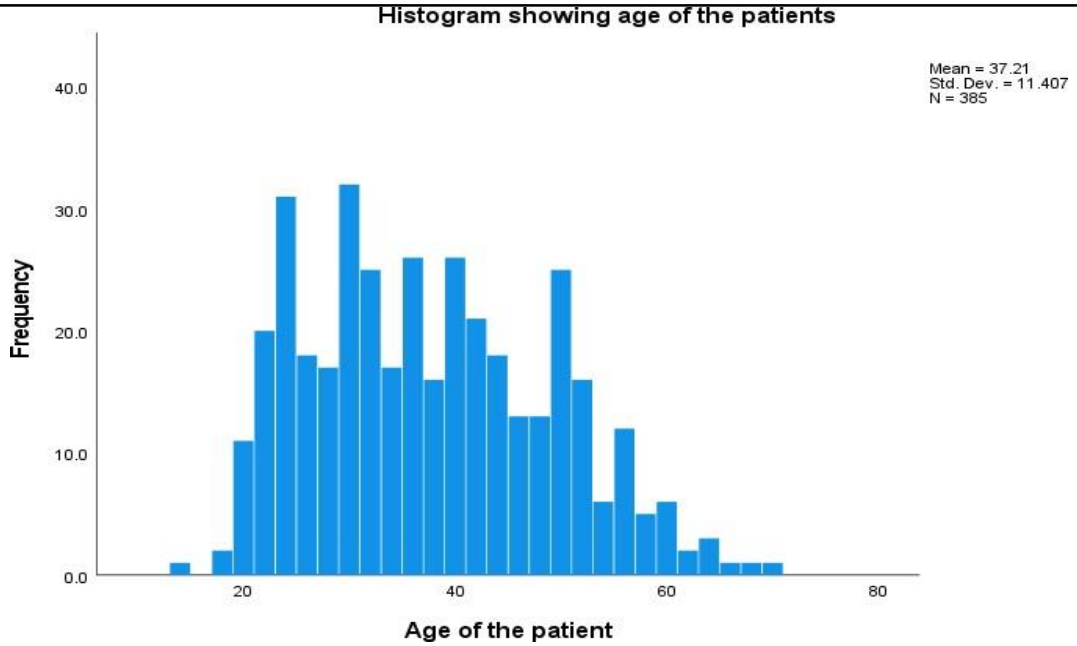


Figure 1: Histogram showing age of the patients

Based on gender, they were categorized into male and female. Among them 200 (51.9%) patients were male and 185 (48.1%) patients were female as shown in Table 4.2.

Table 2: Gender of the patients

Variable		Frequency	Percentage
Gender	Male	200	51.9
	Female	185	48.1

Based on types, the radiological procedures were divided into 5 groups: Ultrasound, X-ray CT- scan, MRI, and fluoroscopy. Out of the total number of patients, 80 (20.8%) underwent ultrasound, 53(13.8%) underwent X-ray, 112 (29.1%) underwent CT-Scan, 75 (19.5%) underwent MRI and 65 (16.9%) underwent fluoroscopy.

Table 3: Type of radiology procedure the patients have undergone

Type of radiological procedure the patients have undergone	Frequency (n%)
Ultrasound	80 (20.8%)
X-Ray	53 (13.8%)
CT-Scan	112(29.1%)
MRI	75 (19.5%)
Fluoroscopy	65(16.9%)

Patient interaction and communication practices among radiology professionals

On the basis of questions regarding the explanation given to the patient before the procedure, the majority of patients 278 (72.2%) reported that an explanation was given to them before undergoing the procedure. This shows that most radiology professionals give priority to informing patients. However, a small proportion 107 (27.8%) indicated that they were not given an explanation.

Based on the question regarding asking patients about their concerns, almost half of the patients 196 (50.9%) said that the radiology professionals asked and addressed their concerns, while 189 (49.1%) were not asked about their concerns.

On the basis of the question regarding friendly tone by radiology professionals, a major proportion of patients 350 (90.90%) reported that radiology professionals used a friendly tone during their interactions. Only 35 (9.1%) experienced the vice versa.

Based on the question regarding encouraged questions during the procedure, less than half of the patients 167 (43.4%) felt encouraged to ask any type of questions during any procedure while a larger number of patients 218 (56.6%) reported a lack of encouragement.

Based on the question regarding patients being comfortable asking questions from the radiology professionals, more than half the number of patients 246 (63.9%) felt comfortable asking questions from the staff. However, 139 (36.1%) were not comfortable.

Based on the question regarding informed patients about risks, an overwhelming number of patients 383 (99.5%) reported that they were not informed about the risks of the procedure. Only 2 (0.5%) stated that they were informed.

Based on the question regarding ensuring patients understand the next steps, more than half of the patients 216 (56.1%) said that the staff ensured that they understood the next steps in the process. However, 169 (43.9%) patients were not clear about the next steps.

Based on the question regarding radiographers' attentiveness towards the patients, a major part of patients 270 (70.1%) agreed that the staff was attentive towards them. While 115 (29.9%) reported that the radiographer was not attentive.

Table 4: Patient interaction and communication practices among radiology professionals

Variables		Frequency (n%)
Explanation given to the patient before procedures	Yes	278 (72.2%)
	No	107 (27.8%)
Asked concerns from the patients	Yes	196 (50.9%)
	No	189 (49.1%)
Friendly tone by the radiology professionals	Yes	350 (90.9%)
	No	35 (9.1%)
Encouraged questions during the procedures	Yes	167 (43.4%)
	No	218 (56.6%)
Patients are comfortable asking questions from the radiology professionals	Yes	246 (63.9%)
	No	139 (36.1%)
Informed the patients about the risks of the procedures	Yes	2 (0.5%)
	No	383 (99.5%)
Radiology professionals ensure the patients understand the next steps	Yes	216 (56.1%)
	No	169 (43.9%)
The radiographer is attentive to the patient	Yes	270 (70.1%)
	No	115 (29.9%)

Association between communication and satisfaction level.

Based on the results of the question regarding the explanation given to the patient before the procedure, the patients who received an explanation before procedure 238 were significantly more satisfied while a small number of patients who did not receive an explanation 76 were not satisfied. According to the p-value (<0.001), there is a statistically strong association between the explanation given to the patient before the procedure and patient satisfaction with communication.

Based on the results of questions regarding asking concerns from patients, those whose concerns were asked were more likely to be satisfied with the communication (173 satisfied versus 23 dissatisfied). Conversely, patients whose concerns were not asked were dissatisfied (93 dissatisfied versus 96 satisfied). According to the p-value (<0.001), there is a statistically strong association between concerns asked from the patient and patient satisfaction with communication.

Based on the results of the question regarding friendly tone of radiology professionals, those who experienced a friendly tone by the radiology professionals 267 were satisfied whereas, only 2 were not satisfied. For those who did not experience a friendly tone from the radiology professionals, 33 were dissatisfied while 83 were satisfied. According to the p-value (<0.001), there is a statistically strong positive correlation between the friendly tone used by the radiology professionals and patient satisfaction with the communication.

Based on the results of the question regarding encouraged questions during the procedure, those who were encouraged to ask questions were largely satisfied with communication 159 satisfied versus 8 dissatisfied. Whereas, most patients were not encouraged to ask questions, and expressed dissatisfaction (108 dissatisfied versus 110 satisfied). According to the p-value (<0.001), there is a statistically strong association between encouraged patients to ask questions during the procedure and patient satisfaction with the communication.

Based on the results of questions regarding patients comfortable asking questions from the radiology professionals, of those who felt comfortable, 236 were satisfied, and only 10 were dissatisfied. While most patients who felt uncomfortable were dissatisfied (106 dissatisfied versus 33 satisfied). According to the p-value (<0.001), there is a statistically strong association between patients comfortable asking questions and patient satisfaction with communication.

Based on the results of the question regarding informed patients about risks, a large majority of uninformed patients showed 267 satisfied patients and 116 dissatisfied patients. All 2 patients informed about the risks were satisfied. According to the p-value of 0.35, providing information about procedure risks was not significantly associated with patient satisfaction.

Based on questions regarding ensuring patients understand the next steps, patients who received assurance from the staff, 205 were satisfied compared to 11 dissatisfied. Among patients who did not receive assurance 105 were dissatisfied versus 64 satisfied. According to the p-value (<0.001), there is a statistically strong association between ensuring patients understood the next steps and patient satisfaction with communication.

On the basis of the question regarding radiographers' attentiveness towards the patients, approximately all patients who received attentiveness were satisfied 256 satisfied versus 5 dissatisfied. While most patients who did not receive attentiveness were not satisfied 111 were dissatisfied versus 4 satisfied. According to the p-value (<0.001), the relationship was statistically significant.

Table 5: Association between patient communication practices and satisfaction levels.

Patient communication-related questions		Patients satisfied with the communication		P Value
		Yes	No	
Explanation given to the patient before procedures	Yes	238	40	<0.001
	No	31	76	

Asked concerns from the patients	Yes	173	23	<0.001
	No	96	93	
Friendly tone by the radiology professionals	Yes	267	83	<0.001
	No	2	33	
Encouraged questions during the procedures	Yes	159	8	<0.001
	No	110	108	
Patients are comfortable asking questions from the radiology professionals	Yes	236	10	<0.001
	No	33	106	
Informed the patients about the risks of the procedures	Yes	2	0	0.35
	No	267	116	
Radiology professionals ensure the patients understand the next steps	Yes	205	11	<0.001
	No	64	105	
The radiographer is attentive to the patient	Yes	265	5	<0.001
	No	4	111	

On the basis of scoring, patient satisfaction was divided into two categories. Scores less than 60% (ranging from 0 to 3) were considered as not satisfied. While scores 60% or higher (ranging from 4 to 7) were considered as satisfied. A total of 114 (29.6%) patients were not satisfied. While a large proportion of patients 271 (70.4%) were satisfied with the communication.

Table 6: satisfaction scores of the patients

Satisfaction Level	Score Range	Frequency (n%)
Satisfied (greater than or equal to 60%)	4-7	271 (70.4%)
Not satisfied (less than 60%)	0-3	114 (29.6%)

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Discussion

This study examined the association between discrete, observable communication behaviours by radiology staff and overall patient satisfaction in a large public-sector imaging department. Consistent with frameworks for patient-centred and value-based care, behaviours that emphasised clarity, empathy, and partnership—pre-procedure explanation, solicitation of concerns, encouragement and comfort around questions, clarity about next steps, perceived friendliness, and attentiveness—showed strong, positive relationships with satisfaction (1–4,7–9,13). These associations align with prior work indicating that communication is not merely a courtesy but a core quality driver in imaging, shaping trust, comprehension, and adherence to subsequent care (3,4,7,8). The near absence of risk communication we observed mirrors documented gaps in routine practice and highlights an area where radiology services can better meet ethical and informational needs without unduly prolonging throughput (3–5,8).

Interpretation in the context of the literature

Our findings reinforce the premise that patient-centred communication is integral to value-based radiology (7,13). Departments that embed plain-language explanations and explicitly invite questions tend to report better patient experience and, in some studies, operational benefits such as reduced anxiety-related motion artefact or fewer repeat scans (3,7,10–13). The strong associations seen for "clarity on next steps" and "attentiveness" extend prior qualitative and survey Evidence suggesting that navigational cues and perceived responsiveness are pivotal touchpoints in imaging encounters (3–5,8,14–16). In LMIC settings, where variability in health literacy and language can compound uncertainty, these behaviours may be especially consequential (14–16).

The null finding around risk disclosure likely reflects a floor effect rather than a lack of importance. Ethical guidance endorses proportional discussion of material risks and discomforts, yet front-line constraints and ambiguity regarding "who should say what" often hinder consistent delivery (3–5,8,9). Pragmatically, brief, standardised risk statements—anchored to modality and indication—could raise the baseline without overwhelming staff or patients (3,4,8).

Mechanisms and pathways

Multiple pathways plausibly link communication to satisfaction and downstream quality. Clear explanations and question-friendly climates reduce uncertainty, which can attenuate anxiety and improve cooperation during scans (10–13). Checking understanding and signposting "what happens next" may enhance recall and adherence to follow-up instructions, mitigating delays and unnecessary revisits (3,4,7–9). Perceived friendliness and attentiveness map onto relational trust, a determinant of patient experience and intention to reuse services in diverse settings, including Pakistan (14–16).\

Strengths and limitations

Strengths include a pragmatic, real-world sample across common modalities and a focus on concrete, teachable behaviours that can be translated into training and workflow prompts (3,4,7–9,13). The study also addresses a contextual gap by analysing communication–experience links in a public hospital in Pakistan, complementing evidence largely generated in high-income contexts (14–16).

Limitations warrant caution. The cross-sectional design precludes causal inference; although the directionality is theoretically well-motivated, longitudinal or experimental designs are needed to verify effect sizes (7,10–13). Convenience sampling may limit generalisability, and self-reported measures carry social desirability and recall bias risks. Satisfaction was dichotomised for analytic simplicity; while this enhances interpretability, it sacrifices granularity. Finally, the extremely low prevalence of risk disclosure impeded meaningful estimation of its association with satisfaction.

Implications for practice and policy

The communication items that showed the strongest associations lend themselves to low-cost, scalable interventions. Radiology units can implement brief, standardised pre-procedure scripts, visible "Ask-3-Questions" prompts, and explicit "What happens next?" micro-checklists at exit points (3,4,7–9). Targeted training in plain-language explanations and active listening can be embedded into onboarding and refresher curricula, with observational auditing or patient-reported experience measures to sustain adherence (3,4,8,9,13). In resource-constrained settings, prioritising these high-yield behaviours could yield measurable gains in experience without major capital investment (14–16). For risk communication, modality-specific one-liners incorporated into scripts—supplemented by pictorial leaflets for low-literacy groups—offer a feasible starting point (3–5,8).

Future research

Three directions are salient. First, evaluate causal impacts of scripted explanations and question-prompt interventions on satisfaction, anxiety, and operational outcomes (e.g., motion artefact, repeat rates) via stepped-wedge or cluster randomised designs (7,10–13). Second, co-design culturally tailored materials (including multilingual visuals) and test their effectiveness in LMIC radiology services (14–16). Third, study implementation strategies that sustain behaviour change under throughput pressure, such as brief audit-and-feedback cycles and patient-experience dashboards at the modality level (3,4,8,9,13).

Conclusions

Specific, teachable communication behaviours—clear explanations, eliciting concerns, encouraging and enabling questions, clarifying next steps, and maintaining a friendly, attentive manner—are strongly linked to patient satisfaction in diagnostic radiology. Embedding these behaviours through simple scripts, prompts, and training aligns with patient-centred and value-based care goals and is particularly pertinent for busy public facilities. Addressing the persistent gap in risk communication should be a parallel priority. Rigorous implementation and effectiveness studies are now needed to confirm causal benefits and guide scale-up.

Declarations

Ethics Approval and Consent to Participate

This study was approved by the Ethics Review Committee of Mardan Medical Complex, Mardan. Written informed consent was obtained from all participants before their enrollment in the study. All procedures were performed in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments.

Consent for Publication Not applicable.

Availability of Data and Materials: The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests: The authors declare that they have no competing interests.

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Authors' Contributions

AA: Conceptualized and designed the study, supervised data collection, performed statistical analysis, and wrote the original draft of the manuscript.

BB: Contributed to methodology development, data collection, data analysis, and manuscript revision.

CC: Participated in data collection, data entry, literature review, and manuscript writing.

DD: Assisted in statistical analysis, data interpretation, and critical revision of the manuscript.

EE: Contributed to data collection, quality control, and manuscript editing.

FF: Participated in literature review, data interpretation, and manuscript revision.

GG: Provided technical support, assisted in data collection, and contributed to manuscript preparation.

All authors read and approved the final manuscript.

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