

Predictive Factors Influencing Patient Satisfaction in Radiological Service Environments

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Abstract: The satisfaction level of patients towards the treatments provided helps them in recovering quickly. The satisfaction level will also help the providers in determining the quality of services they offer. This study aims to understand the factors influencing the satisfaction level of patients who underwent radiology services from health service providers. The radiology service includes activities the patients encountered between the time they admitted and the time they leave from the center. A structured questionnaire is framed by considering Physical Environment, Privacy measures, Communication with des worker, Communication with service provider, Quality of radiology service, Empathy, and Accessibility as highly influential factors. The respondents were identified through multi stage random sampling method. A total of 260 samples were collected from the patients who underwent radiology treatment. Structural Equation Modeling was used to know the formation of patients' satisfaction towards radiological services. It is certain from the analysis that the communication related activities like the interaction between the patient and service provider and the information transparency are the factors have great impact in the patients' satisfaction.

Keywords: Satisfaction, Radiology, Patients, Communication, Information

Introduction:

Patients' satisfaction is a key factor in determining the quality of medical services offered by the health care centers (Jayantkumar P.H., Dasharathbhai P.N, 2019). The medical services offered by the health care centers meet the expectations of the patients will reflect in their satisfaction level (Liu .L., Fang .J, 2019). Radiological services play an important role in the diagnosis, treatment, and management of various medical conditions. Patients' satisfaction is an essential factor in healthcare delivery, and radiological services are no exception. It is crucial to ensure that patients are satisfied with the quality of radiological services provided. The Service Quality (SERVQUAL) model is one of the most widely used frameworks for measuring patients' satisfaction in healthcare services. It assesses the gaps between the expected and perceived service quality in five dimensions:, reliability,

assurance, tangibility, empathy and responsiveness. Several studies have used the SERVQUAL model to assess patients' satisfaction towards radiological services. For example, Al-Ghamdi et al. (2021) conducted a study in Saudi Arabia that employed the SERVQUAL model to evaluate patient satisfaction with radiological services. The research revealed that most patients were content with the overall quality of radiological services. But there were big holes in the areas of empathy and responsiveness, which means that these areas need to be improved. Another study by Abdullah et al. (2021) in Malaysia employed the SERVQUAL model to evaluate patient satisfaction with radiological services. The research indicated that patients were predominantly content with the quality of radiological services. However, the dimensions of reliability and empathy had big gaps, which means that these areas need to be improved. The SERVQUAL model is a good way to find out how happy patients are with radiological services overall. It can help find places where changes need to be made so that patients get the high-quality radiological services they expect. Patient satisfaction is an important part of judging and improving healthcare services, especially radiological services. The purpose of this study was to evaluate patient satisfaction with radiological services in Chennai, offering metrics for service enhancement within the study context. The study also serves as a starting point for more research and discussion about how to improve the delivery of radiological services in Chennai. This study can help improve the quality of radiological services by focusing on patient satisfaction. This will make the whole healthcare experience better for patients in the area.

Review of Literature:

Radiological services refer to the procedures provided to patients in the radiology department, including routine day-to-day services and special examinations that may require contrast agents for specific cases (Ochonma Og, 2014). Several studies have used the SERVQUAL model to assess patient satisfaction towards radiological services. For instance, a study by Nalini et al. (2020) in India assessed patient satisfaction towards radiological services using the SERVQUAL model. The study found that there were significant gaps in the dimensions of tangibility, reliability, responsiveness, and empathy, indicating that improvements are needed in these areas. Similarly, a study by Rezaei et al. (2020) in Iran also used the SERVQUAL model to assess patient satisfaction towards radiological services. The study found that patients were generally satisfied with the quality of radiological services provided. However, there were significant gaps in the dimensions of responsiveness, assurance, and empathy, indicating that improvements are needed in these areas. Another study by Alharbi et al. (2020) in Saudi Arabia also used the SERVQUAL model to assess patient satisfaction towards radiological services. The study found that patients were generally satisfied with the quality of radiological services provided. However, there were significant gaps in the dimensions of reliability, responsiveness, and empathy, indicating that improvements are needed in these areas. Similarly, a study by Muimbura et al. (2019) in Tanzania used the SERVQUAL model to assess patient satisfaction towards radiological services. The study found that there were significant gaps in the dimensions of tangibility, reliability, and empathy, indicating that improvements are needed in these areas. In summary, the SERVQUAL model is a useful tool for assessing patients' satisfaction towards radiological services. These studies highlight the need for improvements in various dimensions of radiological services to ensure that patients receive high-quality services that meet their expectations. A study conducted in UAE revealed that, the health service providers have priorities the appointment schedule, enhance the patient- service provider interaction and the reduction of waiting time. These factors positively influence the satisfaction level of patients (Abuzaid, M. M., et al, 2023).

(Chand RB, 2012) Patient-centered care is crucial in radiological services and encompasses activities before, during, and after procedures to improve well-being. Delays, neglect, harsh language, unnecessary repeats, and preferential treatment can create problems. By addressing emotional and psychological needs and treating patients with empathy and dignity, radiology staff can alleviate anxiety and improve satisfaction, indicating quality care. (Teshome Mulisa, 2017) The researcher found that the majority of respondents were happy with radiological services. It is advised that

customers be given special care and attention during radiological examination procedures, and that the department shorten the time it takes to enter the examination room. The patients those who underwent radiotherapy treatment for cancer expressed that their satisfaction level regarding the treatment is influenced by the knowledge of the doctor, kind hearted, good communication and the cheerful attitude (Samant, R., et al, 2022). A study in Vietnam considered five major factors in determining the satisfaction level of patients, which includes administrative procedure, communication, facilities available, results transparency and accessibility. In these factors availability of facilities has greater impact in the satisfaction level of patients (Thanh, N. D., et al, 2022).

The satisfaction level of patients' undergone radiological services is greatly influenced by the assurance factors (Dwijayanti, K. A., et al, 2024). A study by Jiang, Y., et al, 2024 argued that, the radiology service providers have to follow teach back method to the patients of MRI scan. This improves their satisfaction and reduces their anxiety. The implementation of web based teleradiology system reduces the waiting time of patients and the reduction in waiting time significantly improves the satisfaction level of the patients (Nigatu, A. M., et al, 2025). A study in UAE revealed that, the patients underwent radiology treatments acknowledge the importance of AI in radiology related services. They accepted that the assistance of AI improves the diagnostic accuracy and that satisfies them (El-Sayed, M. Z., et al, 2025). The language simplification while preparing the radiology report will improve the confidence and understanding level of the patients regarding their medication (Gupta, A., et al, 2025). Through literature the researcher understand the different factors in determining the patients' satisfaction. This research focuses on the most influencing factor in understanding the patients' satisfaction level.

Research Methodology:

The main objective of this paper is to know the satisfaction of patients about radiological services and to find out most influential factor in satisfaction towards radiological services. To achieve the needed, survey is taken among the patients above age of 18, who visited and get services from radiology scan centers and hospitals with radiology scan centers in Chennai. Chennai is a district of Tamilnadu state. This district is consist of 16 taluks. This district have more hospitals and standalone scan centers. A total of 260 samples were collected from all the taluks in chennai. The researcher used multi-stage random sampling method to identify the respondents for the data collection.

A structured questionnaire was designed to collect the data from the patients. The questionnaire contains two sections. Section 1 includes the demographic details about the Patients and section 2 includes the patients' satisfaction towards radiological services. To know the patients' satisfaction towards radiology services, the researcher used Structural Equation Modeling and to identify the most influencing factor in patients' satisfaction, frequency tabulation was used.

Patients' Profile

Table 1: Patients' Profile

Variables	Responses	Frequency	Percentage
Age Group	18–30	69	26.54%
	31–40	75	28.85%
	41–50	69	26.54%
	51–60	22	8.46%
	61 and Above	25	9.62%
Occupation	Business	10	3.85%

Monthly Household income	Government employee	47	18.08%
	House wife	69	26.54%
	Student/Unemployed	69	26.54%
	Private employee	65	25.00%
	<20,000	28	10.77%
Type of scan	20,001-40,000	102	39.23%
	40,001-60,000	42	16.15%
	60,001-80,000	38	14.62%
	80,001-100,000	20	7.69%
	More than 1,00,000	30	11.54%
CT	CT	63	24.23%
	Gastro	32	12.31%
	MRI	56	21.54%
	Conventional x-ray	54	20.77%
	Ultrasound	55	21.15%

Table 1 presents the demographic and radiological service-related characteristics of the patients included in the study. The age distribution indicates that the majority of respondents fall within the 31–40 age group (28.85%), closely followed by the 18–30 and 41–50 groups (each at 26.54%), suggesting that radiological services are primarily utilized by individuals in their early to mid-adulthood. Only a small proportion of patients are aged 51–60 (8.46%) or above 61 years (9.62%), reflecting comparatively very low engagement among older adults. In terms of occupation, the sample is dominated by housewives (26.54%) and students/unemployed individuals (26.54%), followed by private employees (25%). Government employees constitute 18.08% of the respondents, while business professionals represent the smallest category (3.85%). This distribution indicates a diverse patient base primarily comprising non-working individuals and private-sector workers. The monthly household income data reveals that the largest segment of patients falls within the ₹20,001–₹40,000 bracket (39.23%), indicating a predominantly lower-middle-income population accessing radiological services. This is followed by the ₹40,001–₹60,000 group (16.15%) and the ₹60,001–₹80,000 group (14.62%). Only 11.54% of respondents earn above ₹1,00,000 per month, suggesting limited representation from higher-income categories. Regarding the type of scan undertaken, CT scans account for the highest proportion (24.23%), followed by MRI (21.54%) and ultrasound procedures (21.15%). Conventional X-rays (20.77%) and gastro-related scans (12.31%) constitute the remaining share. This distribution reflects the broad utilization of advanced imaging modalities, especially CT and MRI, which are commonly recommended for diagnostic accuracy.

Patients' Satisfaction Model

An exploratory model on Patients' satisfaction towards radiological services were constructed based on the influences of Physical Environment, Privacy measures, Communication with des worker, Communication with service provider, Quality of radiology service, Empathy, and Accessibility. Dependent variables are the observed, endogenous variables and the independent variables are the observed, exogenous variables used for framing the model.

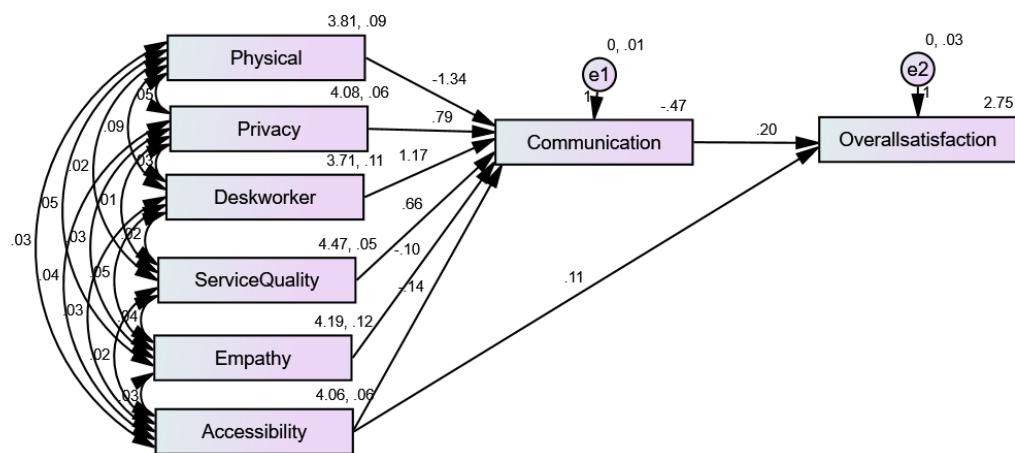


Figure 1 Patients satisfaction Model for Radiological services

The figure 1 displays the structural relationship between the Patients' satisfaction towards radiological services and the other independent variables.

Table 2: Fitness of Patients satisfaction Model for Radiological services

Chi-Square	Probability level	DF	CMIN/DF	RMSEA A	RFI	IFI	NFI	CFI
5.387	0.370	5	1.077	.684	0.977	1.000	0.997	1.000

Source: Primary data

The above table describes the adequacy level of the constructed patients' satisfaction model. The probability level of getting chi-square statistic for the above constructed model is 0.370 which is greater than 0.05. It ensures the statistical correctness of the assumptions of relationship made between the variables used in the specified model.

The value of Minimum Discrepancy Function divided by Degrees of Freedom (CMIN/DF) for the buying intention model is 1.077 which is less than 5 and it represents the better fit of the data used for the construction of the model. The statistical value of Root Mean Square Error of Approximation (RMSEA) is 0.684 which is less than 0.08 and it is a good indicator of model fitness. The fit index value more than 0.9 represents good indicator of model fit and for the above buying intention model the values of Relative Fit Index (RFI) is 0.977, Incremental Fit Index (IFI) is 1.000, Normed Fit Index (NFI) is 0.997 and Comparative Fit Index (CFI) for the model is 1.000. All the fit index values are greater than 0.9 which explains the statistical fitness level of construct.

Patient satisfaction Model Path and Hypothesis Testing

The relationships between the theoretical constructs are represented by regression coefficients between the constructs. The below table shows the causal relationship between exogenous variables and endogenous variables present in the model.

Table 3: Casual Relationships in Fitness of Patients satisfaction Model for Radiological services

Influences of Exogenous Variables on Endogenous Variables			Estimates	S.E.	Critical Ratio	p - value
Communication with SP	<---	Physical Environment	-1.339	.128	-10.497	0.000
Communication with SP	<---	Privacy measures	.794	.085	9.390	0.000
Communication with SP	<---	Communication with DW	1.174	.091	12.960	0.000
Communication with SP	<---	Service Quality	.660	.039	17.070	0.000
Communication with SP	<---	Empathy	-.100	.026	-3.832	0.000
Communication with SP	<---	Accessibility	-.138	.045	-3.095	0.002
Overall satisfaction	<---	Accessibility	0.109	0.048	2.280	0.023
Overall satisfaction	<---	Communication with SP	0.202	0.053	3.815	0.000

Source: Primary data

The single headed arrow shows the relationship between casual factors and the satisfaction level of patients related to radiological services. The above table shows that when the Privacy measures Factors related to patients goes up by one unit their satisfaction goes up by 0.794 units. The p value between Privacy measures Factors and patient satisfaction is 0.000 which shows the significant relationship between these two variables. The above table shows that when the Communication with desk worker Factors related to patients goes up by one unit their satisfaction goes up by 1.174 units. The p value between Communication with desk worker Factors and patient satisfaction is 0.000 which shows the significant relationship between these two variables. The above table shows that when the Service Quality Factors related to patients goes up by one unit their satisfaction goes up by 0.660 units. The p value between Service Quality Factors and patient satisfaction is 0.000 which shows the significant relationship between these two variables. The above table shows that when the Physical Environment factors related to patients goes up by one unit their satisfaction goes up by -1.339 units. The p value between Physical Environment factors and patient satisfaction is 0.000 which shows the significant relationship between these two variables. The above table shows that when the Empathy Factors related to patients goes up by one unit their satisfaction goes up by -.100 units. The p value between Empathy Factors and patient satisfaction is 0.000 which shows the significant relationship between these two variables. The above table shows that when the Accessibility Factors related to patients goes up by one unit their satisfaction goes up by -.138 units. The p value between Accessibility Factors and patient satisfaction is 0.002 which shows the significant relationship between these two variables.

While considering the Communication with service provider factors, one unit of change in Privacy measures is influencing the Communication with service provider which go up by 0.794 units. This shows the significant relationship among the dependent and the independent variables.

Table 4: Effects of Patients satisfaction Model for Radiological services

Dependent Variables	Independent Variables	Direct Effects	Indirect Effects	Total Effects	R²
Communication with SP	Accessibility	-0.152	0.000	-0.152	0.769
	Empathy	-0.151	0.000	-0.151	
	Service Quality	0.619	0.000	0.619	

	Communication with DW	1.677	0.000	1.677	
	Privacy measures	0.887	0.000	0.887	
	Physical Environment	-1.733	0.000	-1.733	
Patients' satisfaction	Accessibility	0.147	-0.037	0.110	0.113
	Empathy	0.000	-0.037	-0.037	
	Service Quality	0.000	0.153	0.153	
	Communication with DW	0.000	0.414	0.414	
	Privacy measures	0.000	0.219	0.219	
	Physical Environment	0.000	-0.428	-0.428	

The structural model assessing the determinants of communication with service providers and patients' satisfaction in radiological services revealed prominent variations across service attributes. Communication with desk workers demonstrated the strongest positive direct effect ($\beta = 1.677$) on communication with service providers, followed by privacy measures ($\beta = 0.887$) and service quality ($\beta = 0.619$). These results highlight the foundational role of administrative interaction quality, confidentiality, and technical efficiency in shaping patient and service provider communication. Conversely, physical environment ($\beta = -1.733$), accessibility ($\beta = -0.152$), and empathy ($\beta = -0.151$) showed negative direct influences, signaling lapses in infrastructural adequacy, service navigation, and interpersonal engagement. The model explained 76.9% of the variance in communication with service providers ($R^2 = 0.769$), indicating strong predictive power.

For patients' satisfaction, the predictors primarily influenced outcomes through indirect effects mediated by communication. Communication with desk workers again exhibited the strongest total effect (0.414), followed by privacy measures (0.219) and service quality (0.153). Accessibility contributed a modest positive total effect (0.110), while empathy (-0.037) and the physical environment (-0.428) negatively affected satisfaction. The lower R^2 value for patient satisfaction (0.113) suggests that additional variables beyond the model likely shape patient satisfaction within radiological contexts.

Discussion

The results confirm the crucial importance of communication-related factors in determining patient experiences in radiology departments. Desk workers are very important first points of contact, and their behavior, clarity, and responsiveness have a big impact on how patients see things. Their influence transcends communication, affecting overall satisfaction and illustrating that administrative interactions are crucial mediators in service contexts marked by elevated patient anxiety and technical intricacy. The good effects of service quality and privacy measures show even more that patients care a lot about professional competence and privacy. In radiological environments characterized by exposure, vulnerability, and uncertainty, privacy assurances and efficient service delivery significantly enhance trust and perceived quality of care. Surprisingly, accessibility and empathy had negative effects on communication. This suggests that patients' expectations and the realities of service delivery are not in sync. These patterns may be due to things like long wait times, not enough staff, or not enough emotional engagement. The strong negative effect of the physical environment also shows that there are big problems with infrastructure that could make people less comfortable, more anxious, and less satisfied with how well they think they can communicate. Overall, the model

demonstrates that patient satisfaction in radiological services is a multidimensional construct shaped by both interpersonal and structural factors. The relatively low explanatory power for satisfaction indicates that additional variables—such as waiting duration, perceived accuracy of diagnosis, or staff courtesy—may be critical and warrant further investigation.

Conclusion

This study provides essential insights into the determinants of communication effectiveness and patient satisfaction within radiological service environments. The results highlight the dominant role of desk worker communication, privacy measures, and service quality, while also drawing attention to the substantial negative impact of physical infrastructure deficiencies. Although accessibility and empathy are traditionally important in healthcare, their negative effects in this context point to potential operational inefficiencies or unmet patient expectations. While the model effectively explains communication outcomes, patient satisfaction remains influenced by broader factors not captured within the current framework. The findings emphasize the need for holistic service enhancements that integrate interpersonal competence, infrastructural improvement, and streamlined administrative processes.

Managerial Implications

Invest in comprehensive training programs for desk workers focusing on empathy, clarity, responsiveness, and patient engagement may strengthen the administrative communication skills. Provide private waiting and consultation place that ensure confidential handling of patient information, and maintain dignity during procedures. Address environmental defects related to comfort, cleanliness, lighting, ventilation, and signage to reduce anxiety and elevate patient experience. Optimize scheduling systems, streamline patient flow, and improve navigation support to ensure smoother access to radiology services.

Academic Implications

The study contributes to healthcare service literature by emphasizing communication as a central mediating variable in patient satisfaction models. It provides evidence that administrative interactions significantly drive patient perceptions, offering new insights into the service delivery mechanisms of technologically dominated healthcare services. The negative effects of accessibility, empathy, and physical environment invite future researchers to explore contextual moderators, such as patient anxiety, facility layout, or workflow efficiency. Additionally, the modest variance in satisfaction signals opportunities for expanded models incorporating variables like perceived diagnostic certainty, waiting time, or emotional reassurance.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organisation or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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