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Original Article

The Satisfaction of Medical Practitioners with Quality of Public-Private Partnership (PPP) Radiological Services at a Teaching Hospital in South West Nigeria: Our Experience

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Abstract

Introduction: The quality of diagnostic services is essential for timely and accurate patient care. In resource-limited settings like Nigeria, challenges such as inadequate infrastructure, underfunding, and lack of resources affect healthcare delivery. Public-Private Partnerships (PPPs) have emerged as a viable solution to address these challenges by leveraging resources from both sectors. This study evaluates physician satisfaction with PPP radiological services at Lagos State University Teaching Hospital (LASUTH). **Methods:** This study deployed a descriptive cross-sectional design on 290 physicians at Lagos State University Teaching Hospital, Lagos State, Nigeria. Data were collected using structured questionnaires and descriptive statistics, including frequencies, percentages, were used to summarize and analyze the data. **Results:** Overall, 71.7% of physicians were satisfied with PPP radiological services, with requisition form adequacy (79.3%) and personnel availability (43.9%) being key strengths. Dissatisfaction stemmed from delays, poor communication, and inconsistent service quality. Access to updated diagnostic handbooks and specialties significantly influenced satisfaction, with radiologists and surgeons reporting higher satisfaction levels ($p < 0.05$). **Conclusion:** Physician satisfaction with PPP radiological services at LASUTH is moderate, highlighting the need for improved communication, timely service delivery, and investments in advanced diagnostic tools. These measures can enhance healthcare quality and patient outcomes in similar resource-limited settings.

Keywords: Public-Private Partnership, Diagnostic Services, Physician Satisfaction, Healthcare Quality, Radiology, LASUTH.

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Introduction

The quality of diagnostic support is essential for timely and accurate patient care in today's world. Physicians depend on these services to inform clinical decisions, develop treatment plans, and improve patient outcomes. Therefore, the satisfaction of physicians with this diagnostic assistance is a critical aspect of healthcare delivery, as it can significantly influence healthcare standards and patient well-being. Providing quality healthcare services and ensuring optimal patient outcomes depends on accurate and timely diagnostic support. [1]
Major challenges hamper effective and efficient healthcare service delivery in most resource-limiting settings, such as developing countries of the world, including Nigeria, where there is corruption, lack of political will, underfunding of the healthcare sector, mismanagement of scarce funds, and diversion to personal pockets, insufficient manpower, and lack of infrastructure. [2] Nigeria faces numerous challenges in its healthcare system, including inadequate infrastructure, limited resources, and disparities in access to quality care. The satisfaction of physicians with diagnostic support services is a critical determinant of healthcare quality and patient outcomes.

Public-Private Partnerships (PPPs) have emerged as a potential solution to address this issue by leveraging the resources and expertise of both private and public sectors. It has been shown to positively impact health care service delivery in areas where it is practiced, and they are preferred due to responsiveness to consumer preferences and accessibility. [3]

The important role of national laboratories in public health cannot be overstated. Improving these laboratories is crucial for strengthening the overall health system, and the impact of such improvements on public health cannot be understated. Clinical decision-making, surveillance, and outbreak investigations rely heavily on laboratory services, with over 70% of clinical decisions based on lab results alone. However, the system still faces numerous challenges, including inadequate staffing, outdated equipment and technology, poor maintenance, insufficient quality control, ineffective supply chain management, and a lack of infrastructure and reliable electricity. [4]

Several studies have shown that physician satisfaction with diagnostic support services is crucial to improving overall healthcare quality and ensuring patient satisfaction. [5]

Many factors contribute to physician satisfaction, including the quality and reliability of diagnostic results, quick turnaround times, access to specialized testing, and effective communication between clinicians and diagnostic service providers. These factors are essential for delivering high-quality patient care and treatment outcomes and should be carefully prioritized within the realm of diagnostic services. [6,7]

It is essential to assess the diagnostic capabilities of PPP by examining the satisfaction level of physicians at a teaching hospital with the diagnostic support they receive. [8] This evaluation plays a vital role in pinpointing areas needing improvement. Understanding the strengths and weaknesses of the diagnostic support system can help in devising strategies to enhance healthcare services, ultimately resulting in improved patient outcomes.

This study aims to fill a void in medical research by thoroughly examining how contented doctors are with diagnostic assistance and adding to the available information on improving healthcare quality in Nigeria. The results of this investigation are expected to influence

government policies, help distribute resources, and aid focused actions to improve the standards of diagnostic care in teaching hospitals throughout the nation.
Therefore, this study aimed to assess the perception of physicians in LASUTH about the impact of PPP and to assess doctors' satisfaction with the impact of the PPP project on the quality of care.

Materials and Methods

Study Setting: Lagos State University Teaching Hospital was established in 1955 by the old Western regional government from a small cottage hospital and later became a general hospital providing secondary health care services. It was converted to a Teaching Hospital in July 2001 due to the need to provide training for doctors and other allied healthcare workers to provide high clinical services. It has about 62 subspecialties, 598 Doctors, and 900 Nurses. [37]

The BT Health and Diagnostic Centre (BTHDC) is an ultra-modern Diagnostic Centre facility that provides Radiology and laboratory services at the Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos. The BT Health & Diagnostic Centre is a unique facility designed and built to provide world-class health screening, laboratory, and diagnostic services. The 2-floor edifice features CT scan, MRI, X-ray, Fluoroscopy, Mammography, Ultrasound, Multi-Specialty Integrated Laboratory, Health Screening, and Conference Room with E-conference Capabilities. The total staff capacity is 65.

Study Design

This study used a descriptive and cross-sectional design.

Study Population

The study included attending physicians and resident doctors – eighteen years and above-working in the medical and surgical clinics of LASUTH for more than a year, as well as radiologists and trainee radiologists from the radiology department in LASUTH.

A total of 290 physicians whopossessed all the inclusion criteria were included in this study. The sample size was calculated using the following formula:

$$n = \frac{z^2 pq}{d^2}$$

Where *n* represents the minimum required sample size for a population greater than 10,000, *z* is the standard normal deviate (1.96) corresponding to a 95% confidence interval, *p* is the estimated physician satisfaction prevalence of 60% (0.6) as observed in a previous study from a similar setting,[2] *q* is (1 - *p*) or 0.4, and *d* represents the level of precision, set at 0.025.

Statistics

Data from the questionnaire wereanalyzed using the Statistical Package for the Social Sciences version 22 and the descriptive statistics, including frequencies and percentages, were used to summarize and analyze the data.

Ethical Considerations

The data collection was performed in adherence with the guidelines of the Health Research and Ethics Committee of Lagos State University Teaching Hospital (Ethical I.D: LREC/06/10/1881).

Results

A total of 290 respondents participated in this observational study. Most physicians fell within the age range of forty and sixty years, with physicians in the fourth decade showing the highest frequency (38.3%), followed by physicians in their fifth decade and greater than sixty years with frequencies of 26.9% and 18.6%, respectively (Table 1). Considering physicians' specialty, Radiology was the most prevalent, with 24.1%. It was closely followed by Surgery (20.3%) and Obstetrics and Gynecology (14.5%). Of the respondents, 34.8% and 37.2% have less than 11 years and 11 to 20 years of experience, respectively. (Figure 1)

Table 1. Sociodemographic data

		Frequency	Percent (%)	Cumulative Percent (%)
Age	<31	8	2.8	2.8
	31-40	39	13.4	16.2
	41-50	111	38.3	54.5
	51-60	78	26.9	81.4
	>60	54	18.6	100.0
	Total	290	100.0	
		Gender		
	Female	142	49.0	49.0
	Male	148	51.0	100.0
	Total	290	100.0	

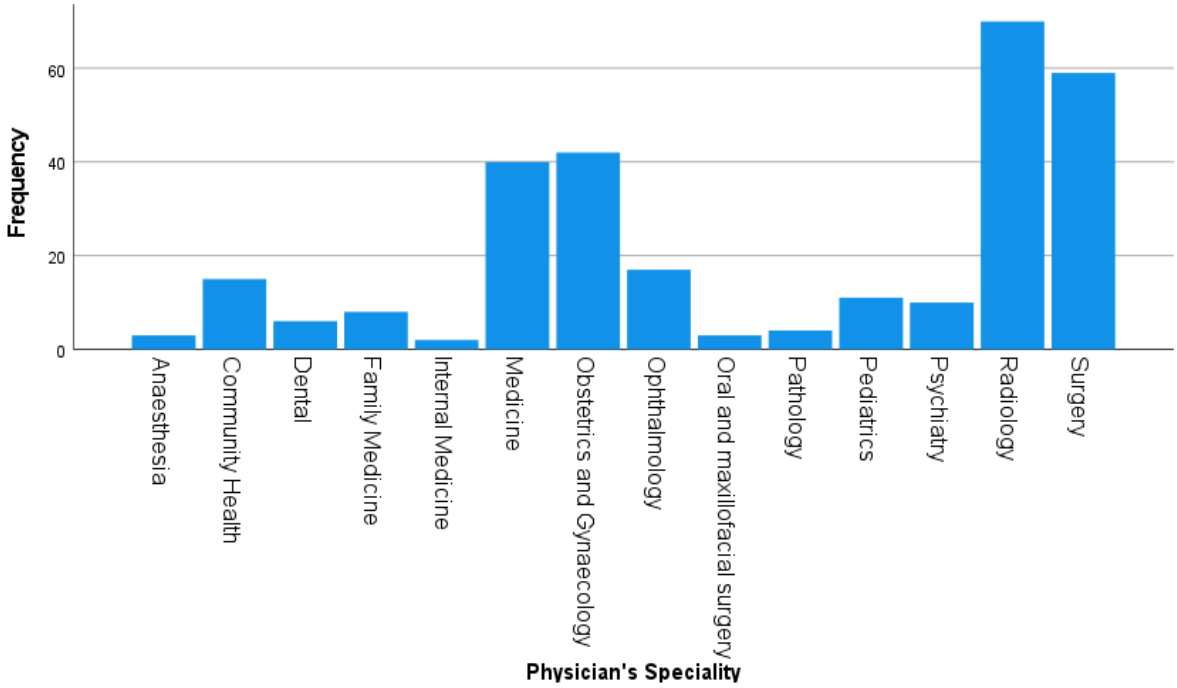

Figure 1: Frequency of participation of each specialty

Only 17.0% admitted to having the diagnostic handbook, while 65.4% did not. Similarly, 16.3%, 80.6%, and 3.1% were satisfied, neutral, and dissatisfied with the handbook's assistance, respectively.

However, only 65.1% of the physicians admitted to having the contact information of the radiology personnel, while 43.9 % of physicians reported that radiology personnel were always available when contacted. In the same vein, 43.9% and 59.9% were satisfied with timely advisory services and the ability to resolve complaints, respectively (Table 2)

Table 2: Frequency table of level of Satisfaction

Do you have an updated diagnostics handbook?	frequency	Per cent
Yes	49	17.0
Not sure	51	17.6
No	189	65.4
Total	289	100.0
How much are you satisfied with the assistance of the handbook to utilize the diagnostic services?	Frequency	Per cent
Satisfied	47	16.3
Neutral	233	80.6
Dissatisfied	9	3.1
Total	289	100.0

Do you have the contact information (official phone number) of the radiology personnel?	Frequency	Per cent
Yes	188	65.1
Maybe	21	7.3
No	80	27.7
Total	289	100.0
Are Radiology personnel available when you attempt to contact them?	Frequency	Per cent
Always	127	43.9
Sometimes	153	52.9
Never	9	3.1
Total	289	100.0
How much are you satisfied with the timely expert/advisory service of radiology staff at times of need (directly or through telephone and email communications)?	Frequency	Per cent
Very satisfied	52	18.0
Satisfied	127	43.9
Neutral	89	30.8
Dissatisfied	16	5.5
Very dissatisfied	5	1.7
Total	289	100.0
How much are you satisfied with the radiology unit's ability to resolve complaints?	Frequency	Per cent
Very satisfied	24	8.3
Satisfied	173	59.9
Neutral	66	22.8
I	26	9.0
Total	289	100.0
How much are you satisfied with the radiology request form?	Frequency	Per cent
Very satisfied	28	9.7
Satisfied	201	69.6
Neutral	47	16.3
Dissatisfied	8	2.8
Very dissatisfied	5	1.7
Total	289	100.0
How much are you satisfied with the test menu adequacy of the radiology services to manage your patient?	Frequency	Per cent

Very satisfied	13	4.5
Satisfied	162	56.1
Neutral	97	33.6
Dissatisfied	12	4.2
Very I	5	1.7
Total	289	100.0
Overall Satisfaction	**Frequency**	**Per cent**
Very Satisfied (81% -100%)	33	11.4%
Satisfied (61% - 80%)	175	60.3%
Neutral (41% - 60%)	76	26.2%
Dissatisfied (21% - 40%)	5	1.7%
Very dissatisfied (0% - 20%)	1	0.3%
Total	290	100.0%
If not satisfied or neutral, what are your reasons?	Frequency	percent
Time-related	4	15.4
Poor communication related	4	15.4
Quality/results	2	7.7
Staff attitude	2	7.7
Others	14	53.8
Total	26	100.0

Regarding the physician's satisfaction with the radiologist's request form, only 69.6% showed satisfaction, while 56.1% were comfortable with the test menu's adequacy. In general, 71.7% of respondents were satisfied with overall radiology services, while only 2.0% were dissatisfied with the same services rendered. (Table 2) Of those not satisfied, time-related factors were the most common reason, and this accounted for 15.4% (Table 2)

Table 3 showed that there was no statistically significant association between the age of the physician and the level of satisfaction ($\chi^2 = 14.83$, $p = 0.5369$). Satisfaction levels were relatively consistent across different age groups. There was also no statistically significant association between sex and satisfaction level ($\chi^2 = 4.11$, $p = 0.3915$). Both male and female physicians showed similar satisfaction levels. Concerning specialties, radiologists and surgeons exhibited higher satisfaction levels compared to other specialties ($P<0.05$). No statistically significant association between years of experience and satisfaction level was observed ($\chi^2 = 16.18$, $p = 0.4407$)

Having an updated diagnostics handbook significantly influences satisfaction levels ($\chi^2 = 13.47$, $p = 0.0361$). Physicians with access to updated handbooks tend to be more satisfied than those who are unsure or do not have access. Specialty-wise, radiologists and surgeons tend to report higher satisfaction levels, while having an updated diagnostics handbook correlates with increased satisfaction across the board. (Table 3)

Table 3: Association between Physicians Satisfaction and Socio-demographics

Variables	**Physicians Satisfaction**						Statistic	P-value
Age of physician in years	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied	Total	X^2 = 14.83	0.5369
<31	0(0.0)	2(40.0)	3(60.0)	0(0.0)	0(0.0)	5(100.0)		
31 - 40	5(13.9)	20(55.6)	10(27.8)	0(0.0)	1(2.8)	36(100.0)		
41 - 50	11(10.0)	62(56.4)	34(30.9)	3(2.7)	0(0.0)	110(100.0)		
51 - 60	9(11.7)	51(66.2)	16(20.8)	1(1.3)	0(0.0)	77(100.0)		
>60	7(13.0)	34(63.0)	12(22.2)	1(1.9)	0(0.0)	54(100.0)		
Total	32(11.3)	169(59.9)	75(26.6)	5(1.8)	1(0.4)	282(100.0)		
Mean ± SD	50.69 ± 8.73	50.50 ± 9.34	48.83 ± 9.70	49.60 ± 9.40	31.00 ± 0.00		F = 1.49	0.2059
Median (Min-Max)	51.00(35.00 - 65.00)	51.00(26.00 - 66.00)	50.00(25.00 - 73.00)	46.00(41.00 - 62.00)	31.00(31.00 - 31.00)			
25% - 75%	43.00 - 57.00	43.00 - 57.00	43.00 - 55.00	42.00 - 57.00	31.00 - 31.00			
Sex								
Male	19(12.8)	92(62.2)	36(24.3)	1(0.7)	0(0.0)	148(100.0)	X^2 = 4.11	0.3915
Female	14(9.9)	83(58.5)	40(28.2)	4(2.8)	1(0.7)	142(100.0)		
Total	33(11.4)	175(60.3)	76(26.2)	5(1.7)	1(0.3)	290(100.0)		
Specialty								
Anaesthesia	1(33.3)	1(33.3)	1(33.3)	0(0.0)	0(0.0)	3(100.0)	X^2 = 195.02	<0.0001*
Community Health	0(0.0)	8(53.3)	7(46.7)	0(0.0)	0(0.0)	15(100.0)		
Dental	1(16.7)	4(66.7)	1(16.7)	0(0.0)	0(0.0)	6(100.0)		
Family Medicine	0(0.0)	5(62.5)	3(37.5)	0(0.0)	0(0.0)	8(100.0)		
Internal Medicine	0(0.0)	1(50.0)	0(0.0)	0(0.0)	1(50.0)	2(100.0)		
Medicine	10(25.0)	20(50.0)	9(22.5)	1(2.5)	0(0.0)	40(100.0)		
O & G	2(4.8)	25(59.5)	15(35.7)	0(0.0)	0(0.0)	42(100.0)		

Ophthalmology	1(5.9)	13(76.5)	3(17.6)	0(0.0)	0(0.0)	17(100.0)		
Oral and maxillofacial surgery	0(0.0)	1(33.3)	1(33.3)	1(33.3)	0(0.0)	3(100.0)		
Pathology	0(0.0)	4(100.0)	0(0.0)	0(0.0)	0(0.0)	4(100.0)		
Paediatrics	0(0.0)	9(81.8)	2(18.2)	0(0.0)	0(0.0)	11(100.0)		
Psychiatry	1(10.0)	5(50.0)	3(30.0)	1(10.0)	0(0.0)	10(100.0)		
Radiology	10(14.3)	41(58.6)	18(25.7)	1(1.4)	0(0.0)	70(100.0)		
Surgery	7(11.9)	38(64.4)	13(22.0)	1(1.7)	0(0.0)	59(100.0)		
Total	33(11.4)	175(60.3)	76(26.2)	5(1.7)	1(0.3)	290(100.0)		

Discussion

The role of radiology as a key diagnostic tool, particularly in disease management and predicting outcomes, can no longer be overstated. Therefore, in achieving good healthcare delivery, it is essential to assess the Physician's satisfaction with these radiological services.

Despite radiology's obvious clinical importance, there is a glaring lack of information on Physicians' satisfaction with the quality of radiological services available. Although numerous research works have been done on patient satisfaction with the quality of radiological service worldwide [9-12], it is worthy of note that, to our knowledge, no recent study has assessed Physicians' satisfaction with radiological services in Nigeria.

Our observational study was conducted in a teaching hospital in Lagos, South West Nigeria, with 290 respondents. However, 289 medical practitioners participated in the study, having almost equal male and female distribution. Most of these responders were married and were in the 5th decade. These findings are consistent with a study of GPs' satisfaction with radiology services in rural communities in Australia [13]. In that study, most respondents were above 50 years old with a similar male-to-female ratio.

In a similar research work on the knowledge, attitude, and practice of radiology among Physicians in a teaching hospital in Jos, Nigeria, a male preponderance was noted, most of whom were in the 4th and 5th decades.[14]

One way of auditing radiology services is to assess physicians' satisfaction with them. This study reveals overall satisfaction with radiology services as 71.7%, while dissatisfaction accounted for 2.0%.

In Baltimore, US [14], where the level of satisfaction recorded was 84.0%. The acquisition of newer and more technologically driven sophisticated radiological equipment could be adduced as the reason behind this very high level of satisfaction. However, a very low satisfactory level (39.8%) was observed in a research work done in Jos, Nigeria. This contrasting revelation could be ascribed to the smaller number of participants (123) in contrast to the (450) in the Baltimore study and (289) in our study. The authors noted the reasons for dissatisfaction in our study as

time factors, poor communication, poor quality of results, and staff attitude. These were also observed in the work of Salaam et al. [15]

Since physicians are usually responsible for filling out the requisition forms, the adequacy of these forms sent to the radiologists was assessed. In this study, 79.3% of participants were satisfied with the adequacy of the forms, while only 4.5% were not satisfied. In a study in Nepal investigating whether clinicians communicated with the radiologist through requisition forms, the adequacy of clinical information was 83.6%.[16] Similar studies revealed adequacy varying from 62.0% to 91.7%. [17-20]. Since relevant clinical information is mostly passed to the clinicians through the use of requisition forms, it is only logical and compelling to ensure that the form is appropriately and adequately filled. This informs why the Royal College of Radiologists recommends that requisition forms should be completed accurately and legibly in order to prevent misinterpretation and that, ideally, they should not be handwritten. [21]

The authors noted some limitations in this research work. First, there was no assessment of the patient's history of allergy and risk of fall. In future, such provisions should be made available in the requisition forms. Cases of patients reacting to radiation or other contrast media have been reported. Secondly, the mode of transportation of the patients to the radiology laboratory could be included.

The study addresses a critical gap by focusing on physicians' satisfaction with diagnostic services in Nigeria, an area that has been less explored. It employs a comprehensive sampling method, with a robust sample size of 290 participants across multiple specialties, ensuring diverse and representative perspectives. Additionally, the study provides detailed analysis by examining key factors such as the availability of personnel, adequacy of requisition forms, and turnaround times, offering actionable insights.

Despite its strengths, the study faced some challenges. Financial constraints limited its scope, and participants showed a lack of knowledge about the cost of investigations and waiting times. Moreover, there was limited understanding of public-private partnerships (PPP) among the participants, which may have affected the depth of responses.

This study recommends several policy measures to improve satisfaction with diagnostic services. Enhancing communication between physicians and radiology staff is a priority, as addressing this gap would significantly improve collaboration and satisfaction. Additionally, measures should be implemented to expedite turnaround times for diagnostic results, especially for time-sensitive cases. The availability of updated diagnostic handbooks and properly designed requisition forms should be ensured to facilitate accurate and efficient diagnostics. Regular training programs are essential for radiology staff to enhance their technical proficiency and foster better attitudes, thereby improving interactions with medical practitioners.

Future research should focus on several areas to further advance the understanding of satisfaction with diagnostic services. Patient-centred assessments that incorporate satisfaction metrics would help align the perspectives of physicians and patients. Research should also explore the impact of adopting advanced diagnostic tools on satisfaction levels. Longitudinal studies would be beneficial to assess changes in satisfaction over time, particularly after the implementation of recommended policies. Additionally, studies should be expanded to rural areas and other healthcare facilities to identify regional disparities in diagnostic service quality.

Recommendations

The study emphasizes several actionable steps to improve satisfaction with PPP radiological services in a teaching hospital in Nigeria. Addressing time-related issues is critical to ensure the timely delivery of results and services, which would significantly enhance physician satisfaction. Strengthening communication between radiology staff and physicians would help address dissatisfaction related to advisory and expert support. Maintaining consistent quality in radiological outputs across all shifts, including weekends and holidays, is equally important. Continuous training for radiology staff should be prioritized to improve their professionalism and interactions with medical practitioners.

The study also recommends updating diagnostic handbooks and ensuring their accessibility, as these resources are associated with higher levels of satisfaction. Expanding service offerings to include advanced diagnostic tools, such as PET scans, cardiac MRI, and functional brain MRI, would address existing unmet needs. Establishing reliable referral and backup systems for unavailable tests is essential to maintain continuity of care. Requisition forms should be standardised, ensuring they are legible and adequately completed to enhance communication and accuracy. Finally, further studies should explore additional factors such as patient allergies and transportation to radiology labs, which could influence satisfaction and service efficiency.

These measures aim to address key areas of dissatisfaction while improving the overall effectiveness and quality of PPP radiological services in healthcare delivery.

Conclusion

The overall Physicians' satisfaction in this study was 71.7%, (11.4% + 60.3%). The authors noted that the reasons for dissatisfaction in our study included time factors, poor communication, staff attitude, and quality of results. In terms of adequacy of filing the requisition forms, 79.3% of participants were satisfied. It is suggested that future assessments should include the history of patients' allergies and the mode of transportation to the radiology facility.

The study highlights both strengths and limitations, focusing on the perspectives of physicians regarding diagnostic services in Nigeria.

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