PATIENT SATISFACTION WITH DIAGNOSTIC SERVICES OF A PUBLIC SECTOR TERTIARY CARE HOSPITAL IN A DEVELOPING COUNTRY: A CROSS-SECTIONAL STUDY USING SERVQUAL® QUESTIONNAIRE

Syeda Mahum Zahra Bokhari,[1] Shahid Mahmood,[2] Ghazia Qasmi,[3] Syeda Zainab Hassan Zaidi,[4] Taqdees Fatima[5]

ABSTRACT

Background & Objectives: Patient satisfaction is a multidimensional concept that consists of client's perceived needs, their expectations and experience of a health care system. This study aimed to assess patient satisfaction with pathology and radiology services at a public tertiary care hospital in a Pakistani metropolitan city.

Methods: From August to December 2023, we conducted exit interviews with 434 randomly selected adult patients at a 1700-bed teaching hospital in Lahore. Using the SERVQUAL® questionnaire, we assessed client satisfaction and service quality across accessibility, affordability, reliability, responsiveness, and assurance. Analysis involved descriptive statistics, patient satisfaction scoring, and examining socio-demographic factors with multiple logistic regression.

Results: Out of 248 pathology clients, 74 (29.8%) were aged 35-44 years and 127 (51.2%) were female. Of 186 radiology clients, 63 (33.8%) were aged 45 or older and 137 (73.7%) were male. Overall, 59% clients using pathology and 53% clients using radiology services were satisfied with more females (75%;p=<0.001) were satisfied from radiology service. Only one-third of clients were satisfied with problem resolution and the availability of a helpline. Higher likelihood of satisfaction from radiology services was found for affordability (OR: 1.53; 95% CI: 1.12-2.87, p=0.001) and accessibility (OR: 1.81; 95% CI: 1.05-2.13, p=0.01) service domains, whereas for pathology service, accessibility and level of education were significant domains of satisfaction.

Conclusions: A significant proportion of clients at a teaching hospital in a developing country were dissatisfied with pathology and radiology services. Key predictors of satisfaction included education level, area of residence, responsiveness, accessibility, and affordability.

Key words: Diagnostic Services, health service delivery, SERVQUAL® questionnaire. Health Care Utilization, Healthcare Service, pathology service.

Diagnostic service is the backbone of clinical practice and decision making for patient care. United States Department of Veteran Affairs described it as the service which "facilitate the provision of timely, cost-effective, and high-quality diagnostic care in a safe and secure environment and includes clinical services of pathology, radiology, and nuclear medicine".[1] Patient satisfaction is a multidimensional concept that comprises of client's perceived needs, expectations and experience of a health care system.[2] In many countries, patient satisfaction is used as a tool to assess the quality of health service and hospital funds are linked to the performance of healthcare staff.[3] Dissatisfaction from a healthcare service may affect the client confidence on health system which might result in under-utilization and waste of precious resources, therefore, quality assurance process of any healthcare service requires regular feedback from its clients

1,2,4,5. Department of Community Medicine, Allama Iqbal Medical College, Lahore
3. Associate Professor Surgery, SMDC

Correspondence:
Syeda Mahum Zahra Bokhari, PG Trainee Oncology JHL

and timely rectification of the gaps.[4] Using patient satisfaction survey is a reasonable tool to provide data pertaining to client's experience of the service.

Researchers have used number of validated questionnaires investigating varied domains of satisfaction from a healthcare service including accessibility, affordability, responsiveness, and quality assurance. These domains encompass physical ambience, waiting time for consultation, communication between clients and providers, attitude towards medics and attitude of support staff. SERVQUAL®, Patient Satisfaction Questionnaire (PSQ-18), O-PAHC and I-PAHC are few examples of these tools.[5,6] Since, healthcare settings are influenced by socio-cultural factors, health financing, management practices and policies, therefore, a uniform standardized tool is not in practice to get feedback from patients in different countries.

Major predictors of patient satisfaction include accessibility, cost, trust on physician competence, waiting time, in addition to the age, disease profile, socio-demographic characteristics of the clients.[7] Liang et al. showed that patient satisfaction was influenced by communication with doctors, hospital cleanliness, waiting time and acceptable charges. There was a significant regional variation in patient satisfaction for which government needs to enact policies.[8] Sinyiza et al. in their study in Malawi reported a low overall client satisfaction with health services (8.4%) and they attributed this dissatisfaction to poor sanitation, unavailability of doctors and health staff not listening and explaining about health condition and treatment.[9] On the other hand, a study in Ethiopia investigating 2399 patients found that 87.6% patient were satisfied from laboratory services.[10] Important domains of satisfaction were accessibility of sites, adequacy of waiting area, cleanness of latrines, medic-client communication.[4] There is a wide variation in health services provided in outdoors, indoors and diagnostic services.

Pathology and radiological services may involve technical, interventional and comparatively costly processes for which clients need to be reasonably counselled; they may have to wait for longer time for procedures and receive reports, and may pay charges for the investigations. Thus, client expectations may not be fulfilled, leading to dissatisfaction.[10] For instance, Mesfin et al. in their investigation of factors related to quality of laboratory services in Ethiopia reported that ineffective communication with clients and lack of quality management system were the main factors affecting quality of laboratory service. About two-third laboratory professionals did not receive work related training, 53.4%

laboratories had poor equipment quality and about 41% had high work load.[11]

There is a considerable gap in existing literature regarding the evidence on patient satisfaction with diagnostic services in public sector hospitals in developing countries. Main research question is whether there is difference between provided diagnostic services and client's expectations in terms of reliability, assurance, empathy, responsiveness and tangibility of service? Existing study aims to assess patient satisfaction on diagnostic services provided in a large public sector teaching hospital of Lahore, Pakistan. Data from this study will help understand the predictors of satisfaction in terms of physical ambience, attitude of staff, provider-client communication and identify factors that may enhance or hinder consumer satisfaction. Results are expected to be used by hospital administrators and policy makers to adjust the service delivery according to the expectations of consumers.

METHODS

1. Study setting and design

This descriptive cross-sectional study was conducted in an 1800 bedded public sector tertiary care teaching hospital of Lahore, Pakistan from July-December 2023, after approval from institutional ethical review board, Jinnah Hospital Lahore, Pakistan (No.236/26/04/ 2022/ 51 ERB). This health facility is visited by individuals from all urban towns, surrounding semi urban and rural areas, and clients are mostly belonging to lower and middle socioeconomic classes. This health care facility provides pathology services in haematology, histopathology, immunology, microbiology, chemical pathology and molecular biology related tests. For radiology service, in addition to diagnostic radiological procedures, such as X-rays, CT-scan, MRI, this hospital also offers interventional radiological procedures. Since it is public sector hospital, therefore, only nominal fee is charged for all these diagnostic services.

2. Study subjects and sampling method

A total of 477 clients (patients) aged 18 and above, both men and women, regularly using diagnostic services both in indoor and outdoor departments of the hospital were invited and 434 participants completed this study. Sampling size was calculated by Open Epi software version 3.01 and using anticipated frequency of satisfaction from diagnostic services as 50%, and with 5% absolute precision around the proportion, with 95% confidence level, using the formula, n= [DEFF*Np(1-p)]/ [(d2/Z21-α/2*(N-1) +p*(1-p)]). The minimum estimated sample size was 384, whereas

we added 10% of this calculated sample to adjust for missing entries and refusals. We used systematic random sampling technique to invite participants for this study. Every third client with hospital registration slip coming out of pathology and radiology departments were approached for participation.

3. Data collection tool and procedures

A validated questionnaire SERVQUAL® was used to undertake in-person interviews of patients/clients who visited both indoor and outdoor settings. SERV QUAL® is an internationally accepted questionnaire developed by Parasuraman, Zeithaml & Berry in 1988. This tool consisted of 22 items (Cronbach alpha = 0.96 for perception and 0.93 for expectation items). This scale asks questions on five domains of service (Tangible

= 4 items, Reliability=5 items, Responsiveness=4 items, Assurance=4 items and Empathy=5 items).12 These domains encompassing various dimensions of service include physical features of facility, access, waiting ambience(tangibility), ability to perform promised service (reliability), willingness to help customers (responsiveness), knowledge of staff and courtesy towards clients, behaviour of laboratory staff and medics (assurance), consultation time, patient privacy (empathy), respect for patient preferences, cost of tests, and technical services. Each of the 22-item scale is measured on a five-point Likert scale (1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, to 5= strongly agree). These items are positively stated.6 Informed consent was obtained before the start of the study. Each interview took 15 to 20 minutes. Form was reviewed

Table 1: *Baseline characteristics of participants visiting pathology and radiology departments of a public sector tertiary care hospital of Lahore, Pakistan (n=434)*

Characteristics	Clients visiting Pathology Department (n=248)		Clients visiting Radiology Department (n=186)	
	Number	Percentage	Number	Percentage
Age (in years)				
<25	49	19.8 %	47	25.3%
25-34	69	27.8 %	40	21.5%
35-44	74	29.8 %	36	19.4%
45 and above	56	22.6 %	63	33.8%
Sex				
Males	121	48.8%	137	73.7%
Females	127	51.2%	49	26.3%
Employment status				
Employed	129	52.0%	115	61.8%
Home maker	79	31.9%	39	21.0%
Unemployed	40	16.1%	32	17.2%
Area of residence				
Rural	194	78.2%	31	16.7%
Urban	54	21.8%	155	83.3%
Marital Status				
Currently married	189	76.2%	136	73.1%
Currently not married	59	23.8%	50	26.9%
Educational Status				
No Schooling	62	25.0%	40	21.5%
Completed Primary	21	8.5%	12	6.5%
Completed Secondary	88	35.5%	74	39.8%
Completed College/University	77	31.0%	60	32.3%
Frequency of visit				
Regularly visiting	112	45.2%	94	50.5%
First time visit	136	54.8%	92	49.5%

after the interview and responses were checked for missing entries before relieving the participant.

4. Data management and analysis

Data were entered into SPSS version 26 for data management and analysis. Missing entries were checked by validating the data by running frequency tables, whereas normality assumption was by checked by using Shapiro-Wilk test. Socio-demographic characteristics (age, sex, education, employment status, marital status and area of residence) were categorized into meaningful groups for analysis. Difference in the proportions was assessed by Pearson's Chi-squared test (Fisher's exact test if cell values are less than 5). Median value of 4.2 and 3.8 was used as a cut off on a satisfaction scale devised from summary score, to decide overall satisfaction level (or not satisfied) from pathology services and radiology services respectively. Normality assumption was checked for summary satisfaction score and for comparison of satisfaction score with socio-demogra-phic characteristics. Student's t-test

was used to assess the difference of means. Multiple logistic regression analysis was performed to examine the satisfaction level categorized as mentioned above (satisfied and not satisfied) in relation to age, sex, area of residence, educational status, employment status, accessibility and affordability of diagnostic services. Adjusted estimates were presented as adjusted odds ratio (OR) with 95% confidence intervals of this odds ratio. P-value of less than 0.05 was considered statistically significant.

RESULTS

Sociodemographic profile of participants.

Four hundred and seventy-seven visiting pathology (n=271) and radiology (n=206) departments of the hospital were invited for an exit interview. Nineteen clients (7%) from pathology and 13(6.3%) clients from radiology department refused to participate and data of eleven clients were excluded due to missing entries on relevant variables. Finally, data of 434 clients (248

Table 2: *Patient' satisfaction with pathology and radiology services provided in a public sector tertiary care hospital of Lahore, Pakistan using SERVQUAL® questionnaire (n=434)*

Characteristics	Overall Satisfaction Pathology Services (n=248)			Overall satisfaction Radiology Services (n=186)		
	Satisfied Number (%)	Not Satisfied Number (%)	*P*	Satisfied Number (%)	Not Satisfied Number (%)	*P*
Age						
<25 years	27(55.1%)	22(44.9%)		20(42.6%)	27(57.4%)	
25-34 years	41(59.4%)	28(40.6%)	0.16	20(50.0%)	20(50.0%)	0.23
35-44 years	39(52.7%)	35(47.3%)		20(55.6%)	16(44.4%)	
45 years and above	40(71.4%	16(28.6%)		39(61.9%)	24(38.1%)	
Gender						
Males	71(58.7%)	50(41.3%)	0.82	62(45.3%)	75(54.7%)	<0.001
Females	76(59.8%)	51(40.2%)		37(75.5%)	12(24.5%)	
Employment status						
Employed	78(60.5%)	51(39.5%)		53(46.1%)	62(53.9%)	
Home maker	48(60.8%)	31(39.2%)	0.63	29(74.4%)	10(25.6%)	0.009
Unemployed	21(52.5%)	19(47.5%)		17(53.1%)	15(46.9%)	
Area of residence						
Rural	22(40.7%)	32(59.3%)	0.99	10(32.3%)	21(67.7%)	0.01
Urban	115(59.3%)	79(40.7%)		89(57.4%)	66(42.6%)	
Marital Status						
Married	114(60.3%)	75(39.7%)	0.54	77(56.6%)	59(43.4%)	0.12
Single	33(55.9%)	26(44.1%)		22(44.0%)	28(56.0%)	
Educational Status						
No Schooling	48(77.4%)	14(22.6%)	0.001	15(37.5%)	25(62.5%)	0.07
Primary and above	87(46.7%)	99 (53.3%)		84(57.6%)	62(42.4%)	

from pathology and 186 from radiology department) were analysed (Figure 1).
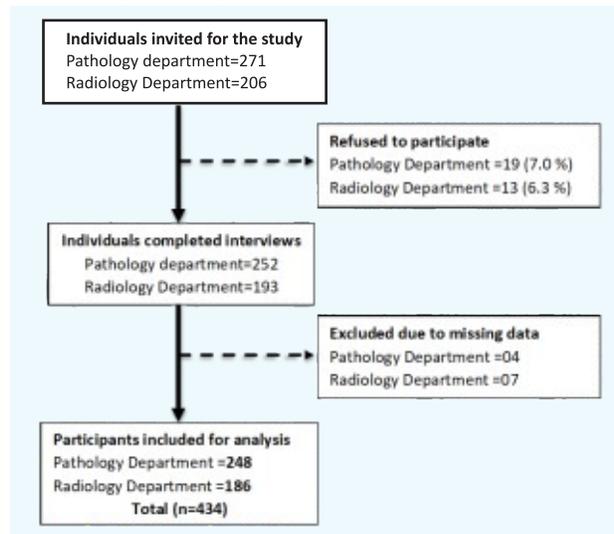
Figure 1: *Selection flow of participants to assess*

satisfaction with pathology and radiology services provided in a public sector tertiary care hospital of Lahore, Pakistan (n=434)

Of 248 clients from pathology department, 74(29.8 %) were aged 35 to 44 years, 127(51.2%) were females, 129(52%) were employed. Most pathology clients (194, 78.2%) were from rural areas; 88(35.5%) had completed secondary education and 112(45.2%) clients were the regular visitor to this hospital. In comparison, most clients in radiology department (63, 33.8%), were aged 45 years or above, 137(73.7%) were males, 74(39.8%) had completed secondary education, 136 (73.1%) were married, 115(61.8%) were employed and 94(50.5%) were the regular visitor of the hospital (Table 1).

Patient's level of satisfaction with diagnostic services

Overall, 59% and 53% clients were satisfied with pathology and radiology Services respectively (Figure 2).

Table 3: *Predictors of client satisfaction from diagnostic (pathology and Radiology) services provided in a public sector of a tertiary care hospital of Lahore Pakistan (n=434)*

| Characteristics	Clients visiting Pathology Department (n=248)			Clients visiting Radiology Department (186)		
	Odds Ratio (OR)	95% CI. Of OR	p	Odds Ratio (OR)	95% CI. Of OR	P
Age						
< 40 years	Reference	Reference		Reference	Reference	
≥ 40 years	0.73	0.34-1.58	0.43	0.39	0.12-1.25	0.11
Sex						
Male	Reference	Reference		Reference	Reference	
Female	0.76	0.26-2.13	0.59	1.00	0.58-1.25	0.99
Residence						
Rural	Reference	Reference		Reference	Reference	
Urban	1.22	0.49-2.97	0.66	1.58	0.35-7.09	0.55
Educational status						
No Schooling	Reference	Reference		Reference	Reference	
Primary education and above	4.76	1.88-12.5	0.001	0.28	0.07-1.13	0.07
Employment Status						
Unemployed	Reference	Reference		Reference	Reference	
Employed	0.66	0.21-2.06	0.47	1.26	0.56-2.41	0.46
Home maker	0.84	0.28-2.58	0.77	1.15	0.76-2.78	0.67
Accessible						
No	Reference	Reference		Reference	Reference	
Yes	8.55	3.87-18.81	0.001	1.81	1.05-2.13	0.01
Affordable						
No	Reference	Reference		Reference	Reference	
Yes	4.98	2.04-12.13	0.001	1.53	1.12-2.87	0.001

Comparison of client satisfaction summary score in relation to socio-demographic characteristics showed that in radiology services satisfaction level among females was high (75.5%) than males and this difference was found statistically significant (p<0.001). The people living in urban areas are more satisfied from the radiology services (57.4%) than those living in rural areas and this difference was found statistically significant (p=0.01). For pathology services, satisfaction level was higher among those who had primary schooling and above (47%) than those who received no education and this relation was found statistically significant (p=0.001) (Table 2).

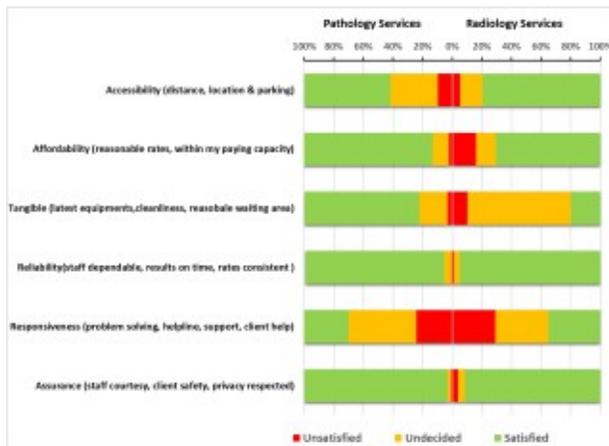**Domains of client satisfaction from diagnostic services**

Figure 3 depicts the level of satisfaction from pathology and radiology services in terms of various domains of satisfaction including accessibility, affordability, tangibility, reliability, assurance and responsiveness. We found that almost 75% clients using pathology services were satisfied from presence of latest equipment's, cleanliness waiting time (Tangibility), whereas only 20% clients were satisfied on this domain. On the other hand, all clients were satisfied from accessibility, affordability and staff courtesy domains of the service. On the other hand, only one-third clients were satisfied from the way their problems are solved, or presence of helpline for their facilitation (Figure 3).

Predictors of patient satisfaction with diagnostic services

Our logistic regression model showed no statistically significant association between satisfaction from pathology services and age (OR: 0.73;95%CI: 0.34-1.58; p=0.43), and sex (OR:0.76 ;95%CI: 0.26-2.13; p=0.59), whereas those living urban areas were 1.22 times at higher odds of satisfaction, yet confidence interval estimate was imprecise(0.49-2.97). However, those completed formal education compared to no education were four times at higher odds of satisfying from pathology services (OR: 4.76; 95% CI 1.88-12.5, p=0.001). Odds of satisfaction was also higher for accessibility (OR: 8.55; 95% CI: 3.87-18.81, p=0.001) and affordability (OR; 4.98, 95% CI: 2.04-12.13, p=0.001) of service domains (Table 3). Comparatively, odds of satisfaction from radiology service were statistically insignificant for socio-demographic characteristics, yet there was higher likelihood of satisfying from radiology services in terms of affordability (OR: 1.53; 95% CI: 1.12-2.87, p=0.001) and accessibility (OR: 1.81; 95% CI: 1.05-2.13, p=0.01) (Table 3).
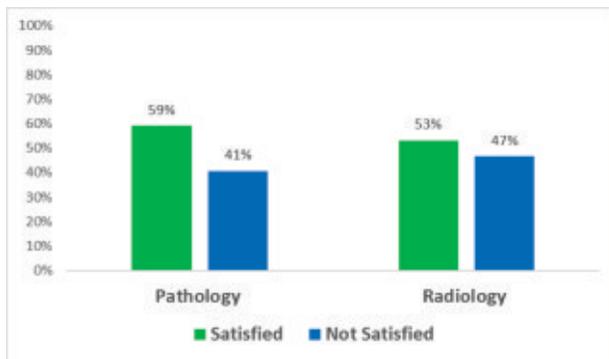
Figure 2. *Overall satisfaction from pathology and radiology services provided in a public sector tertiary care hospital of Lahore, Pakistan (n=434)*

Figure 3. *Client's satisfaction from diagnostic services provided in a public sector tertiary care hospital of Lahore, Pakistan based on SERVQUAL® standards (n=434).*

DISCUSSION

Diagnostic services are vital component of healthcare in any setting. On one side of spectrum, this support clinical decision making and on the other end, these are useful for monitoring the prognosis and surveillance activities for prevention. In addition to the technical complexities involved to operate diagnostic services, there are quite a few aspects directly linked to the clients, such as physical ambience, communication, cost, waiting time, attitude of attending staff, privacy and responsiveness towards client's needs and concerns. Patient satisfaction survey is one of the tools to assess the prevailing situation on ground and to identify gaps to be filled by the healthcare administration. This study examined the patient's satisfaction based on provision of physical ambience, medic-client communication, and attitude of medics towards patients/ clients, extent to which clients are satisfied to visit again or refer their

friends to use diagnostic services, both in outdoor and indoor departments of a public sector teaching hospital in Lahore. Overall, fifty-nine percent clients expressed their satisfaction towards pathology services and fifty-three percent towards radiology services. Clients were not satisfied with level of cleanliness, problem solving approach adopted by the staff, yet they expressed satisfaction on affordable price of tests and physical accessibility of this healthcare facility.

A reliable and validated questionnaire named SERV QUAL was used in our study which is designed for low-income countries as well. The diagnostic services (pathology and radiology) were surveyed and analysed separately for comparison. The results should be interpreted and read considering the limitations inbuilt using a cross-sectional study design and considering the fact that it was a single centre study which might affect its generalizability to other hospital settings. Strengths of this study is its comprehensive nature and rigorous analysis and comparisons, using standard statistical techniques. We also analysed data to identify predictors of satisfaction with diagnostic services of a public sector tertiary care hospital of a developing country.

Literature shows that a study at department of Medicine, Bacha Khan Medical Complex, Peshawar, Pakistan identified accessibility of services, waiting for check-up, staff interaction, medical care, cost of care, and cleanliness as significant factors for patients satisfaction.[12] These findings are consistent with our findings. Another study done at Mayo Hospital, a public sector tertiary care hospital in Lahore, reported that reliability and responsiveness of healthcare staff are most important predicting factors for patient satisfaction.[13] These observations are similar to the findings in our study where we found affordability, tangibility, and responsive domains played a vital role in client satisfaction. Similarly, in different settings and different culture, a study in Nigeria found that cleanliness of the hospital environment, attitude of medical and paramedical staff, waiting time, promptness of laboratory results have a great impact on patient satisfaction.[14] Likewise, during 2022, a study in Riyadh, Saudi Arabia reported that waiting time for consultations, quality of consultation, behaviour of medical staff were important consideration of patients using the service there.[15] Another study in Malawi found that only 8.4% of clients were satisfied from diagnostic services and this much lower level of satisfaction was attributed to poor medics-patient communication.[9] Ambience of healthcare settings plays an important role in choosing the health facility. This factor was highlighted in a study at Combined Military Hospital (CMH) Lahore. Low satisfaction was observed due to absence of toilets, inadequate and uncomfortable sitting arrangement, lack of clean drinking water.[16] Similar findings were reported in a study conducted in Bangladesh.[17] Reliability and responsiveness of healthcare staff are most strongly predicting patient satisfaction in public and private health care sectors; therefore, clients were more satisfied with private hospital settings where these factors are considered quality standards more than in a public sector healthcare setting.[14,17,19] However, comparing public and private hospital services on these parameters may not be comparative as in developing countries like Pakistan, more people from lower socio-economic strata are using services from public sector healthcare settings.

Health Care delivery systems particularly in developing world are facing multiple challenges, yet these are striving to improve the quality of care and now are working under the regulations devised by some provinces in Pakistan. In Punjab, where our study setting is located has introduced minimum service delivery standards, including standard for diagnostic services. These standards are regularly watched by Punjab Healthcare Commission

Patient satisfaction surveys are increasingly gaining popularity in recent years which is a positive change. Evidence should be regularly updated on this important aspect of healthcare. However, there is a gap in using this evidence at policy and management level. Usually, this evidence is not given weightage by the policy makers and health managers in a developing country. With increasing complexity in provision of healthcare setting and higher awareness among clients about quality standards, there is a need to update the assessment tools for client satisfaction. In addition, tools developed in more developed countries should be tailored to the cultural and socioeconomic situations prevailing in developing countries, in order to generate valid and relatable evidence for decision making.

CONCLUSION

Overall, 59% clients using pathology and 53% clients using radiology services of the teaching hospital were satisfied. A considerable proportion of clients had shown dissatisfaction which calls for remedial measures to meet the client's expectations and needs. Level of education, area of residence responsiveness, accessibility and affordability were major predictors for satisfaction among clients using diagnostic services at a tertiary care hospital setting in a developing country.

Author's Contribution

Conceptualization study design	SMZB, SM, SZHZ, GQ
Data Acquisition	SMZB, SZHZ, TF, ZL
Data Analysis/ interpretation	SMZB, SZHZ, TF, ZL, SM, GQ
Manuscript drafting	SMZB, SZHZ, ZL, TF, ZL
Manuscript review	SM, GQ, TF, SZHZ

All authors read and approved the final draft.

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