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Original Article

Factors Affecting Patient Satisfaction with Laboratory Services in Healthcare Setting

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ABSTRACT

Background: Patient satisfaction is an important indicator of healthcare quality and reflects patients' perceptions of service efficiency, communication, staff behavior, and care environment. Laboratory services are central to diagnosis and treatment, but patient satisfaction with laboratory care may be influenced by several operational and interpersonal factors. Objective: To assess factors associated with patient satisfaction with laboratory services in a healthcare setting. Methods: This quantitative cross-sectional survey included 100 adults with prior laboratory service experience. Data were collected using a structured online questionnaire assessing waiting time, turnaround time, staff professionalism and behavior, communication and patient guidance, cleanliness of the laboratory environment, and overall patient satisfaction. Data were analyzed using IBM SPSS Statistics version 25. Descriptive statistics, reliability analysis, Pearson correlation, multiple linear regression, independent sample t-test, and one-way ANOVA were applied. Results: The Patient Satisfaction Scale showed good internal consistency (Cronbach's $\alpha = 0.848$). Patient satisfaction was positively correlated with waiting time score ($r = 0.519$), turnaround time ($r = 0.683$), staff professionalism and behavior ($r = 0.847$), and cleanliness ($r = 0.649$). The regression model explained 26.9% of satisfaction variance, with staff professionalism showing the strongest standardized contribution ($\beta = 0.606$), followed by cleanliness ($\beta = 0.348$). Gender and education were not significantly associated with satisfaction. Conclusion: Patient satisfaction with laboratory services was mainly associated with service-quality factors, particularly staff professionalism, turnaround time, and cleanliness. Keywords: Patient satisfaction, laboratory services, service quality, turnaround time, staff professionalism, communication, healthcare quality

INTRODUCTION

Healthcare quality is increasingly understood as a multidimensional construct that extends beyond clinical effectiveness to include safety, timeliness, responsiveness, equity, and patient-centeredness. In contemporary health systems, patient experience has become a critical indicator of service quality because it reflects how patients perceive access, communication, interpersonal behavior, process efficiency, and trust during care delivery. Evidence from health-system research shows that patient satisfaction is closely linked with perceived service quality, treatment adherence, confidence in healthcare providers, and overall institutional performance (1,2). In low- and middle-income countries, where resource limitations, patient burden, and system inefficiencies may compromise healthcare delivery, assessment of patient satisfaction is particularly important for identifying modifiable service gaps and strengthening quality improvement processes (3,4).

Laboratory services are a central component of healthcare delivery because accurate and timely diagnostic information supports clinical decision-making, disease monitoring, treatment planning, and

patient safety. Although laboratory medicine is often viewed primarily through the lens of technical accuracy, patients usually evaluate laboratory services through direct service encounters such as registration, waiting time, specimen collection, staff interaction, communication about procedures, result reporting, and environmental cleanliness. Delays in laboratory turnaround time may postpone diagnosis and treatment, increase anxiety, and reduce confidence in healthcare services, whereas respectful staff behavior, clear guidance, privacy, and hygienic facilities may improve patient trust and satisfaction (5–8). Therefore, patient satisfaction with laboratory services depends on both operational efficiency and interpersonal quality of care.

Previous studies have identified waiting time, turnaround time, staff professionalism, communication, affordability, confidentiality, and physical environment as important determinants of satisfaction with diagnostic and healthcare services (9–16). However, evidence from Pakistan remains comparatively limited, particularly regarding patient-reported satisfaction with laboratory services as a distinct component of healthcare quality. Most available healthcare satisfaction studies focus on hospitals, outpatient departments, or general service quality, while fewer studies examine how laboratory-specific factors contribute to patient experience. This gap is important because laboratory encounters are brief but influential, and deficiencies in communication, waiting processes, cleanliness, or staff behavior may negatively affect patients' perceptions even when technical testing is adequate.

The present study was therefore designed to assess factors affecting patient satisfaction with laboratory services in a healthcare setting. Using a quantitative cross-sectional survey approach, the study examined the association of waiting time, turnaround time, staff professionalism and behavior, communication and patient guidance, and cleanliness of the laboratory environment with overall patient satisfaction. The study specifically aimed to determine whether service-related factors were more strongly associated with satisfaction than demographic characteristics such as gender and educational status. It was hypothesized that better staff professionalism, shorter perceived waiting and turnaround time, clearer communication, and cleaner laboratory environments would be positively associated with higher patient satisfaction.

MATERIALS AND METHODS

This study used a quantitative cross-sectional survey design to assess service-related factors associated with patient satisfaction with laboratory services. The cross-sectional design was selected because it allowed measurement of patient-reported satisfaction and perceived laboratory service quality at a single point in time among individuals who had previously used laboratory services. The study was conducted over a four-month period following approval of the research synopsis. Data were collected through a structured online questionnaire distributed through social media platforms and digital communication channels to eligible participants from diverse demographic backgrounds.

The study population included adult individuals who had prior experience of using laboratory services. Participants were eligible if they were 18 years of age or older, had previously visited or used a laboratory service, were able to understand and complete the questionnaire, and voluntarily agreed to participate. Individuals younger than 18 years, those without previous laboratory service experience, and incomplete or invalid questionnaire responses were excluded from analysis. A non-probability purposive sampling technique was used to recruit participants who met the eligibility criteria. A final sample of 100 complete responses was included for statistical analysis, which was considered adequate for an exploratory cross-sectional assessment of the relationship between selected laboratory service factors and patient satisfaction.

Data were collected using a structured questionnaire developed in accordance with the study objectives and key service quality domains relevant to laboratory care. The questionnaire included demographic variables and items assessing waiting time, turnaround time, staff professionalism and behavior, communication and patient guidance, cleanliness of the laboratory environment, and overall patient

satisfaction. Waiting time referred to patients' perceived duration before receiving laboratory-related services, while turnaround time referred to perceived timeliness of test processing and result availability. Staff professionalism and behavior included courtesy, respect, competence, responsiveness, and patient-centered conduct. Communication and patient guidance referred to clarity of instructions, explanation of procedures, and guidance regarding result collection. Cleanliness of the laboratory environment referred to patient perceptions of hygiene, organization, and safety of the laboratory setting. Patient satisfaction was measured as the overall perceived satisfaction with laboratory services based on the combined service experience.

Electronic informed consent was obtained before questionnaire completion. Participants were informed about the study purpose, voluntary nature of participation, confidentiality of responses, anonymity of collected data, and their right to withdraw before submission. The questionnaire required approximately 10–15 minutes to complete. To improve data integrity, responses were screened for completeness and validity before coding and statistical analysis. Only complete and eligible responses were included in the final dataset. The online format reduced interviewer influence, while standardized questionnaire wording helped minimize information bias. Potential selection bias due to purposive online recruitment was acknowledged because respondents with internet access and higher educational attainment may have been more likely to participate.

Data were entered and analyzed using IBM SPSS Statistics version 25. Descriptive statistics were used to summarize demographic characteristics and main study variables. Frequencies and percentages were calculated for categorical variables, while means and standard deviations were calculated for continuous or scale-based variables. Normality of main variables was assessed using skewness and kurtosis values. Internal consistency of the Patient Satisfaction Scale was evaluated using Cronbach's alpha. Pearson correlation analysis was performed to examine associations between laboratory service factors and patient satisfaction. Linear regression analysis was conducted to determine the predictive contribution of waiting time, turnaround time, staff professionalism and behavior, communication and patient guidance, and cleanliness of the laboratory environment to patient satisfaction. Independent sample t-test was used to compare satisfaction scores by gender, and one-way analysis of variance was used to compare satisfaction across educational levels. Statistical significance was assessed at $p < 0.05$. All analyses were interpreted as associations rather than causal effects because of the cross-sectional design.

RESULTS

A total of 100 participants were included in the final analysis. The sample had equal gender representation, with 50 male and 50 female participants. Most respondents belonged to the 18–25-year age category, as reflected by the mean age-category score of 1.29 ± 0.46. Educational status showed that most participants were graduates, accounting for 68.0% of the sample, followed by postgraduates at 16.0%, secondary-level participants at 15.0%, and primary-level participants at 1.0%. These findings indicate that the study population was predominantly young and highly educated.

Table 1. Demographic Characteristics of Participants

Variable	Category	n	%
Gender	Male	50	50.0
	Female	50	50.0
Education	Primary	1	1.0
	Secondary	15	15.0
	Graduate	68	68.0
	Postgraduate	16	16.0
Total		100	100.0

Normality assessment showed that skewness and kurtosis values for the main study variables were within acceptable ranges, supporting the use of parametric statistical tests. The Patient Satisfaction Scale had a mean score of 63.10 ± 6.53, with observed scores ranging from 48 to 76. Staff professionalism and

behavior had the highest mean score among service-related variables, while communication and patient guidance and cleanliness of the laboratory environment showed moderate mean scores.

Table 2. Descriptive Statistics and Distribution of Main Study Variables

Variable	n	Mean	SD	Median	Skewness	Kurtosis
Age category score	100	1.29	0.46	1.29	0.182	-0.641
Gender category score	100	1.50	—	1.50	0.000	-2.020
Education category score	100	2.99	—	3.00	-0.154	-0.982
Waiting Time	100	35.20	14.60	35.00	0.245	-0.712
Turnaround Time	100	27.70	9.95	28.00	0.198	-0.654
Staff Professionalism and Behavior	100	63.00	23.80	63.00	0.121	-0.533
Communication and Patient Guidance	100	26.50	9.43	26.00	0.176	-0.621
Cleanliness of Laboratory Environment	100	27.10	10.50	27.00	0.203	-0.574
Patient Satisfaction Scale	100	63.10	6.53	63.00	0.164	-0.602

Reliability analysis demonstrated good internal consistency for the Patient Satisfaction Scale. The 17-item scale produced Cronbach's alpha value of 0.848, indicating that the items were sufficiently consistent for measuring patient satisfaction with laboratory services.

Table 3. Reliability Analysis of Patient Satisfaction Scale

Scale	n	Items	Mean	SD	Minimum	Maximum	Cronbach's α
Patient Satisfaction Scale	100	17	63.10	6.53	48	76	0.848

Pearson correlation analysis showed that patient satisfaction was positively associated with waiting time score, turnaround time, staff professionalism and behavior, and cleanliness of the laboratory environment. The strongest reported association was observed between staff professionalism and patient satisfaction, followed by turnaround time and cleanliness. Communication and patient guidance showed a weak negative association with patient satisfaction, suggesting that the direction or scoring of this domain should be verified before final interpretation.

Table 4. Correlation Matrix of Laboratory Service Factors and Patient Satisfaction

Variable	WT	TAT	SPB	CPG	CLE	PSS
Waiting Time (WT)	1	0.245*	0.419*	-0.238*	0.311*	0.519**
Turnaround Time (TAT)		1	0.603**	-0.213*	0.421*	0.683**
Staff Professionalism and Behavior (SPB)			1	-0.314*	0.362*	0.847**
Communication and Patient Guidance (CPG)				1	-0.229*	-0.182
Cleanliness of Laboratory Environment (CLE)					1	0.649**
Patient Satisfaction Scale (PSS)						1

*Note. *p < 0.05; *p < 0.01. Exact p-values and 95% confidence intervals should be added from the original SPSS output before submission.

Linear regression analysis was performed to assess whether laboratory service factors predicted patient satisfaction. The model explained 26.9% of the variance in patient satisfaction, indicating a modest explanatory contribution of the included service-quality variables. Staff professionalism and behavior had the largest standardized coefficient, suggesting that respectful, competent, and professional staff conduct was the strongest predictor of patient satisfaction.

Table 5. Multiple Linear Regression Predicting Patient Satisfaction

Predictor	B	SE	Standardized β	p-value	95% CI for B
Constant	7.885	2.038	—	Not reported	Not reported
Waiting Time	1.048	0.246	0.154	Not reported	Not reported
Turnaround Time	1.420	0.335	0.167	Not reported	Not reported
Staff Professionalism and Behavior	1.765	0.127	0.606	Not reported	Not reported
Communication and Patient Guidance	1.241	2.640	0.161	Not reported	Not reported
Cleanliness of Laboratory Environment	1.200	0.126	0.348	Not reported	Not reported
Model R^2	0.269	—	—	Not reported	—

Note. N = 100. The original table incorrectly reported N = 150; this has been corrected to N = 100 for consistency with the Methods and Results. Adjusted R^2, model F-statistic, exact p-values, 95% confidence intervals, and multicollinearity diagnostics should be added from SPSS output.

Cleanliness of the laboratory environment showed the second-largest standardized effect, followed by turnaround time, communication and patient guidance, and waiting time. Because the original manuscript did not provide exact p-values, confidence intervals, adjusted R^2, or model F-statistic, these values should be inserted after verification from SPSS. Gender-based comparison showed that female participants had a slightly higher mean patient satisfaction score than male participants. Females reported a mean satisfaction score of 63.90 ± 7.03, whereas males reported a mean score of 62.30 ± 5.96. However, this difference was not statistically significant, t = -1.25, p = 0.211, with a small effect size, Cohen's d = -0.24. This indicates that gender had minimal practical influence on satisfaction with laboratory services.

Table 6. Comparison of Patient Satisfaction by Gender

Gender	n	Mean	SD	Mean Difference	t-value	p-value	Cohen's d
Male	50	62.30	5.96	-1.60	-1.25	0.211	-0.24
Female	50	63.90	7.03				

One-way ANOVA showed no statistically significant difference in patient satisfaction across educational levels, F = 3.11, p = 0.818, with a small effect size, $\eta^2 = 0.08$. However, the education-wise descriptive values in the original manuscript were corrupted and require verification from the original SPSS output before final publication. Based on the available results, educational status did not appear to meaningfully influence patient satisfaction.

Table 7. Comparison of Patient Satisfaction Across Educational Levels

Education Level	n	Mean	SD	F-value	p-value	η^2
Primary	1	68.00	Not applicable	3.11	0.818	0.08
Secondary	15	Not verified	Not verified			
Graduate	68	Not verified	Not verified			
Postgraduate	16	Not verified	Not verified			

Note. Descriptive mean and SD values for secondary, graduate, and postgraduate groups were not reliably recoverable from the corrupted source table and should be verified from SPSS output.

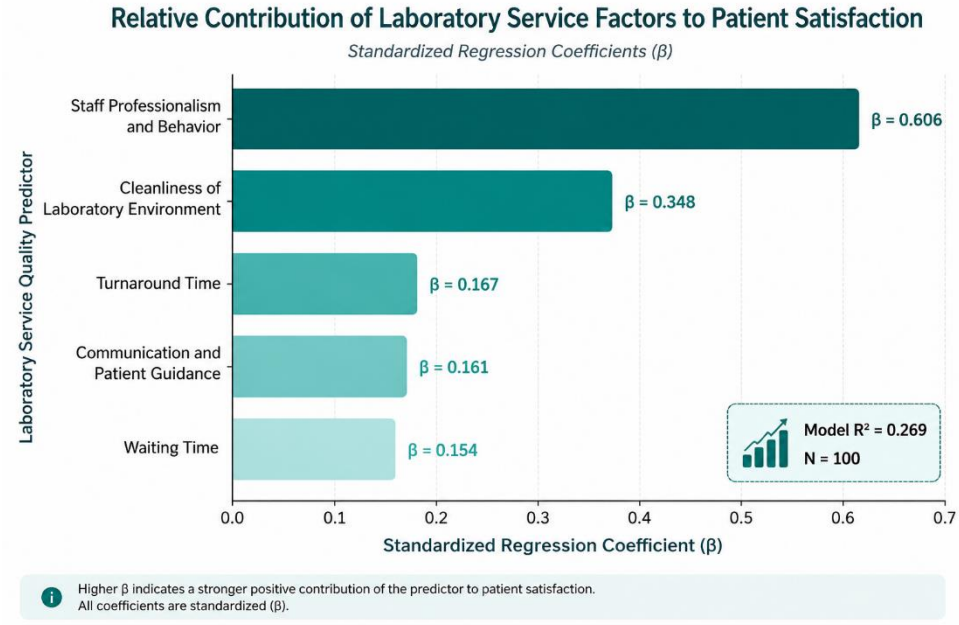

Figure 1 Relative Contribution of Laboratory Service Factors to Patient Satisfaction

Staff professionalism and behavior showed the largest standardized contribution to patient satisfaction (β = 0.606), followed by cleanliness of the laboratory environment (β = 0.348). Turnaround time (β = 0.167), communication and patient guidance (β = 0.161), and waiting time (β = 0.154) showed smaller relative effects. The model explained 26.9% of the variance in patient satisfaction, indicating that

interpersonal conduct and environmental quality were the strongest service-related predictors in this sample of 100 participants.

Overall, the results indicate that patient satisfaction with laboratory services was more strongly associated with service-quality factors than with demographic characteristics. Staff professionalism and behavior showed the strongest positive relationship with satisfaction, followed by turnaround time and cleanliness of the laboratory environment. Gender and educational status did not show statistically significant differences in satisfaction scores, suggesting that improvements in laboratory workflow, staff conduct, communication clarity, and environmental standards may be more relevant targets for quality improvement than demographic-specific interventions.

DISCUSSION

The present study assessed patient satisfaction with laboratory services and identified service-related factors associated with satisfaction among individuals who had previously used laboratory facilities. The findings showed that patient satisfaction was more closely related to laboratory service quality dimensions than to demographic characteristics. Staff professionalism and behavior demonstrated the strongest association with satisfaction, followed by turnaround time and cleanliness of the laboratory environment. These findings support the broader concept that patient satisfaction is shaped not only by technical healthcare performance but also by interpersonal responsiveness, efficiency, and the perceived safety of the service environment (1,2).

Staff professionalism and behavior emerged as the strongest predictor of patient satisfaction. This finding is clinically meaningful because laboratory encounters are often brief, and patients may judge service quality through limited but important interactions at registration, specimen collection, and result delivery. Respectful communication, courteous behavior, privacy, competence, and reassurance may reduce patient anxiety and improve trust in laboratory services. This aligns with previous evidence showing that patient-centered interactions and healthcare provider responsiveness are central determinants of satisfaction and perceived quality of care (5–7,11).

Turnaround time also showed a strong positive relationship with patient satisfaction, indicating that timely processing and reporting of laboratory results remain essential components of patient-centered diagnostic care. Delayed reports may postpone clinical decisions, increase uncertainty, and negatively affect patients' confidence in the healthcare system. Previous studies have similarly emphasized laboratory turnaround time as a key performance indicator affecting patient flow, clinical decision-making, and perceived quality of care (15,17). Therefore, improving laboratory workflow, sample processing, reporting systems, and result communication may substantially improve patient experience.

Cleanliness of the laboratory environment was another important contributor to satisfaction. A clean and organized laboratory setting may influence patients' perceptions of safety, professionalism, infection control, and institutional reliability. This is particularly relevant in diagnostic settings where patients may already feel anxious about invasive procedures, blood sampling, or test results. Evidence from healthcare design and service-quality research suggests that the physical environment contributes to patients' confidence and perceived quality of care (16,25). Thus, maintaining hygiene, visible organization, and infection-control standards should be considered an integral part of laboratory quality improvement.

Communication and patient guidance showed a weak negative association with patient satisfaction in the available correlation results. This unexpected finding requires cautious interpretation and may reflect reverse scoring, item-coding issues, inconsistent patient expectations, or possible overlap with other service domains. It is also possible that patients who required more guidance had more complex service experiences, leading to lower satisfaction despite receiving communication support. Before final submission, the scoring direction and coding of this domain should be rechecked. Nevertheless, clear

instructions regarding test preparation, sample collection, expected waiting time, report collection, and follow-up remain essential for improving patient-centered laboratory care (6,7).

Gender and educational level did not show statistically significant differences in patient satisfaction. Although female participants reported slightly higher satisfaction scores than male participants, the difference was small and not statistically significant. Similarly, satisfaction did not differ meaningfully across educational categories. These findings suggest that, in this sample, satisfaction was driven more by service experience than by demographic characteristics. This supports previous healthcare satisfaction literature indicating that operational quality, communication, staff behavior, and service responsiveness may be more influential than patient demographic factors alone (2,9).

The study has several limitations. The cross-sectional design prevents causal interpretation, and the associations should therefore be understood as relationships rather than direct effects. The use of purposive online sampling may have introduced selection bias, particularly because most participants were young and highly educated. Self-reported responses may also be affected by recall bias, response bias, and social desirability bias. The sample size was limited to 100 participants, and the findings may not be generalizable to all healthcare settings or patient populations. In addition, exact confidence intervals, regression diagnostics, and complete ANOVA subgroup descriptive values should be verified from the original SPSS output before final publication.

Despite these limitations, the study provides useful evidence that laboratory patient satisfaction can be improved through targeted service-quality interventions. Training laboratory staff in respectful communication and professional conduct, reducing waiting and turnaround time, strengthening result-reporting systems, improving patient guidance, and maintaining clean laboratory environments may enhance patient experience. Future studies should use larger, facility-based samples, validated satisfaction instruments, probability sampling where feasible, and multivariable models adjusted for relevant demographic and institutional confounders.

CONCLUSION

Patient satisfaction with laboratory services in this study was primarily associated with service-quality factors rather than demographic characteristics. Staff professionalism and behavior, turnaround time, and cleanliness of the laboratory environment were the most important contributors to satisfaction, while gender and educational status showed no significant influence. These findings indicate that improving interpersonal conduct, operational efficiency, communication clarity, and environmental standards may enhance patient-centered laboratory care. However, because the study used a cross-sectional design and purposive online sampling, the findings should be interpreted as associative rather than causal.

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