

Patients and Clinicians Satisfaction with Clinical Laboratory Services at a Tertiary Care Hospital: A Cross-sectional Study

Bi A KHADEJA¹, SANTHOSH VISWAN², A KAVIYATHENDRAL³, SUGANYA SASIKUMAR⁴



ABSTRACT

Introduction: Clinical laboratories are an essential part of the healthcare system providing vital information required for patient's care. As the importance of monitoring the satisfaction status is becoming necessary and no data regarding the same is available in this region, so present study was designed to implement it in the institution.

Aim: To estimate the clinicians and patients satisfaction status with the services provided by the Central Clinical Laboratory, Karpaga Vinayaga Institute of Medical Sciences and Research Centre (CCL-KIMS and RC) in Kanchipuram District, Tamil Nadu, India.

Materials and Methods: A cross-sectional study was conducted in the Central Clinical laboratory, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, a tertiary care Medical college hospital in Kanchipuram district, Tamil Nadu, India between April 2019 to December 2019 in three phases including a total of 150 clinicians and 150 patients. The patient's satisfaction status was assessed using questionnaires by the investigator. Self-administered structured questionnaire was used for determining the clinician's satisfaction status. Likert scale was used and the mean score of satisfaction for each, patients and clinician was calculated. Data entry and analysis was done using Statistical Package for the Social Sciences (SPSS) 25.0 V software. Chi-square test was used to find out the association between satisfaction status and the

different attributes. Spearman's correlation was performed to assess the relationship between the satisfaction status and the different phases of the study.

Results: In present study, the mean age of patients was 38.0 ± 11.6 years and clinicians 42.9 ± 8.7 years, respectively. Majority of participants among patients were females 82 (54.7%), and clinicians were males 105 (70%). Among patients 95% were married 63.3%, 135% came from the middle category of socio-economic status (90), while 122% resided in the semi-urban area 81.3%. 101 of the clinicians (67.3) had an experience of more than three years at KIMS and RC. Overall 131 (87.3) of the patients and 106 (70.7) of the clinicians were satisfied with the services provided by the central clinical laboratory at KIMS and RC. An improvement in the satisfaction status of the patients and clinicians from phase I to III was observed. Around $n=19$ (12.7%) and $n=44$ (29.3%) of the patients and clinicians were dissatisfied with the laboratory services.

Conclusion: In the present study, the overall level of patients and clinicians satisfaction status was high and satisfactory. An improvement in the observed satisfaction status from phase I to III was attributed to the trainings given to the laboratory staff on the international standards of laboratory management. Domains like the turn around time, interface of laboratory and hospital information system and waiting time for specimen collection required improvement.

Keywords: Attitude of health personnel, Clinical laboratory standards, Patient care, Quality assurance, Quality improvement tool

INTRODUCTION

Clinical laboratories are an essential part of the healthcare system providing important information required for patient's care [1-3]. Customer satisfaction with the services provided in a medical laboratory is one among the 12 quality essentials of Total Quality Management System (TQMS). It is emphasised by all the standards for quality assurance including ISO 17025, ISO 15189 and ISO 9001 [4]. Customers' satisfaction is an expression of the gap between the expected and perceived characteristics of a service. Customers reviewing a healthcare facility are patients, their relatives, physicians, paramedical staff, health officials, communities and interested parties [4].

In developing countries services from the healthcare sectors have an overwhelming work load, due to which the focus on the concept of quality in the care provided is neglected, although it is the right of the beneficiary [5]. Needs of patients should be taken into account, as the assumption, of them to be uneducated with few options for healthcare services is invalid. They are well educated and aware of the healthcare choices. Recently, accreditation bodies for a hospital or a clinical laboratory emphasise on the beneficiaries' role in the

improvement of the services provided [6,7]. It is in contrast to the traditional assessment of healthcare which emphasised on technical improvements only [8,9].

The customer is the king in medical laboratory services and their satisfaction is core in quality of healthcare delivered. Services provided are meaningless when it does not satisfy its users. Periodically analysing patients and clinicians satisfaction with the healthcare services provided has a vital role in prioritising the funds and implementing the essentials required for the laboratory in a timely manner [4].

Patients are referred as the main value of the clinical environment. They are the reason for all works and therefore work cannot be done without them. Patient's satisfaction has a positive effect on their recovery from illness, patient's willingness to follow-up in the same institution, appropriate clinical care by physicians and job satisfaction for all healthcare personnel [8,10]. Customer satisfaction gives an opportunity to identify the deficiencies between the expected versus received care. Comforting and reassuring the apprehensive patients prior to sample collection by a well trained phlebotomist who is the first person a patient meets in the laboratory was found to be an effective factor in ascertaining patient satisfaction [7].

The best way of measuring and improving the quality of laboratory service is to take into account the valuable suggestions by the test requesting clinician who is the prime user of the laboratory [11]. The 70% of all medical decisions are based on laboratory results [1]. The reports generated from the laboratory gives an added value to the clinical expertise for prompt decision making by the clinician and to minimise guess work.

Quality and improvement in healthcare without considering the medical laboratory service is incomplete. The quality improvement in healthcare is mainly proven by the high quality of medical laboratory results [9,12]. It also aids in providing better service, remain in competition with other hospitals, participating confidently in recognition and accreditation programs [5,13]. Poor infrastructure, shortage of supplies, lack of trained technical staff, ineffective equipment maintenance and material-man power mismanagement are some of the problems faced by the laboratories in rural locality [1]. Satisfied services needs team work among all healthcare workers [14-16].

Patient and clinician satisfaction assists in the evaluation of healthcare services from the beneficiaries' point of view. As the importance of monitoring the satisfaction status is becoming necessary and no data regarding the same is available in this region, hence, present study was designed to estimate the patients and clinicians satisfaction status with the services provided by CCL-KIMS and RC.

MATERIALS AND METHODS

A cross-sectional study was conducted in the Central Clinical laboratory, at Karpaga Vinayaga Institute of Medical Sciences and Research Centre (CCL-KIMS and RC), a tertiary care Medical college Hospital in Kanchipuram district, Tamil Nadu, India between April 2019 to December 2019. The study was conducted with prior approval from the Institutional Ethics committee (IEC Ref No. KIMS/SUG/2019/05). The laboratory caters to the people from the surrounding 20 villages around it in the disciplines of clinical chemistry, pathology and microbiology. The laboratory functions 24*7 and on all days.

Inclusion criteria: All available clinicians in KIMS and RC who regularly required laboratory investigations to be performed for their patients and agreed to participate in the study were included. All patients above the age of 18 years who were willing to participate in the study were included randomly and interviewed after completing their laboratory examinations upon leaving the hospital. Patients availing laboratory services between 08.00 AM-05.00 PM were only included in the study.

Exclusion criteria: Patients and clinicians not willing to participate in the study were excluded.

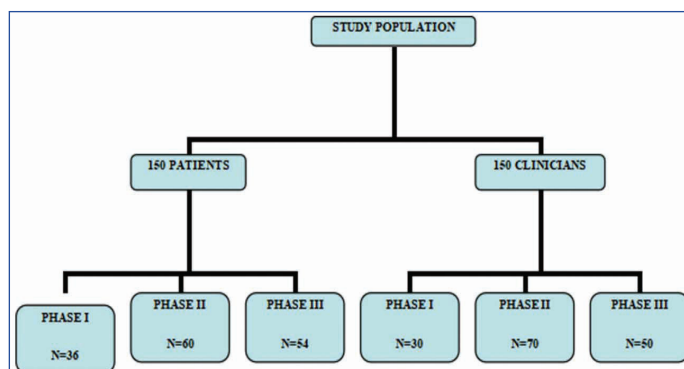
Sample size calculation: The required sample size for the participants was determined by using a single population formula considering the following assumptions: proportion of 87.6% level of significance=0.05, margin of error (d)=5% and a non respondent rate of 10%. The calculated sample size for the study was 150 patients and 150 clinicians [1].

Study Procedure

A written consent for participation in the study was obtained after the study objectives were explained to each participant. The study period of nine months was divided into three phases, phase I (April- June), phase II (July-September) and phase III (October-December) respectively to ensure guiding and addressing the issues requiring improvements then and there throughout the study. Data collection and methodology employed was uniform during all the three phases of the study. ISO 15189:2012 is

a standard available for quality and competence testing in a medical laboratory. ISO 15189: 2012 and feedbacks from the participants were used as a guide to identify the existing gaps and to implement the improvements during the study period. Training and implementation on all the different clauses was done based on ISO 15189: 2012 [17].

The [Table/Fig-1] depicts the number of participants enrolled during the three phases of the study. Modified patient and clinician satisfaction questionnaires were used for data collection. These questionnaires were developed after referring to a validated published survey tool from the CAP Q-Probes program [18]. Adaptation to the questionnaire was done by the senior consultants from the department of biochemistry, KIMS and RC. The patient's satisfaction questionnaire contained 15-items. Socio-demographic details of the patients (marital status, education, occupation, income, socio-economic status by Standard of Living Index (SLI) scale [19], residence, language, number of times patient has visited and availed the hospital services) were collected through face-to-face interviews by the investigator and the satisfaction survey was carried out using paper based questionnaires. A 12-items paper based clinician's satisfaction questionnaire was distributed to the participating clinicians and was collected the same day [18]. The questionnaire was standardised and validated by piloting on 10 patients and 10 clinicians. Details like number of years working in KIMS and RC and department to which the clinician belonged were collected as profile from the clinicians.



[Table/Fig-1]: Distribution of study population.

A 5-point and 3-point Likert scale was used for clinician's and patient's satisfaction questionnaires respectively. 1-Very satisfied, 2-Satisfied, 3-Neutral, 4-Dissatisfied, 5-Very dissatisfied was employed for clinicians and 1-satisfied, 2-neutral and 3-dissatisfied was employed for patients. The mean score of satisfaction for each patient and clinician was calculated as the average of all satisfaction domains. A mean score of less than 2 was taken as patient's perceived satisfaction and a score of more than or equal to 2 was taken as patient's perceived dissatisfaction. A mean score of less than 3 was taken as clinician's perceived satisfaction and a score of more than or equal to 3 was taken as clinician's perceived dissatisfaction.

Participants were informed to attend all the questions and tick the appropriate option mentioned in the questionnaire. Suggestions/recommendation for improvement from the current laboratory practice from the participants were documented in the comments section of both the questionnaires.

STATISTICAL ANALYSIS

Data entry and analysis was done using SPSS software version 25.0. Socio-demographic variables were analysed as percentages. Association of the variables with the satisfaction status was checked with Chi-square test. The p-value <0.05 was considered to be statistically significant. Spearman's correlation was performed

to assess to relationship between the satisfaction status with the different phases of the study participation.

RESULTS

In this study, the mean age of patients was 38.0 ± 11.6 years (range: 19-66). Majority of participants among patients were females $n=82$ (54.7%) and $n=68$ (45.3%) of the patients were males.

In [Table/Fig-2] among patients 95 (63.3%) were married and 53 (35.3%) were graduated, 17 (11.3%) of the patients were unemployed whereas 54 (36%) were professionals and 135 (90%) came from the middle category of socio-economic status while 122 (81.3%) resided in the semi-urban area. It was observed that 116 (77.3%) of patients spoke Tamil. The 13 (8.7%) of patients said that they had visited the hospital services more than thrice. Around two thirds of the patients 93 (62%) had visited the hospital services more than once.

Socio-demographic profile of patients	Number	Percentage
Marital status		
Single	55	36.7
Married	95	63.3
Education		
Illiterate	10	6.7
Primary	20	13.3
Higher secondary	47	31.3
Graduation degree	53	35.3
Professional	20	13.3
Occupation [18]		
Unemployed	17	11.3
Semi-skilled	24	16
Skilled	37	24.7
Professional	54	36
Others	18	12
Income (INR)		
<1000	31	20.7
1000-10,000	24	16
10,000-20,000	45	30
20,000-50,000	42	28
>50,000	8	5.3
Socio-economic status [18]		
Lower	9	6
Middle	135	90
Higher	6	4
Residence		
Rural	17	11.3
Semi-urban	122	81.3
Urban	11	7.3
Language		
Tamil	116	77.3
Telugu	15	10
Urdu	16	10.7
Others	3	2
No. of patient's visit to the hospital services		
1	57	38
2	56	37.3
3	24	16
>3	13	8.7

[Table/Fig-2]: Socio-demographic profile of patients.

According to [Table/Fig-3] the clinician's profile have mean age of clinicians was 42.9 ± 8.7 years (range: 28-67). The clinicians were males with 105 (70%) while 45 (30%) were females.

Profile from the clinicians	Number	Percentage
No. of years working in KIMS and RC		
1	3	2
2	11	7.3
3	35	23.3
>3	101	67.3
Departments to which the clinicians' belonged		
Anaesthesiology	16	10.7
Emergency Medicine	6	4.0
ENT	10	6.7
General Surgery	12	8.0
Intensive Care Unit	6	4.0
Medicine	12	8.0
Obstetrics and Gynaecology	12	8.0
Oral and Maxillofacial Surgery	8	5.3
Ophthalmology	10	6.7
Oral Medicine	8	5.3
Orthopaedics	12	8.0
Paediatrics	12	8.0
Pedodontics	8	5.3
Psychiatry	12	8.0
Radiology	6	4.0

[Table/Fig-3]: Clinical profile of the clinicians included in the study. Anaesthesiologist were the majority amounting to 10.7% (n=16) of clinicians.

The [Table/Fig-4] describes the association between the socio-demographic variables and satisfaction status of the patients and clinicians. Among the socio-demographic variables considered, marital status of patients (p -value=0.04) and gender of clinicians (p -value=0.002) was found to be significantly associated with the satisfaction status. This implied that married patients and male clinicians were more satisfied with the services provided. Patient variables such as age, gender, language, education, occupation, residence, socio-economic status and number of patient visits to the hospital services were not statistically significant.

[Table/Fig-5] depicts that overall 131 (87.3%) of the patients and 106 (70.7%) of the clinicians were satisfied with the services provided by the central clinical laboratory at KIMS and RC. The patients and clinicians dissatisfied with the laboratory services were 19 (12.7%) and 44 (28.7%) respectively. Among the 150 patients and clinicians in each group, who participated in the study, 36 (24%), 60 (40%), 54 (46%) of the patients and 30 (20%), 70 (46%), 50 (34%) of the clinicians were enrolled during the phase I, II and III respectively. Progressive and a statistically significant improvement in the satisfaction status of the patients and clinicians from phase I to III is depicted in [Table/Fig-5]. Conversely there is a reduction in dissatisfaction status from both the groups. As and when the study progressed, as an outcome of the training, the compliance of the employees of the laboratory improved which showed an improvement in the satisfaction levels of both the patients and the clinicians.

Spearman's correlation was performed to assess to relationship between the satisfaction status and the different phases of the study. A statistically significant correlation indicating an improvement in the satisfaction status of the participants is observed in the present study. No significant response was observed for adequacy of test menu on the test request form and turn around time from the clinicians [Table/Fig-6].

Association of the satisfaction scores with the socio-demographic profile of patients							
Variables	n (Satisfied %)	n (Dissatisfied %)	p-value	Variables	n (Satisfied %)	n (Dissatisfied %)	p-value
Age groups in year				Occupation			
24-29	69 (52.5)	12 (63.14)	0.091	Unemployed	14 (82.4)	3 (17.6)	0.643
30-40	23 (85.2)	4 (14.8)		Semi-skilled	22 (91.7)	2 (8.3)	
>40	39 (92.9)	3 (7.1)		Skilled	33 (89.2)	4 (10.8)	
Gender				Professional	48 (88.9)	6 (11.1)	
Male	56 (82.4)	12 (17.6)	0.095	Others	14 (77.8)	4 (22.2)	
Female	75 (91.5)	7 (8.5)		Income (INR/month)			
Language				<1000	24 (77.4)	7 (22.6)	0.447
Tamil	101 (87.1)	15 (12.9)	0.93	1000-10,000	21 (87.5)	3 (12.5)	
Telugu	13 (86.7)	2 (13.3)		10,000-20,000	41 (91.1)	4 (8.9)	
Urdu	14 (87.5)	2 (12.5)		20,000-50,000	38 (90.5)	4 (9.5)	
Others	3 (100)	0		>50,000	7 (87.5)	1 (12.5)	
Marital status				Residence			
Single	44 (80)	11 (20)	0.04*	Rural	13 (76.5)	4 (23.5)	0.278
Married	87 (91.6)	8 (8.4)		Semi-urban	109 (89.3)	13 (10.7)	
Education				Urban	9 (81.8)	2 (18.2)	
Illiterate	8 (80)	2 (20)	0.185	No. of patient's visit to the hospital services			0.055
Primary	16 (80)	4 (20)		1	45 (78.9)	12 (21.1)	
Higher secondary	43 (91.5)	4 (8.5)		2	50 (89.3)	6 (10.7)	
Degree	49 (92.5)	4 (7.5)		3	24 (100)	0	
Professional	15 (75)	5 (25)		>3	12 (92.3)	1 (7.7)	
Socio-economic status							
Lower	8 (88.9)	1 (11.1)	0.94				
Middle	118 (87.4)	17 (12.6)					
Higher	5 (83.3)	1 (16.7)					

Association of the satisfaction scores with Clinicians profile							
Variables	n (Satisfied %)	n (Dissatisfied %)	p-value	Variables	n (Satisfied %)	n (Dissatisfied %)	p-value
Age groups in year				Department			
24-29	2 (50)	2 (50)	0.402	Anaesthesiology	10 (62.5)	6 (37.5)	0.1267
30-40	49 (75.4)	16 (24.6)		Emergency Medicine	6 (100)	0	
>40	55 (67.9)	26 (32.1)		ENT	9 (90)	1 (10)	
Gender				General Surgery	6 (50)	6 (50)	
Male	82 (78.1)	23 (21.9)	0.002*	Intensive Care Unit	4 (66.7)	2 (33.3)	
Female	24 (53.3)	21 (46.7)		Medicine	6 (50)	6 (50)	
No. of years working in KIMS and RC				Obstetrics and Gynaecology	7 (58.3)	5 (41.7)	
1	2 (66.7)	1 (33.3)	0.781	Oral and Maxillofacial Surgery	7 (87.5)	1 (12.5)	
2	7 (63.6)	4 (36.4)		Ophthalmology	6 (60)	4 (40)	
3	27 (77.1)	8 (22.9)		Oral Medicine	6 (75)	2 (25)	
>3	70 (69.3)	31 (30.7)		Orthopaedics	11 (91.7)	1 (8.3)	
				Paediatrics	10 (83.3)	2 (16.7)	
				Pedodontics	4 (50)	4 (50)	
				Psychiatry	8 (66.7)	4 (33.3)	
				Radiology	6 (100)	0	

[Table/Fig-4]: Chi-square test between the socio demographic variables and satisfaction status of patient, clinicians.
 % satisfied - Satisfaction score <2 for patients, <3 for clinicians; % Dis-satisfied - Satisfaction score ≥2 for patients, ≥3 for clinicians; *significance at 0.05 level

Overall satisfaction score	n (participated %)	n (Satisfied %)	n (Dissatisfied %)	p-value
Patients	150 (100)	131 (87.3)	19 (12.7)	
Clinicians	150 (100)	106 (70.7%)	44 (29.3%)	
Phase of participation by patients	n (participated %)	n (Satisfied %)	n (Dissatisfied %)	p-value
I	36 (24)	26 (72.2)	10 (27.8)	0.003*
II	60 (40)	53 (88.3)	7 (11.7)	
III	54 (46)	52 (96.3)	2 (3.7)	

Phase of participation by clinicians	n (participated %)	n (Satisfied %)	n (Dissatisfied %)	p-value
I	30 (20)	18 (60)	12 (40)	0.01*
II	70 (46)	44 (62.9)	26 (37.1)	
III	50 (34)	44 (88)	6 (12)	

[Table/Fig-5]: Chi square test between the phases of participation by patients, clinicians and their satisfaction status.

Patient's questionnaire	Chi-square value	p-value	Rho	p-value
Location of the laboratory in the hospital	27.3	0.0001	-0.399**	0.0001
Working hours of the laboratory	26.05	0.0001	-0.257**	0.002
Attitude and professional conduct of the lab personnel	8.868	0.06	-0.17*	0.038
Availability of laboratory staff during the working hours	33.8	0.0001	-0.462**	0.00001
Adequacy of seats in the waiting room	32.84	0.0001	-0.467**	0.00001
Waiting time for specimen collection	24.22	0.0001	-0.364**	0.00001
Explaining sample collection procedure before the sample collection	23.3	0.0001	-0.386**	0.00001
Number of needle prick attempts	11.83	0.003	-0.382**	0.00001
Any reaction over the phlebotomy site	19.98	0.001	0.260**	0.001
Toilet facility near the laboratory for specimen collection	118.8	0.001	-0.703**	0.00001
Crowd regulation near the counters	46.49	0.0001	-0.485**	0.00001
Length of time taken to report the investigation results	9.38	0.05	-0.240**	0.003
Overall cleanliness of CCL-KIMS and RC	11.29	0.02	-0.212**	0.006
Display of available laboratory tests	23.74	0.0001	-0.370**	0.00001
Doubts and feedbacks from patients were encouraged and addressed by the laboratory staff	50.34	0.0001	-0.458**	0.00001
Clinician's questionnaire	Chi-square value	p-value	Rho	p-value
Adequacy of test menu on test request form	18.26	0.02	-0.028	0.737
Departmentalisation of laboratory services in CCL-KIMS and RC	29.23	0.0001	-0.172*	0.035
Specimen collection by the laboratory technicians	27.51	0.001	-0.339**	0.001
Provision for emergency/urgent investigations	28.54	0.001	-0.391**	0.001
Critical value notification	39.39	0.0001	-0.313**	0.001
Quality/reliability of results from CCL-KIMS and RC	29.26	0.0001	-0.359**	0.001
Turn Around Time (TAT)	21.09	0.007	-0.129	0.116
Prompt notification during introduction of a new investigation	35.99	0.0001	-0.283**	0.001
Availability of working staff during the working hours	33.92	0.0001	-0.336**	0.001
Laboratory's ability to resolve complaints	28.38	0.0001	-0.280**	0.001
Satisfied with the Laboratory Information System (LIS)- Hospital Information System (HIS) interface	20.59	0.008	-0.196*	0.001
Despatch services by the laboratory	64.28	0.0001	-0.469**	0.001

[Table/Fig-6]: Comparison of the satisfaction scores of patients and clinicians in the different phases.

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed)

DISCUSSION

The study was intended to find out patients and clinicians satisfaction status at central clinical laboratory- KIMS and RC. The participants of the study were young, married women predominated as patients. Similar study done by Aleign A and Belay YA also reported the same [10]. Another study by Teklemariam Z et al., concluded that 50% of the population were females [1]. Only 6.7% of our patients were illiterate and 11.3% were unemployed. 90% of our patients were from the middle category of socio-economic status and 81.3% resided in the semi-urban area. The study also concluded that 38% of patients were using the laboratory services for the first time. Among the clinicians 54% were above the age of 40 years and of the total clinicians 30% were females. The average experience of the clinicians at KIMS and RC was more than three years. However this relationship had no impact on the satisfaction status of the laboratory services.

There was an improvement in the patient and clinician's satisfaction score as the study progressed from phase I to III. The study concluded that clinician's satisfaction score was 70.7% which improved from 60% in phase I to 88.2% in phase III (p-value=0.01). This difference may be attributed to the study design with participation involving three phases and also to the sample size in different phases.

The initial clinician's satisfaction score was similar to that observed from Pusan National University hospital in South Korea (58.1%), Millennium medical college (60%) and Nekemte referral hospital (65%) Ethiopia [20-22]. The final satisfaction score from the clinicians was similar to the studies from hospitals in north eastern parts of Ethiopia (80%) and college of American Pathologist Q-probes study of 81 institutions (85.7%) [1,23]. Hailu L et al., [24] observed that 50% of the clinicians were satisfied with the general laboratory services, gender was not associated with satisfaction status, while specialisation was significantly correlated. In the present study gender of the clinicians was associated with satisfaction status while the departments to which they belonged was not associated with the satisfaction status.

Among the different domains assessed in our study, a significant improvement was observed from phase I to phase III by the clinicians for despatch services (Chi-square=64.28, p=0.0001), notification of the critical value (Chi-square=39.39, p=0.0001) and introduction of a new test (Chi-square=35.99, p=0.0001). They were also satisfied with the availability of lab staff during the working hours (Chi-square=33.92, p=0.0001), quality/reliability of laboratory test results (Chi-square=29.26, p=0.0001), departmentalisation of hospital laboratory (Chi-square=29.23, p=0.0001), provision for emergency/urgent test (Chi-square=28.54, p=0.001). In this study

dissatisfaction was observed for Turn Around Time (TAT) and Laboratory Information System- Hospital Interface System (LIS- HIS) interface. Similar studies done by Almatrafi D et al., and Hailu HA et al., also concluded dissatisfaction for TAT from the clinicians [9,25]. The overall patient's satisfaction status was 87.3% and it had improved from 72.2% in phase I to 96.3% during phase III (p-value=0.03). In this study the satisfaction was high among women, especially married women as they were the predominant population using the laboratory services.

Across the three phases a statistically significant improvement was observed predominantly in most of the domains from the patients. Doubts from patients were encouraged and addressed by lab staff (Chi-square=50.34, p=0.0001), crowd regulation in counters (Chi-square=46.49, p=0.0001), lab personnel availability during working hours (Chi-square=33.8, p=0.0001), seating availability in waiting area (Chi-square=32.84, p=0.0001), location of the laboratory (Chi-square=27.3, p=0.0001) were among the most satisfied domains over the three phases. Explanation of procedure by lab personnel before sample collection (Chi-square=23.3, p=0.0001) had improved over the three phases due to the effective trainings conducted to the lab technicians.

Patients in this study were satisfied with the available toilet facility for sample collection. However Qadri SS et al., has reported dissatisfaction for the toilet facility in his study [2]. Fondoh VN et al., observed a statistically significant reduction in the dissatisfaction scores for waiting time (34.9% to 19.3%), issuing of results (22% to 8.1%), specimen collection (21.5% to 13.8%) and duty consciousness (21% to 4.7%) after addressing the feedbacks received from the customers [26]. Similar to this study, they assessed the satisfaction scores for waiting area and explaining sample collection procedure before the sample collection. However, low satisfaction scores were reported from their study. Gupta A et al., reported that 70% of participants were satisfied with the phlebotomy services. However, sitting arrangements in waiting area and knowledge of universal precaution were poor [6]. Dawar R observed that comforting and reassuring the apprehensive patients prior to sample collection by a well trained phlebotomist who is the first person a patient meets in the laboratory was found to be an effective factor in ascertaining patient satisfaction [7]. Factors like poor communication, long waiting periods and repeated pricks were considered as negative experience by the patients thereby decreasing their satisfaction [7]. Service quality, short waiting period to receive test reports, availability of advised lab tests and clean and accessible washrooms and staff behaviour influences patients satisfaction for laboratory services, [11].

However at CCL-KIMS and RC, 12.7% of patients and 29.3% of clinicians were dissatisfied with the laboratory services. The main dissatisfaction was observed for HIS-LIS interface and turn around time from the clinicians and waiting time for specimen collection from the patients.

Limitation(s)

Participants were limited to patients availing services between 08.00 AM-5.00 PM only. Patients coming during the evenings and night could not be included as the services are 24x7.

CONCLUSION(S)

The overall degree of patients and clinicians satisfaction status was 87.3% and 70.7%, although domains like the turn around time, interface of laboratory and hospital information system and waiting time for specimen collection required improvement. It is also concluded that there was an improvement with the satisfaction levels from phase I to III which was attributed to the trainings given to the laboratory staff on the international standards of laboratory management. There were also 12.7% of patients and 28.7% of clinicians who were dissatisfied. Root cause analysis was discussed

with all the stakeholders of the laboratory. Corrective and preventive actions were planned for implementation to improve the overall percentage of satisfaction. Regular studies like this will improve good laboratory practices thereby ensuring quality healthcare system.

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REFERENCES

- [1] Teklemariam Z, Mekonnen A, Kedir H, Kabew G. Clients and clinician satisfaction with laboratory services at selected government hospitals in eastern Ethiopia. *BMC Res Notes*. 2013;6:15. Doi: 10.1186/1756-0500-6-15. PMID: 23324260; PMCID: PMC3556148.
- [2] Qadri SS, Pathak R, Singh M, Ahluwalia SK, Saini S, Garg PK. An assessment of patients satisfaction with services obtained from a tertiary care hospital in rural Haryana. *Intern J Collabo Res Internal Med Pub Health*. 2012;4(8):1524-37.
- [3] Rusanganwa V, Gahutu JB, Hurtig AK, Evander M. Physicians' satisfaction with clinical referral laboratories in Rwanda. *Glob Health Action*, 2020;13(1):1834965. Doi: 10.1080/16549716.2020.1834965.
- [4] Etukudoh NS, Obeta UM. Patient's (Client) satisfaction with medical laboratory services contributes to health and quality improvement. 2021. Doi: 10.5772/intechopen.99290.
- [5] Chattopadhyay A, Saha T, Karmakar P, Sengupta P, Boral K, Yasmin S. Patient satisfaction evaluation in CGHS dispensaries in Kolkata, India. *J Dent Med Sci*. 2013;6(4):13-19.
- [6] Gupta A, Dwivedi T, Sadhana, Chaudhary R. Analysis of Patient's Satisfaction with Phlebotomy Services in NABH Accredited Neuropsychiatric Hospital: An Effective Tool for Improvement. *J Clin Diagn Res*. 2017;11(9):EC05-08. Doi: 10.7860/JCDR/2017/26190.10562. Epub 2017 Sep 1. PMID: 29207713; PMCID: PMC5713735.
- [7] Dawar R. Patient satisfaction of phlebotomy services in a tertiary care hospital. *Int J Curr Res Aca Rev*. 2015;3(6):35-38.
- [8] Obeta UM, Goyin LP, Udenze C, Ojo J. Assessment of job satisfaction indices among health professionals in Jos University teaching hospital: An analytical study. *Journal of Business and Management*. 2019;21(2):38-50.
- [9] Almatrafi D, Altaweel N, Abdelfattah M, Alqazian M, Darrar H, Alomari A, et al. Assessment of Customer Satisfaction with the Clinical Laboratory Services Provided in King Abdullah Medical City, Makkah. *The Egyptian Journal of Hospital Medicine*. 2018;70(11):2029-37.
- [10] Aleign A, Belay YA. Patient satisfaction with clinical laboratory services and associated factors among adult patients attending outpatient departments at Debre Markos referral hospital, Northwest Ethiopia. *BMC Res Notes*. 2019;12(1):517.
- [11] Zaini RG, Zaini RG. Physician's satisfaction from laboratory services in maternity and children hospital in Makkah. *Int J Lab Med Res*. 2014;1:02-09.
- [12] Abera RG, Abota BA, Legese MH, Negesso AE. Patient satisfaction with clinical laboratory services at Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia. *Patient Prefer Adherence*. 2017;11:1181-88.
- [13] Khan G. The impact of healthcare accreditation on patient's satisfaction: A literature review. *International Journal of Health Sciences and Pharmacy*. 2020;4(1):49-56. Doi: http://doi.org/10.5281/zenodo.3862791.
- [14] Obeta MU, Etukudoh NS, Chongs ME, Ime DM. Challenges of inter professional teamwork in Nigerian healthcare. *Interpersonal Relationships*. 2020. Doi: 10.5772/intechopen.95414.
- [15] Obeta MU, Etukudoh NS, Udenze C, and Eze ME. Inter professional teamwork in public organisations, a paradigm shift to crisis in Nigerian hospitals. *London Journal of Medical and Health Research*. 2020;20(3):31-40.
- [16] Ashdown LC. PATIENT: A tool to assist in creating a patient-Centered team approach to health-care delivery: Lessons from a physician patient. *J Patient Exp*. 2020;7(1):16-18. Doi: 10.1177/2374373518812048.
- [17] ISO 15189:2012 Medical laboratories- requirements for quality and competence. 2012. Edition:3, No.of pages: 53.
- [18] Laboratory general checklist. Laboratory accreditation program. North-field, Ill: College of American Pathologist: 2006. GEN.20368.
- [19] Saif-Ur-Rahman KM, Anwar Iqbal, Hasan Md., Hossain Shahed, Shafique Sohana, Haseen Fariha, et al. Use of indices to measure socio-economic status (SES) in South-Asian urban health studies: A scoping review. *Syst Rev*. 2018;7:196. https://doi.org/10.1186/s13643-018-0867-6.
- [20] Koh YR, Kim SY, Kim IS, Chang CL, Lee EY, Son HC. Customer satisfaction survey with clinical laboratory and phlebotomy services at a tertiary care unit level. *Ann Lab Med*. 2014;34(5):380-85.
- [21] Yeshanew AG, Geremew RA, Temesgen MK. Assessment of patient and healthcare workers satisfaction on the laboratory services in St. Paul's hospital millennium medical college, Addis Ababa, Ethiopia. *Int J Sci Rep*. 2017;3(7):192-99.
- [22] Ejeta E, Tadele G, Desalegn M, Abere S, Elias K. Healthcare provider satisfaction with laboratory service of Nekernte referral hospital. *Int J Med Sci*. 2015;7(5):91-97.
- [23] McCall SJ, Souers RJ, Blond B, Massi L. Physician Satisfaction with clinical laboratory services. *Arch Pathol Lab Med*. 2016;140(10):1098-103.

- [24] Hailu L, Mihiretie H, Dabsu R, Demissie D, Hallu W. Clinician's satisfaction and utilization of laboratory services in selected western Ethiopia hospitals Nekemte Ethiopia. *SCIOL Biomed*. 2019;3:136-42.
- [25] Hailu HA, Yalew A, Desale A, Asrat H, Kebede S, Dejene D, et al. Physicians' satisfaction with clinical laboratory services at public hospitals in Ethiopia: A national survey. *PLoS ONE*. 2020;15(4):e0232178.
- [26] Fondoh VN, Awasom CN, Enow-Tanjong R, Fondoh RM, Njukeng P, Shang J, et al. Evaluation of corrective actions of feedback from clinicians on clinical laboratory services at Bamenda Regional Hospital Laboratory, Cameroon. *Afr J Lab Med*. 2020;9(1):843.

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Biochemistry, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Madurantakam, Chengalpattu, Tamil Nadu, India.
2. Professor and Head, Department of Biochemistry, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Madurantakam, Chengalpattu, Tamil Nadu, India.
3. Undergraduate Student, Department of Biochemistry, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Madurantakam, Chengalpattu, Tamil Nadu, India.
4. Assistant Professor, Department of Biochemistry, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Madurantakam, Chengalpattu, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Bi A Khadeja,
GST Road, Karpaga Vinayaga Institute of Medical Sciences and Research Centre,
Maduranthakam, Chengalpattu, Tamil Nadu, India.
E-mail: akhadbi@gmail.com

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