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Original Research Article

Patient's satisfaction and service quality of clinical laboratory: A questionnaire based analysis in accredited tertiary care government hospital

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ABSTRACT

Introduction: The Phlebotomy is the first phase of interaction of the patient to the laboratory. It is therefore considered as an important step of good clinical laboratory practice and is referred to as "pre-analytic phase". Patient's satisfaction is one of the key quality indicators in the laboratory.
Aims & Objectives: To assess the patient's satisfaction , to investigate, monitor, and analyse the non-conformities in order to remove the root cause by performing corrective and preventive action in order to improve the quality of laboratory services.
Materials ad Methods: A cross-sectional study conducted in a NABH/NABL accredited government super-speciality hospital on 1500 patients over a period of three months. Data were collected in a self administered predesigned, pretested, structured questionaired feedback form in both Hindi and English, further reviewed by Senior Pathologist in a quality assurance meet and CAPA.A statistical analysis performed by using SPSS version 16.0 software and Likert Scale.
Result: Overall patient satisfaction with phlebotomy services found to be high, i.e 88%. Highest mean rating of satisfaction was 99.2% for parameter -Whether the seats during phlebotomy was comfortable. The parameter for washroom facility accounted for 75 % dissatisfaction followed by 63.4% overall dissatisfaction noted for ambulatory services. Phlebotomy services needs improvements: 12%.
Conclusion: The study enlighten to understand patient preferences through a patient satisfaction questionnaire known as a "feedback form." Knowing how our patients feel about our laboratory services is vital and to identify all problems (non-conformities) found in the analysis and take appropriate CAPA.

1. Introduction

Total Quality Management (TQM) is described as a quality created and maintained by a team of medical health care personnel of an institution to improve patient's satisfaction. The National Board for Hospital Accreditation (NABH) quality standards also emphasize the role of patients in improving laboratory performance.[1–3] The quality maintenance in NABL & NABH accredited hospitals is quiet challenging in government super-speciality hospitals regarding laboratory services. Patient satisfaction plays a pivotal role in quality management where the number of patients are numerous.

To date, there is no generally accepted definition of patient satisfaction. It is defined as "the degree of agreement between the patient expectations of ideal care and an individual perception of the care actually received."[4] This satisfaction comes from both the healthcare encounter and the accuracy of the results received. Health care personnel should be above the minimum required, to achieve patient satisfaction.

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Phlebotomy is the first phase of interaction of the patient to the laboratory. The patient who is sick, never wants to wait a long time for his or her turn and does not want multiple pricks. Appropriate counselling should be performed before sample collection, and consent should be obtained whenever needed. Throughout the entire process, attention should be paid to the patient's sensibilities. Any error in sample collection can result in incorrect result values and discomfort to the patient. Therefore, it is considered to be a crucial step of good clinical laboratory practise and is termed as "pre-analytical control". Repeated interaction with patients is required to gain their trust and reduce pre-analytical error, particularly in cases of mismatches of sample vials, barcoding, and requisition slips containing patient demographics.

The clinical laboratory ought to have a "Sample collection manual" that provides standard operating procedures (SOP) on patient preparation prior to sample collection , the definite methodology of sampling, labelling, handling, transport, and storage. Also, the clinical laboratories must provide appropriate and reasonable information or instructions to patients when or if necessary. Pre-analytical factors that may alter and affect the test results should be caught up. The manual must provide guidelines on sample collection and preservation of specialised tests such as genetic testing, cytology, and histopathology. These manuals are available for reference and should be used for the ongoing training of personnel involved in sample collection. Samples must be properly secured to prevent leakage, spillage, or contamination. Containers in transit must display the biohazard symbol. If necessary, use an appropriate sample transport kit (to help control temperature and spillage). Sample will be sent to the lab along with the requisition form (signed by the clinician) that should be rechecked while receiving by the technician in charge.

2. Aim of the Study

To assess the patient's satisfaction by visiting the laboratory sample collection centre to investigate, monitor, and analyse the non-conformities in order to remove the root cause by performing corrective and preventive action (CAPA) in order to improve the quality of laboratory services.

3. Materials and Methods

We conducted a hospital based patient's satisfaction survey study on 1500 patients in Janakpuri Super-speciality Hospital, a NABH and NABL-accredited government hospital over a period of six months (January 2020 to June 2020). Ethical clearance was obtained from the institutional research review and ethical board (F.No.2/JSSHS/IEC/ECC-10/2020).

The sample size was calculated by formula:

Margin of error is calculated using a formula = $Z * \sqrt{((p * (1 – p)) / n)}$

We had taken margin of error as 3%, confidence interval of 96% so Z* score was 2.056 and we had no preconceived idea of the value of the sample proportion, so we had used p^ as 0.50. (The calculated minimum sample size came out to be 1200).

The patient or attendant asked to fill a self-administered, predesigned, pretested, structured patient satisfaction questionnaire known as "feedback form", in both Hindi and English languages. These forms were designed by the senior pathologist in charge, specially trained in NABL assessment, along with inputs and advise from hospital administration faculty, senior residents, technical personnel, and obtained from previous studies in the archives.[2,5–7]

The feedback form filled by lab personnel was highly discouraged, unless the patient himself or herself wanted to give feedback and illiterate or unable to write. In such cases, lab personnel were instructed to fill the form on their behalf and write the reason for the same. The patient's personal confidentiality was maintained in accordance with clinical laboratory ethics.

3.1. Inclusion criteria

1. All the patients visiting to Phlebotomy room for sample collection for testing to be performed in Department of Pathology, Microbiology and Biochemistry.
2. The completed duly signed feedback forms submitted by patients or their attendants as the source of data.
3. The patients who have no conflict or disagreement to get enrolled in the present study.

3.2. Exclusion criteria

1. Debilitated, critically ill, mentally challenged, and unconscious patients were excluded.
2. The patients who are not willing to submit their feedback form.
3. The patients who are not willing to get enrolled in the present study.

The phrase "waiting time for phlebotomy" described as "time starting since the patient enters to the sample collection room to the time enrolled for phlebotomy." Ideally, for blood sampling, it should take maximum of 10 minutes.[8–10]

As soon as the patient arrived in the sample collection area, the phlebotomy procedure was explained by our trained phlebotomist. Before leaving the room, the staff at the registration counter politely requested the patient to fill the feedback form by explaining all of the written parameters in simple language. The forms were then collected with gratitude from the patient, followed by proper documentation, countersigned by the receiving technical

staff, and placed in a feedback box. The box was opened weekly by the quality manager, and the lab consultants reviewed the complaint or feedback, notified it, and discussed the same with the resident doctors and technical staff to perform CAPA.

The form consists of 13 questions. A 6- point's Likert scale was used. Qualitative grading was performed by requesting the patients to score from 1 - 6 for all provided parameters i.e. 1- Excellent; 2 -Very good; 3- Good; 4- Average; 5-Poor; 6- Not applicable.

3.3. Statistical analysis

Data analyses were performed with SPSS 16 software. Satisfied or dissatisfied percentages were calculated by dividing the number of satisfied or dissatisfied responses by the total number of patients respectively.[7,11] Satisfactory mean and standard deviation were calculated for each parameter of questionnaire. Also, the 95% confidence interval, mean, and standard deviation were calculated for each scale (i.e., 1-6).

Excellent, very good, and good were considered satisfactory, whereas average and poor were considered unsatisfactory. Facilities that were not available were excluded.

Satisfaction % = No. of satisfactory response×100 / Total no. of patients studied (N)

Dissatisfaction % = No. of satisfactory or dissatisfactory response×100 / Total no. of patients studied (N)

Likert scale was used to calculate overall satisfaction rate:

[n (Excellent) × 5] + [n (V. good) × 4] + [n(Good)× 3] + [n(Avg)× 2]+ [n(Poor) × 1] ×100 / Total No. of the ratings (N=1-5)

n= number, N = Total number

Percentage of each rating (excellent, very good, good, average and poor) was calculated by dividing the number of each rating responses by total number of ratings (N=1-5) = n (each rating responses)× 100 / Total number of ratings (N)

4. Results & Observations

Out of total 1500 patients, 892 were male and 608 were female representing male preponderance (M:F = 1.47:1) and belonged to the wider age group of 11–81 years. Total number of respondents with percentages and Likert scoring with satisfactory mean and standard deviation are shown in survey conducted [Table 1 /Figure 1].

4.1. Satisfaction

In Likert scale, overall satisfaction rate with phlebotomy services was found to be high, i.e. 88% patients were satisfied (excellent, very good and good) with the services.

The mean rate of satisfaction of patients with the phlebotomy services was high; 331.87 (SD 241.25).

Highest mean rating of satisfaction was 99.2% (Mean +- SD; 375 +-333.50) obtained for parameter 12 (Whether the seats during phlebotomy was comfortable) followed by parameter 8,i.e. 99% (Whether sample taken in a single prick). The highest grade "excellent" was most commonly given for parameter 8 i.e. 70%, grade "very good" was most commonly given for parameter 12 i.e 52% and grade "good" was most commonly given for parameter 10 i.e 37%.

4.2. Dissatisfaction

A total of 12% patients with mean value of 98.64(SD 244.15) were found to be dissatisfied (average and poor) with the phlebotomy services. The parameter 9 for washroom facility accounted for 75% dissatisfaction followed by 63.4% overall dissatisfaction noted for ambulatory services. However, amongst them 87% patients were highly dissatisfied with ambulatory services, specially observed with very sick patients, pregnant females, geriatric age group and differently abled patients.

The dissatisfying "average" grade was given to parameter 13 i.e.11.33%, grade "poor " was most commonly given for parameter 9 i.e. 30%.

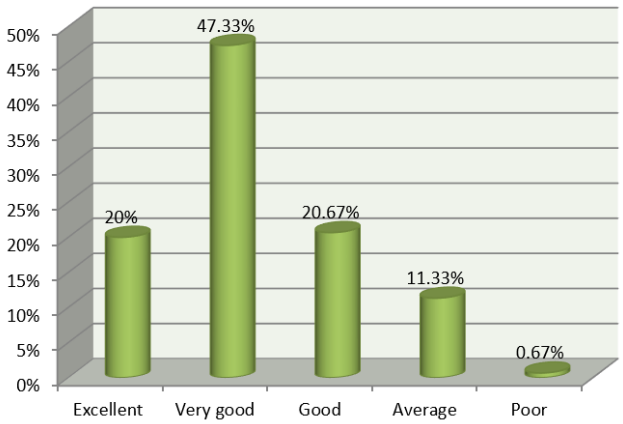

Figure 1: Overall Satisfaction level with phlebotomy services (Parameter 13)

5. Discussion

According to our research, the technical skill of our phlebotomists is the strength of our phlebotomy services and the maximum number of patients i.e., 70% accounted it as an excellent service. The weakness was identified as toilet facilities and ambulatory services for very sick patients.

Our study has been performed in an accredited autonomous government institute, and we are giving more emphasis to continual education on ethical conduct, the value of good communication, job responsibility, as well

Table 1: Likert score and percentage of each parameter and ratings documented in feedback form filled post phlebotomy

S.No.	Parameters	Excellent n(%)	Very good n(%)	Good n(%)	Average n(%)	Poor n(%)	N/A n(%)	Satisfactory Mean Rating +_ SD	Satisfaction n (%)
1	Reception staff	390 (26%)	600 (40%)	405 (27%)	105 (7%)	00	00	375+- 203.84	1395(93%)
2	Ambulatory facility,if any	30 (3%)	100 (10%)	00	00	00	1370(87%)	32.50 +- 47.17	130(36.6%)
3	Investigation was comfortable	450 (30%)	480 (32%)	420 (28%)	45 (3%)	105 (7%)	00	348.75 +- 203.98	1350(90%)
4	Waiting are comfortable and clean	450 (30%)	660 (44%)	345 (23%)	45 (3%)	00	00	375+- 256.03	1455(97%)
5	Waiting time	255 (17%)	540 (36%)	390 (26%)	165 (11%)	150 (10%)	00	337.50+- 163.63	1185(79%)
6	Reports delivered in time	300 (20%)	600 (40%)	450 (30%)	75 (5%)	75 (5%)	00	356.25 +-223.96	1350(90%)
7	Satisfaction with the behaviour of sample collecting staff	300 (20%)	705 (47%)	315 (21%)	150 (10%)	30 (2%)	00	367.50 +- 237.01	1320(88%)
8	Whether Sample taken in a a single prick – Excellent,very good;2 pricks- good;3 pricks-average;4pricks-poor/N/A	1050 (70%)	345 (23%)	90 (6%)	00	15 (1%)	00	371.25 +-475.51	1485(99%)
9	Washroom facility	30 (2%)	45 (3%)	300 (20%)	675 (45%)	450 (30%)	00	262.50 +-301.62	375(25%)
10	Cleanliness of sample collection area and proper PPE was taken	150 (10%)	480 (32%)	555 (37%)	150 (10%)	165 (11%)	00	333.75 +-214.37	1185(79%)
11	The information regarding investigations properly delivered by staff	440 (29.34%)	600 (40%)	305 20.33(%)	110 (7.33%)	45 (3%)	00	363.75 +-207.74	1345(89.6%)
12	Whether the seats during phlebotomy was comfortable	490 (32.66%)	780 (52%)	218 (14.54%)	12 (0.8%)	00	00	375 +-333.50	1488(99.2%)
13	What is your overall Satisfaction level?	300 (20%)	710 (47.33%)	310 (20.67%)	170 (11.33%)	10 (0.67%)	00	372.50+- 233.86	1320(88%)
14	Would you recommend us to others?	660 (44%)	495 (33%)	330 (22%)	15 (1%)	00	00	375 +-275.23	1485(99%)
	Mean +_ SD	378.21+- 261.00	510+- 217.01	316.64+- 141.77	122.64+- 170.82	74.64+- 122.20	97.86+- 366.15	331.87 +- 241.25	1204.60(82.25%)
	95% CI	227.52- 528.91	384.70-635.30	234.79- 398.50	24.01-221.27	4.09-145.20	113.55 – 309.26	-	-
	Minimum Maximum	30 1050	45 780	90 555	12 675	10 450	-	-	-

Table 2: Comparative study performed with archival previous studies.

S.No.	Studies	Satisfaction Rate	Deficiency which need improvement(Gap analysis)
1	Present study (n= 1500)	**Overall Satisfaction: 82 %** Excellent:20 % Very Good: 47.33% Good: 20.67 % **Needs Improvements : 12%** Average: 11.33 % Poor : 0.67 %	Washroom facility; too distant and cleanliness of toilet. Sampling waiting time. Phlebotomy room cleanliness. Ambulatory facility for seriously ill patients.
2	Anshu Gupta et al [12] (2017) (n=1200)	Good- 70.50% Satisfactory: 23.50% Needs Improvements: 6%	Appropriate uniforms, personnel skills and attitude. Sampling waiting time. Phlebotomy room cleanliness .
3	Dawar R et al [2] (2015)	Good- 69% Satisfactory: 24% Needs Improvements: 7%	Capability of the phlebotomist to calm the patient and to answer all querries. Washroom hygiene and comfort zone. Availability of all clinician requested investigations. Phlebotomy technique.
4	Koh YR et al [1] (2014)	Agree: 80.4% Average: 17.3% Disagree: 2.3%	Sampling & transit . Cost per test. Counselling & information regarding the sampling procedure.
5	Teklemariam Z et al [7] (2013)	Overall Satisfaction: 87.6% Excellent:4.5% Very Good: 51.6% Good: 31.5% Fair: 8.8% Poor : 3.6%	Washroom hygiene and location of toilet. Information given and personnel conduct. Laboratory location.
6	Howanitz PJ et al [5] (1991)	-	Discomfort of patient while phlebotomy.

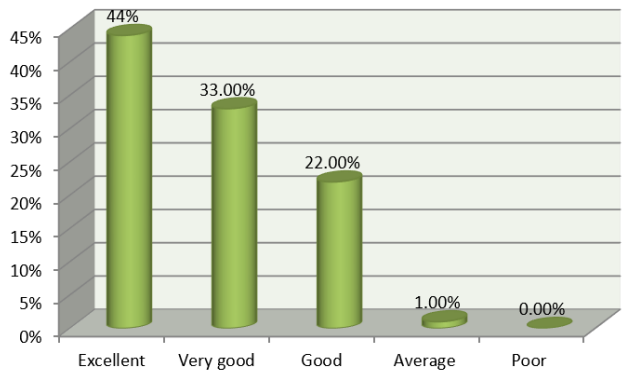

Figure 2: Phlebotomy service recommendation to other patients (Parameter 14)

as patient rights and responsibilities. So the data also revealed that there is no complaint regarding the personal protective equipment used by the technical personnel, and even the security guard followed all the COVID norms very effectively. A security guard was appointed and fully committed to phlebotomy services for directing the patients and to reduce the waiting time, which showed very good satisfaction levels i.e., 44%.

However, for patients who rate their satisfaction high, the phlebotomy services provided must exceed their expectations. Patient's expectations of standard of care vary, so self-rated satisfaction scores are highly subjective and may vary by country, context and socioeconomic determinants.[13,14] Patient's satisfaction as an index of quality of care provided, also depends on how an individual patient perceives the provision of health services throughout their journey of care in lifetime.[15] Various factors can affect patient satisfaction ratings, consisting of doctor-patient relationship, conveyance, information, connection, waiting time and many more. Among above factors, healthcare provider technical skills have been considered to be one of the strongest predictors of satisfaction.[16]

After compiling all the data, complaints were noted and careful observations were made on the ethical, emotional, personal, and financial grounds from which the patient used to suffer during sickness. A root cause analysis was performed, and CAPA was performed. These issues were well discussed with management in the "Quality Assurance Meet." All the data had been critically analyzed, and decisions had been made, especially for ambulatory and toilet facilities [Tables 2 and 3].

Parameter no. 12 i.e., "Whether the seats during phlebotomy was comfortable" and "Whether sample taken in a single prick" received the highest scoring, 99.2 % and 99% satisfaction respectively .Waiting time, the questionnaire parameter 5, being an important indicator of NABL continuous quality improvisation. This parameter received high scores in our survey (79% satisfaction).This particular parameter play a pivotal role in overall satisfaction rate to be high with phlebotomy services in current study.

Our hospital regularly train technical personnel every six months, usually appear to be sufficient for improving skills. However, in terms of "behavioural conduct," more practise needed to be done by providing ethical classes frequently,

Table 3: Corrective and preventive actions taken for phlebotomy services

S.No.	Mode of Complaint	Immediate Action	Root cause/Gap Analysis	Corrective Action	Preventive Action
1	Staff should be polite with the patient	Staff was instructed for maintaining cordial behaviour with patients	Due to work fatigue as increase of patients/attendants	Employees are regularly instructed during visits by the administrator for cordial conduct while handling the patients	Interpersonal training and communication skills are regularly organised.
2	Long waiting time	Matter was discussed with the administration	The number of patients has increased because of viral illness season and also otherwise	More sitting arrangement done	Sitting arrangement is increased to reduce chaos and anxiety in patients while in queue
3	Ambulatory services	Matter was discussed with the administration	Due increase of patients/attendants ,patiently listening to every patients ought to be difficult	Identify the needful patients, severely ill, differently abled and geriatric patient and approach them directly for requirement for ambulatory services	To provide ambulatory services immediately and also for back up. To prioritize ambulatory patient for sample collection
4	Sample collection area not clean	Staff was instructed for proper cleaning timely and proper disposal of waste	No instructions was given in person to the cleaning staff as the cleaning was done before the arrival of lab personnel .Also, cotton swab used for phlebotomy procedure were thrown on floor or slipped by patients	Daily inspection was done by technical personnel and resident doctor. Proper instruction was given by phlebotomist and guard to every visiting patient to discard cotton swab or other waste on the dustbin provided	Interpersonal training of biomedical waste management was given to all the laboratory personnel
5	Washroom is too distant and not clean	Attending guard on duty were duly instructed to guide the patients way to washroom. Cleaners were instructed to clean the washroom regularly in short intervals.	Washroom too distant and cleaning of toilet done twice a day.	Daily inspection done for cleanliness of washroom hourly during the sample collection timings. Also, cleaner should be available there always.	Daily charting of cleanliness of washroom should be maintained which is rectified and countersigned by laboratory technical incharge on duty.

conducting oath-taking ceremonies on National celebration day like Republic Day, Independence Day, and Nurse Day. The regular training and rotation of newly recruited as well as old laboratory personnel, also the interval assessment of their knowledge & skills by the laboratory In-charge, are required for betterment of the service quality. The enthusiasm seen amongst technical personnel in the COVID era is itself a huge achievement.

The satisfaction rate for parameter 10 ("Cleanliness of sample collection area") was indeterminate; however, the majority of patients (37%), who were in the lower limit of the satisfaction mean, had an overall satisfaction rate of 79%.

In current study, 47.33% patients rated our phlebotomy services to be very good, and rest 40% found it excellent and good in equal proportions, however 12% demanded improvement. These findings found to be similar with studies performed by Dawar R et.al, Koh et al, and Teklemarian et al [1,2,7]

The most important observation noted in our study is the recommendation status to others (parameter 14). The majority of patients (44% graded it excellent), and the overall satisfaction rate was found to be 99% [Figure -2]

A few prior studies were conducted to efficiently optimise waiting period and manpower for certain essential factors. In a study, in order to reduce the waiting time period for phlebotomy services, Jeon BR et al. used the "active-phlebotomist phlebotomy approach", in which phlebotomists actively approach patients rather than patients approaching to lab personnel. [17] A study by Mijailovic AS et al. found that the effectiveness and accuracy of ambulatory blood collection personnel can be increased especially for OPD patients in order to reduce patient wait times. [18]

As a NABL/NABH accredited super-speciality hospital, extra measures were taken to entertain patients with special and additional needs as follows.

1. Lab personnel trained to be extremely polite while dealing with all the patients
2. A security guard appointed for phlebotomy area to manage patient queue to reduce the sampling and waiting time.
3. Senior citizens, pregnant females and patients with disabilities were given preference
4. Regular training and teaching curriculum conducted to ensure maximum participation by technical personnel
5. A "Quality assurance meet" was regularly conducted at the end of the month to monitor the pre-analytical error along with the whole quality check. The minutes of meetings were documented, and CAPA was put into action.

A few recommendations were made based on our study, such as: a bimodal method of feedback collection by providing feedback forms offline through writing or by sharing link of online google forms. Patient feedback survey to be perform routinely for willing, educated ones who are open to technology to reduce paper waste and infection transfer as much as possible.

6. Conclusion

Every clinical laboratory should conduct this study to better understand what the patient actually requires. The study enlightens how to understand patient preferences and health concerns through a patient satisfaction questionnaire known as a "feedback form." Knowing how our patients feel about our laboratory services is vital. This definitely helps overcome the obstacle of a lack of direct interaction and communication with laboratory staff in the analytical and post-analytical areas of the laboratories and increases patient participation. It aids in the identification of non-conformities, the planning of necessary modifications, their implementation, the gathering of data regarding their impacts, subsequent action on that data, and finally the continual repetition of all those actions at regular intervals to prevent the recurrence of those non-conformities. The Laboratory Incharge, Quality Officer along with lab personnel, and hospital administration, should identify all problems (non-conformities) found in the analysis of these questionnaires and take appropriate corrective and preventative action. Henceforth, a team work is the key to unlocking all the non- conformities in order to improve quality.

7. Abbreviations

CAPA-Corrective and Preventive Action, HIS- Hospital Information System

8. Ethical Approval

Not applicable, as this patient's details has been kept confidential. Only generalised demographic data included in the manuscript.

9. Patient Consent to Participate

As patient's details has been kept confidential, written consent is not applicable for this original article.

10. Author's Contribution

Dr. Swati Raj performed the research analysis and prepared the manuscript, Unnati Nath performed the statistics and data analysis, Dr. Natasha Gulati being the quality manager, all the documentation have been counterchecked and countersigned by her, Dr. Madhu Sinha being the laboratory incharge, gave the concept of the study and data collection , Dr. Abhijit Das did all the corrections and reference search. I Dr Swati Raj, 1st & Corresponding author certify that the manuscript has been read and approved by all the authors, and each author believes that the manuscript represents honest work.

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12. Conflict of Interests

The authors declare that they have no competing interests for the manuscript titled - "Patient's Satisfaction and Service Quality of Clinical Laboratory: A Questionnaire Based Analysis in Accredited Tertiary Care Government Hospital" further there is no conflict of interest among authors.

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