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ORIGINAL ARTICLE

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Patient-Centered Evaluation of Phlebotomy Services A Quantitative Analysis from a Clinical Setting

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ABSTRACT

OBJECTIVES: To assess the satisfaction among patients with phlebotomy services in a tertiary care hospital with standardized questionnaire to identify the key factors contributing to dissatisfaction and execute the relevant Corrective and Preventative Action (CAPA).

METHODOLOGY: A descriptive cross-sectional, (survey-based) study was conducted at a tertiary care hospital in Peshawar, Pakistan, from June to December 2024. A total of 100 patients were randomly selected to participate. Data were collected using a self-developed questionnaire, prepared in both Urdu and English, comprising twelve items rated on a Likert scale. Statistical analysis was performed using SPSS version 26.0.

RESULTS: 93% of respondents reported satisfaction regarding the phlebotomy services. Approximately thirty percent (30.0%) of the participants reported excellent satisfaction with the phlebotomy services, but the majority, 40.5%, deemed them good. Furthermore, 23.5% saw the services as indifferent, 4% as dissatisfied, and 3% as severely dissatisfied. The highest satisfaction rating was achieved for the comfort level during the blood draw, while the lowest satisfaction rate was associated with the total waiting time in the phlebotomy department and the cleanliness of the phlebotomy space.

CONCLUSION: Despite overall patient satisfaction, several areas need our attention, including the waiting time for phlebotomy procedures, inadequate seating arrangements, sample collecting practices, and understanding of standard precautions. Suitable corrective and preventative measures are implemented to address issues.

KEY WORDS: Patient Satisfaction, Phlebotomy, Clinical Laboratory Services, Quality Improvement.

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INTRODUCTION

Phlebotomy, originating from the Greek words phléba (vein) and tomia (to cut), is the procedure of withdrawing blood by puncturing a vein. This practice, formerly referred to as bloodletting, has been used for both therapeutic and diagnostic reasons throughout medical history.[1,2] Phlebotomy is an essential element of laboratory services in contemporary healthcare and is the most frequent patient encounter in diagnostic facilities. Outpatient blood collection, a standard component of health evaluations, has gained prominence for both patients and healthcare facilities, indicating the quality of treatment and management procedures in hospitals. Ensuring superior phlebotomy services is crucial for building a hospital's reputation and improving patient satisfaction. Due of its intrusive characteristics, phlebotomy frequently causes fear, pain, and discomfort, potentially affecting patient satisfaction. Difficulties in venous access, frequently termed difficult venous access (DVA), may need numerous tries to draw blood, leading to pain, bruising, or hematomas. Contemporary advancements, exemplified by the Ultra Touch Push Button system with a reduced cannula wall thickness, seek to improve patient comfort while preserving sample integrity.[3,18]

Patient satisfaction is a multifaceted concept characterized by the correspondence between patient expectations and the perceived quality of service. Phlebotomists often operate as the first point of contact for patients undergoing diagnostic

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procedures, rendering their interpersonal and technical abilities essential in influencing patients' overall experiences.[4,15] Adverse experiences, such as ineffective communication and extended wait times, may undermine confidence in healthcare systems, highlighting the need for specific treatments to tackle these.[5,16] Research indicates that several demographic and contextual characteristics, including age, health condition, and hospital setting, influence patient satisfaction. Geriatric patients often indicate elevated contentment levels, but those suffering from serious ailments may convey discontent. Furthermore, factors like personnel demeanor, waiting rooms, and supplementary services such as catering have been shown to influence satisfaction levels.[6]

The psychological effects of phlebotomy, particularly on children, are well known. Previous unpleasant encounters with needle-based procedures often lead to enduring needle phobia that may continue into adolescence.[7,17] Furthermore, extended wait times for blood collection correlate with patient discontent, anxiety, and diminished faith in the healthcare system. This problem is especially pertinent in high-volume healthcare institutions where patient flow fluctuates considerably during the day. Optimizing processes and strengthening communication between patients and phlebotomy personnel might alleviate these issues, hence improving overall patient satisfaction.[8]

Phlebotomy errors, including frequent or incorrect blood draws, may result in consequences like as bruising, nerve damage, and even hospital-acquired anemia, especially in critically sick patients. These mistakes not only increase healthcare expenses but also jeopardize patient safety and diagnostic precision. Implementing defined protocols, such as those advised by the Clinical Laboratory Standards Institute (CLSI) and the World Health Organization (WHO), is crucial for ensuring the quality and safety of phlebotomy operations. Despite the essential function of phlebotomy services, there is a notable deficiency of research about patient satisfaction in this area, especially in tertiary care institutions such as those in Peshawar. Aspects like personnel conduct, technical proficiency, wait durations, and overall service excellence are often neglected in assessments of healthcare services. This disparity highlights the pressing need for rigorous research and evidence-based strategies to refine phlebotomy methods and improve patient satisfaction. Confronting these problems is essential for enhancing the quality of phlebotomy services and cultivating confidence in healthcare systems.

METHODOLOGY

A cross-sectional survey-based research was conducted in a tertiary care hospital involving 100 patients. The sample size of 100 was calculated using the RaoSoft® online sample size calculator, with a 95% confidence level, 5% margin of error, and an assumed response distribution of 50%. A simple random sampling technique was employed to select participants from patients visiting the phlebotomy section.

Inclusion Criteria:Patients of both genders aged 10 years and above, who had undergone phlebotomy procedures and were willing to participate, were included in the study. The inclusion of patients as young as 10 years was justified based on the frequent attendance of pediatric patients in the phlebotomy section and their ability under attendant supervision to provide meaningful feedback regarding their experience.

Exclusion Criteria: Patients below 10 years of age, critically ill individuals, those with cognitive impairments, or those unwilling to provide consent were excluded from the study.

Data were gathered via a self-constructed, multilingual (Urdu and English) questionnaire, which patients completed autonomously or with support from their attendants. The questionnaire was self-developed after an extensive literature review of previously validated patient satisfaction instruments used in phlebotomy service evaluation. The instrument evaluated satisfaction with phlebotomy services on a five-point Likert scale (1: very dissatisfied, 2: dissatisfied, 3: neutral, 4: satisfied, 5: very satisfied). For analysis, answers categorized as "Neutral," "Satisfied," and "Very Satisfied" were classified as satisfied, whilst "Very Dissatisfied" and "Dissatisfied" were classified as unsatisfied.

The questionnaire had twelve items, and to improve data reliability, phlebotomy personnel performed brief conversations with patients to corroborate their replies. For patients whose questionnaires were completed by attendants, observations from the phlebotomy staff and patient input were used to evaluate particular issues, including fainting, edema, soreness, or discomfort. Informed consent was obtained from all participants, and confidentiality was rigorously maintained. Additionally, a pilot study was conducted on 20 participants to validate the clarity and reliability of both English and Urdu versions of the questionnaire. Necessary linguistic and contextual modifications were made based on feedback. The study was exempted from ethical clearance by the Institutional Review Board of Hafeez Institute of Medical Sciences, Peshawar (IRB/MLT/2024/054, issued on June 3, 2024). The analysis of data included synthesizing results from the finalized surveys and staff interviews to guarantee uniformity and precision.Statistical analysis was performed using SPSS Software version 26.0. Patient satisfaction levels were measured as percentages, determined by dividing the count of satisfied or unsatisfied responds by the entire patient population and multiplying by 100. The total satisfaction level

Parameters	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
How satisfied are you with the clarity of the information provided by the phlebotomist before the procedure?	0	1	8	58	33
	0.0%	1.0%	8.0%	58.0%	33.0%
How satisfied are you with the phlebotomist's ability to answer your questions or concerns during the procedure?	0	0	17	49	34
	0.0%	0.0%	17.0%	49.0%	34.0%
How satisfied are you with the professionalism displayed by the phlebotomist during your visit?	1	4	18	55	22
	1.0%	4.0%	18.0%	55.0%	22.0%
How satisfied are you with the courtesy shown by the phlebotomist during the procedure?	0	2	18	64	16
	0.0%	2.0%	18.0%	64.0%	16.0%
How satisfied are you with the time taken to be called for your blood draw after arriving at the facility?	1	5	19	49	26
	1.0%	5.0%	19.0%	49.0%	26.0%
How satisfied are you with the overall waiting time in the phlebotomy department?	1	5	19	52	23
	1.0%	5.0%	19.0%	52.0%	23.0%
How satisfied are you with the comfort level provided during the blood draw?	0	3	5	57	35
	0.0%	3.0%	5.0%	57.0%	35.0%
How satisfied are you with the phlebotomist's technique in minimizing pain during the procedure?	0	7	14	52	27
	0.0%	7.0%	14.0%	52.0%	27.0%
How satisfied are you with the cleanliness of the phlebotomy area?	1	5	21	48	25
	1.0%	5.0%	21.0%	48.0%	25.0%
How satisfied are you with the overall environment of the phlebotomy department (e.g., seating, privacy)?	0	3	13	57	27
	0.0%	3.0%	13.0%	57.0%	27.0%
How satisfied are you with your overall experience with phlebotomy services at the hospital?	1	6	8	56	29
	1.0%	6.0%	8.0%	56.0%	29.0%
How likely are you to recommend the phlebotomy services to others based on your experience?	1	0	8	54	37
	1.0%	0.0%	8.0%	54.0%	37.0%

Table:1 showing Likert Score for each item and percentage of satisfaction or dissatisfaction

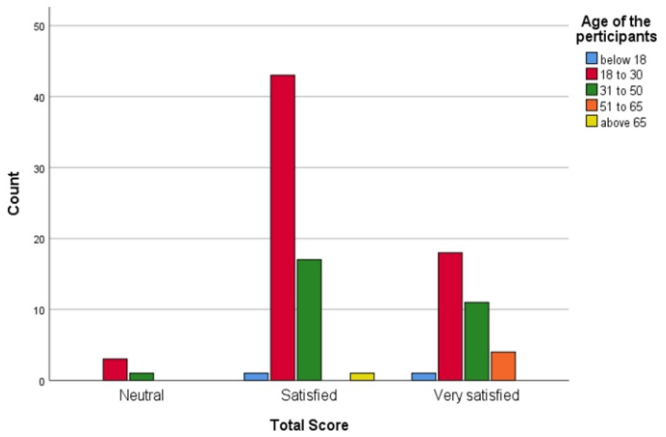

Fig.1. Total satisfaction rate

for phlebotomy services was calculated using a weighted Likert scale, with answers given numerical values (1=very dissatisfied, 2=dissatisfied, 3=neutral, 4=satisfied, 5=very satisfied). Overall score was computed as the aggregate of weighted replies [(number of very satisfied × 5) + (number of satisfied × 4) + (number of neutral × 3) + (number of dissatisfied × 2) + (number of very dissatisfied × 1)] divided by the total number of evaluations.

Percentage satisfaction or dissatisfaction =

$$\frac{\text{number of satisfied or dissatisfied responses} \times 100}{\text{Total number of participants}}$$

The total satisfaction score, calculated by the Likert-scale analysis, was computed using the formula: (number of very satisfied responses × 5) + (number of satisfied responses × 4) + (number of neutral responses × 3) + (number of dissatisfied × 2) + (number of very dissatisfied responses × 1), divided by the overall number of ratings (1-5) for the phlebotomy services, as shown below.

$$\frac{\begin{array}{c}(\text{no. of very satisfied} \times 5) + (\text{no. of satisfied} \times 4) \\ + (\text{no. of neutral} \times 3) + (\text{no. of dissatisfied} \times 2) + \\ (\text{no. of very dissatisfied} \times 1) \times 100\end{array}}{\text{Total no. of rating (1-5)}}$$

The percentage of each rating (very satisfied, satisfied, neutral, very dissatisfied, dissatisfied) was calculated by dividing the count of each rating answer by the total number of ratings (1-5).

$$\frac{\text{Total No. of each rating responses} \times 100}{\text{Total No. of rating}}$$

The length of time spent waiting for phlebotomy denotes the

S.no	Research Studies	Satisfaction rate and need for improvement (%)	Area which need improvement
1.	Our Study	Satisfaction rate: 93% Need improvement: 7%	Phlebotomist's technique for reducing discomfort during the procedure. Duration of wait for sample collection Cleanliness of the phlebotomy station
2.	Gupta A[4]	Good: 70.50% Satisfactory: 23.50% Needs Improvement: 06%	Appropriate apparel, competencies, and conduct of the personnel Duration of wait for sample collection Cleaning of the collecting chamber
3.	Dawar R, [10]	Good: 69% Satisfactory: 24% Needs improvement: 07%	Competence of the phlebotomist in alleviating patient anxiety and addressing inquiries Sanitary conditions and comfort of restrooms Availability of all tests needed by the physician and the sample collection procedure.
4.	Koh Yr, [12]	Agreed: 80.4% Average: 17.3% Disagreed: 2.3%	Procedure for Sample Collection and Delivery Expense of the testing Description of the phlebotomy technique
5.	Teklemarium Z [19]	Overall Satisfaction: 87.6% Excellent: 4.5% Good: 31.5% Fair: 8.8% Poor: 3.6%	Sanitation and accessibility of restrooms Details on the information supplied and staff conduct, as well as the laboratory's location.

Table 2: Comparison between our and previous studies

interval between the patient's entry into the phlebotomy room to the completion of the procedure. The ideal length for blood collection is around 10 minutes.[8-11]

RESULTS

A total of 100 patients participated in the research, with mean age of 15 ± 9 years; the youngest patient was 10 years old, while the oldest was 71 years old. The survey results, including the number of respondents, percentages, and Likert scores, are shown in [Table 1].

Satisfaction or dissatisfaction: The average satisfaction level of patients about the phlebotomy services obtained, as per the Likert scale, was 48.66. A mean rating of 4.24 was obtained for parameter 7, which inquired, "How satisfied are you with the comfort level provided during the blood draw?" This parameter obtained the highest mean satisfaction rating. Parameters 5 and 9 received the minimum grade of 3.91. These characteristics pertain to the total waiting duration in the phlebotomy department and the sanitation of the phlebotomy area.

Total patient satisfaction with phlebotomy services was high, with 93 out of 100 patients (93%) expressing satisfaction (very satisfied, satisfied, and neutral), whereas only 7 out of 100 patients (7%) reported dissatisfaction (dissatisfied and very dissatisfied) [fig.1].

DISCUSSION

Our study revealed that satisfaction with the comfort level during blood draws and the phlebotomist's responsiveness to inquiries was exceptional; however, the overall waiting time and cleanliness in the phlebotomy department were significant deficiencies requiring enhancement, alongside a focus on reducing turnaround time for collections.

Parameter 7, which assesses satisfaction with the comfort level during the blood draw, received the highest score. The phlebotomy department obtained the lowest rating for total waiting time and environmental cleanliness in this study. The overall satisfaction of patients with phlebotomy services in this study significantly high (93%). Bhogale AL et al. Conducted a study assessing patient's satisfaction and perception by standardized metrics and Likert scales on the clinical diagnostic of malaria.[9]

After identifying shortcomings in phlebotomy services, a analysis of the root cause was performed to address the weaknesses, specifically with items 3, 4, 5, 6, 8, and 9, which received moderate to low ratings based on participants feedback and need of improvement. [Table2] presents a comparison of our study with earlier research, pointing out a number of shortcomings.

The root cause of metrics 5 and 9, related to total waiting time in the phlebotomy department and the cleanliness of the phlebotomy environment, was determined to be a failure of comprehension of universal safety protocols and hygiene among the phlebotomy personnel. Inadequate seating for patients caused problem and issues regarding turn-taking, while a reduced number of phlebotomy staff increased the burden on both patients and technical personnel, thereby degrading the quality of services provided (only one phlebotomy station was available for an average daily patient load of 100). Furthermore, a manual record-keeping system was used in substitute of digital methods, such as barcoding, which proved to be time-consuming, cumbersome, and increased the probability of mistakes.

The fundamental cause of low scores in parameters 1, 2, and 8—pertaining to the technician's communication about blood collection, satisfaction with the phlebotomist's responsiveness to inquiries during the procedure, and satisfaction with the phlebotomist's relief techniques—was determined is the insufficient training of phlebotomy staff in techniques and patient interaction. the hospital's usual procedure mandated training for technical workers every six months; nevertheless, this frequency is insufficient and necessitates more frequent execution. The specimens were obtain using several vacutainers in a sequential draw, using a vacutainer holder and a 22-gauge needle. Identified variables were the frequent rotation of laboratory staff and the need for regular training for both new and current employees, accompanied by timely evaluations of their knowledge and abilities by the supervisor for continuous development.

For items 3 and 10, the discerned root causes of patient dissatisfaction were the unprofessional conduct shown by phlebotomists and inadequate environmental circumstances in the phlebotomy department. The issues were linked to the elevated turnover of unseasoned contractual phlebotomists and the lack of structured orientation programs. Additionally, irregular training sessions and inadequate adherence to set standards for professional conduct and departmental upkeep were contributing factors. In response to these issues, comprehensive internal training sessions were implemented. These training programs emphasized enhancing professionalism, communication skills, and understanding of patient-centered care. Furthermore, measures were implemented to improve the department's infrastructure, ensuring a sanitary, private, and comfortable environment for patients. Staff engagement in relevant courses and conferences was encouraged to keep them updated about best practices, hence fostering a culture of continual growth and professionalism within the phlebotomy department.

In our study, 72.5% of participants evaluated the phlebotomy services is satisfactory, 20.5% deemed them sufficient, and 7% indicated a need for enhancement in the services. This finding corresponds with study carried out by dawar r et al, which indicated that 69% of participants found the phlebotomy services acceptable, 24% considered them sufficient, and the remaining 7% identified a need for enhancement in the phlebotomy services.10

A similar study by Koh YR et al, showed that patients exhibited the most dissatisfaction about the explanations of the phlebotomy procedure performed by physicians, nurses, and phlebotomists. In our study, 58 (58.0%) patient's reported satisfaction with the information on the sample collection procedure.[12]

Limited past study has been undertaken to effectively optimize critical factors, such as waiting time and enough staffing for phlebotomy services. Jeon BR et al, performed a study on reducing waiting times in phlebotomy services with an active-phlebotomist services, in which phlebotomists proactively sought patients instead of patients visiting phlebotomy.[13] Another study conducted by Mijailovic AS et al, suggested that the efficacy and precision of phlebotomy staff in outpatient departments might be enhanced by a straightforward method that utilizes patient waiting times, venipuncture volumes, and satisfaction questionnaires to forecast capacity.[14,19]

Limitations: As a tertiary care center, certain measures were implemented to address the special requirements of patients requiring advanced treatment. The measures included: (1) training phlebotomists to handle distressed or uncooperative patients with heightened sensitivity and care; (2) assigning a security guard to the phlebotomy room to assist in managing challenging situations during sample collection; and (3) prioritizing phlebotomy services for elderly individuals and those with disabilities. Training and educational programs for technical professionals were methodically developed and scheduled at regular intervals to enhance participation and skill development.

The limited sample size and the questionnaire's exclusion of specific factors, such as toilet availability and cleanliness, laboratory test result collection procedures, designated phlebotomy waiting times (e.g., <ten minutes, 10-30 minutes, >30 minutes), and turnaround time, represent significant shortcomings. Further study with an enlarged sample size and the inclusion of other domains in the questionnaire is essential to evaluate shortcomings in other area and to get a more thorough understanding of patient's perspectives on phlebotomy services.

The study proposed several recommendations, including the implementation of a barcode system and the regular administration of a Hospital Information System (HIS) patient

feedback survey, which should include a more comprehensive questionnaire by adding additional parameters. Additionally, it is recommended to guarantee the presence of well-kept toilets near the phlebotomy room.

CONCLUSION

This study evaluated patient satisfaction with phlebotomy services in a tertiary care hospital and revealed that most patients were satisfied with the overall service delivery. However, specific aspects such as extended waiting times, inadequate staff–patient communication, and discomfort during venipuncture emerged as key areas of concern. These findings indicate that, while technical performance is generally adequate, interpersonal and organizational factors significantly influence patient satisfaction. To improve service quality, phlebotomy personnel should receive regular training in patient communication and empathy, and hospital management should implement queue management systems and periodic workflow audits to minimize delays. Continuous monitoring of patient feedback through structured satisfaction surveys is essential to ensure that improvements are both measurable and sustainable.

Conflict of Interest: Nothing to declare

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CONFLICT OF INTEREST

Author declared no conflict of interest

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AUTHORS CONTRIBUTIONS

IU: Conception, Design of the work, Data collection, and Drafting, Reviewed, Final approval, Agreement to be accountable.

AK: Conception, Design of the work, Acquistion, Data Analysis, and Drafting, Reviewed, Final approval, Agreement to be accountable.

SHAS: Conception, Design of the work, Interpretation of data for the work, and Drafting, Reviewed, Final approval, Agreement to be accountable.

TZK: Conception, Design of the work, Data collection, and Drafting, Reviewed, Final approval, Agreement to be accountable

DU: Conception, Design of the work, Data collection, Data analysis, Drafting, Reviewed, Final approval, Agreement to be accountable

DATA SHARING POLICY

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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