

# Clients and Clinician Satisfaction with Laboratory Services at the National Referral Hospitals of Eritrea

Filmon Hagos<sup>1</sup>, Yacob Tesfamichael<sup>2</sup>, Efrem Ghirmay<sup>3</sup>, Abraham Teklu<sup>4</sup>, Solomon Negash<sup>5</sup>,  
Oliver Achila<sup>6</sup>

*1 Clinical Laboratory Service Unit, Eritrea Ministry of Health, P.O. Box 212 Asmara, Eritrea*

*2 Clinical Laboratory Science, Asmara College of Health Sciences.*

*3 Clinical Laboratory Science, National Drug Quality Control Laboratory*

*4 Clinical Laboratory Science, Halibet National Referral Hospital Laboratory*

*5 Clinical Laboratory Science, Orotta National Referral Hospital Laboratory*

*6 Clinical Laboratory Science, Department Asmara College of Health Sciences*

**\*Corresponding Author:** Dr. Filmon Hagos Clinical Laboratory Service Unit, Eritrea Ministry of Health, P.O. Box 212 Asmara, Eritrea.

Email: [filhagos68@gmail.com](mailto:filhagos68@gmail.com); Tel: +2917334855

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## Abstract

**Objective:** The objective of the study was to assess clients' and clinicians' satisfaction with laboratory services in specific hospitals in Asmara, Eritrea. **Results:** In general, data was collected from 371 patients who had received laboratory services and 58 clinical service providers. The pooled satisfaction rating was 74.1%. The lowest (65%) and highest (100%) level of satisfaction were on cleanness of latrines and language of communication. Satisfaction rating was significantly associated ( $p < 0.05$ ) with level of education, occupation, residence and hospital. Laboratory services offered at Orotta hospital had a higher rating 210(87.1%) *vis-a-vis* that of Halibet hospital 65(50%) ( $P < 0.000$ ). Most of the clinical services providers were satisfied (85.3%) with the services.

**Keywords:** Patient Satisfaction, Clinician Satisfaction, Eritrea.

## INTRODUCTION

Delivery of optimal clinical laboratory services requires much more than just one or two simple measures, but an integrated range of strategies including adequate staffing and training, range of diagnostic technologies, equipment, supplies, reliable quality assurance and control standards, and adequate number of laboratory services, among others. Accomplishing these is dependent on a multiplicity of factors including the substantive public or private sector investment in laboratory infrastructure. In spite of the widespread recognition that adequate funding of laboratory services within a country is a vital pillar in health service provision; availability and access to quality clinical laboratory services is a major challenge in much of Sub-Saharan Africa (SSA).

The barriers to adequate provision of clinical laboratory services are particularly acute at peripheral laboratories. Systematic assessment of laboratory services within a country has been proposed by several agencies [1, 2]. A critical tool which has been

employed in this regard involves surveying patient-satisfaction levels. The importance of this tool is underscored by the fact that the College of American Pathologists and the Joint Commission on Accreditations for Healthcare Organizations requires all laboratories within its jurisdiction to undertake customer satisfaction surveys either to obtain or maintain accreditation [2, 3, 4, 5]. These studies have also gained popularity and usefulness due to the fact that they can uncover useful feedback which may be instrumental in uncovering the gap between the expected and perceived characteristics of services [6]. Moreover, it has been suggested that repeating studies bi-annually can be useful in maintaining quality of laboratory service and enhancing health care provider's accountability [7].

Although the importance of these surveys is well recognized, less attention has been paid to these studies in much of Sub-Saharan Africa. This fact is adequately exemplified by the paucity of studies on satisfaction with primary customer groups. Indeed, the reliance on technical and functional reports of outcome prevails in most settings [8, 9]. A similar situation prevails

in Eritrea. The country has a rapidly evolving clinical laboratory service landscape. However, this development is inadequately informed by feedback from customers or physicians. This study therefore was designed to assess the level of clients and clinician satisfaction with clinical laboratory services offered at two referral hospitals in Asmara, Eritrea.

## MAIN TEXT

### Study design and Setting

A cross-sectional study was conducted from May-September 2020 to assess the level of clients and clinician's satisfaction with laboratory services at the Orotta and Halibet National Referral Hospitals, in Asmara, Eritrea. The two institutions are the only medical surgical national referral hospitals in the country and, thus offer services to patients countrywide. Briefly, Orotta has several departments including medical-surgical, pediatric, maternity and Internal medicine department. The hospital has 600 technical staff and 429 administrative staff. Similarly, Halibet hospital has surgical, orthopedic, internal medicine, trauma, burn and dermatology units. The laboratory services provided by these hospitals include Parasitology, Bacteriology, Clinical Chemistry, Immuno-serology, Hematology, and Blood Banking. Further, the hospital has 349 technical and 118 administrative staff. Orotta hospital laboratory had average of 94,000 patient flows every year, while Halibet hospital had average of 54,000 patient flows every year.

### Study population

Clinical service providers within the two institutions were included in this study. In addition, randomly selected patients were recruited. Selection criteria included patients above 18 years of age, patients utilizing laboratory services, willingness to grant consent. Seriously ill patients were excluded from the study.

### Sample size and sampling technique

The sample size determination was based on the level of precision required for the proportion of clients who were satisfied with the laboratory services in those facilities. Cochran's formula was used to estimate the sample size <sup>[10]</sup>. A satisfaction level of 50% (p) was used in the sample size determination. A 5% points of absolute precision 95% confidence interval was used. A total of 371 were enrolled in the study.

### Collection of data from Patients

Data was collected using structured questionnaire. The questionnaire incorporated several questions on socio-demographic characteristics and patients' satisfaction indicators toward medical laboratory services. A 5-point Likert Scale rating of Poor (1-point), Fair (2-points), good (3-points), very good (4-points) and excellent (5point) was used to score satisfaction ratings for laboratory services. Initially, the questionnaire was prepared in English and was subsequently translated into Tigrinya (Eritrea National Language). The questionnaire was

administered to patients who had finished their laboratory examinations and returned to Out Patient Department (OPD).

### Collection of data from clinical service providers

A self-administered English questionnaire was given to physicians. The questionnaire contained specific parameters including socio-demographic characteristics, and different clinicians' satisfaction indicators toward medical laboratory services.

### Statistical analysis

Data entry and analysis was made using SPSS 20 software. Poor and fair responses were considered as dissatisfied, where as good, very good and excellent were considered as satisfied. Clients with neutral rating responses were excluded. The percentage satisfaction or dissatisfaction was calculated by dividing the number of satisfied or dissatisfied responses by the total number of respondents excluding neutral response rating, respectively.

The overall rate of satisfaction by Likert scale was calculated as (No. of excellent rating x5) + (No. of very good rating x4) + (No. of good rating x3) + (No. of fair rating x2) + (No. of poor rating x1) divided by the total number of ratings (1–5) for the specific laboratory service. While the percentage of excellent, very good, good, fair or poor rating was calculated by dividing the number of excellent, very good, good, fair or poor rating by the total number of ratings (1–5) for specific laboratory service, respectively. Association of the variables was checked using Chi-square test. Univariate and multivariate logistic regression is employed to determine the possible socio-demographic characteristics associated with the level of satisfaction. P-value < 0.05 was considered as statistically significant.

### Ethical Clearance

The proposal gets ethical clearance from the Ministry of Health, Eritrea, and research ethical committee. Written consent was obtained from all the participant in this study.

## RESULTS

*Socio Demographic characteristics of the participant:* A total of 371 patient and 58 clinical service providers were recruited in the study. Among the study subjects, 170(45.8%) of the patients were males and the rest were females. Majority of the respondents were government workers 146 (39.4%). Housewives and casual laborers comprised, 71 (19.1%) and 60(16.2%), respectively. Disaggregation of data with respect to age revealed that 111 (29.9%) of the participants were less than 25 years of age, 107 (28.8%) were 25–40 years of age; 109 (29.4%) of were within the 40–60 years age grouping; and 44 (11.9%) were above 60 years of age. Similarly, 158 (42.6%) of the respondents attained secondary school and 59 (15.9%) had college level qualification. About 272(73.3%) of the respondents were residents of Asmara, while the rest 99(26.7%) were non-residents. (see Supplementary Table 1).

**Table 1:** Level of satisfaction of respondent with different measuring item of laboratory services in both hospitals (371).

Variables	Satisfied	Dissatisfied
Location of the lab	338(92.3)	28(7.7)
Cleanness and attractiveness of the laboratory room	356(96.2)	14(3.8)
Availability of laboratory staff on working hours	351(94.9)	19(5.1)
The cost of the laboratory service	199(68.9)	90(31.3)
Willingness to conduct laboratory investigation	357(98.1)	7(1.9)
Conduct of laboratory staff during specimen collection.	355(96.7)	13(3.5)
Waiting place	253(70.5)	106(29.5)
Information given during specimen collection	250(68.1)	117(31.9)
Location of latrine to collect specimens	239(70.9)	98(29.1)
Cleanness of toilet to collect specimens	214(63.5)	123(36.5)
Length of time to take results back to physician	284(77.8)	81(22.2)
Language of laboratory staff used to communicate	357(100)	
Overall satisfaction	74.1	25.9

In Likert Scale, Poor and fair responses were considered as dissatisfied, whereas good, very good and excellent were considered as satisfied. The proportion of satisfied patients is

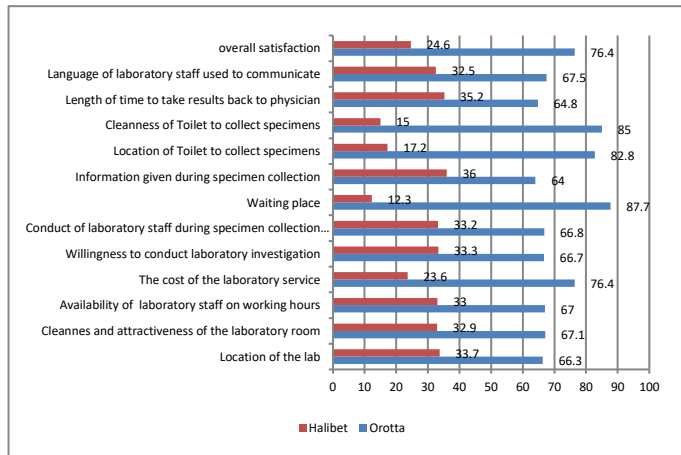
illustrated in Table 1. The pooled satisfaction rating was 74.1%. The item with highest rating was language utilized in the laboratory.

**Table 2:** Bivariate and multivariate analysis predictor to assess the socio-demographic variables with the satisfaction of patient at the national referral hospitals.

Risk Factors	Categories	Satisfied N (%)	Dissatisfied N (%)	Chi (χ <sup>2</sup> ) P-value	Unadjusted Odds Ratio (95% C.I.)	Adjusted odds ratio (95% C.I.)
Sex	Female	155(77.1)	46(22.9)	2.045 0.153	1	
	Male	120 (70.6)	50(29.4)		0.77(0.426-1.39)	
Education	College	35(59.3)	24(40.7)	13.830 0.008	1	1
	Illiterate	25(69.4)	11(22.4)		0.54(0.16-1.89)	1.26 (0.48-3.3)
	Elementary	53(88.3)	7(11.7)		3.1(0.97-9.8)	5.45(1.99-15.12)
	Junior	45(77.6)	13(22.4)		1.20(0.45-3.2)	1.86(0.764-4.52)
	High School	117(74.1)	41(25.9)		1.58(0.74-3.4)	1.925(0.956-3.87)
Age (years)				0.199 0.328	1.013(1.0-1.03)	
	25 -40 years	85(79.4)	22 (20.6)			
	40 – 60 years	81(74.3)	28(25.7)			
	>60 years	33(75.0)	11(30.6)			
Hospital	Orotta	210 (87.1)	31(12.9)	60.721 0.000	1	1
	Halibet	65(50)	65(50)		0.147(0.084-0.26)	0.143(0.84-0.24)
Occupation	Student	20(71.4)	8(28.7)	13.538 0.019	1	
	Farmer & Herdsman	15(75.0)	5(25)		1.58(0.33-7.67)	
	Casual Laborer	52(86.0)	8(13.3)		1.32(0.36-4.91)	
	Jobless	32(71.1)	13(28.9)		1.04(0.29-3.67)	
	Government workers	96(65.8)	50(34.2)		0.764(0.27-2.19)	
	House wife	12(16.9)	50(34.2)		1.053(0.29-3.72)	
Residence	Rural	81(81.8)	18(18.2)	4.168 0.041	1	
	Urban	194(71.3)	78(28.7)		0.738(0.37-1.45)	
No. of visit	Greater than 4Times	25(62.5)	15(37.5)	3.174 0.366	1	
	1Times	147(75.8)	47(24.2)		1.170(0.49-2.811)	
	2Times	73(75.3)	24(24.7)		1.716(0.68-4.323)	
	3Times	30(75.0)	10(25)		1.53(0.517-4.52)	

AOR: Adjusted Odds Ratio; COR: Crude Odds Ratio

In the multivariate analysis, patients from Halibet hospital were less likely to be satisfied with laboratory services (COR = 0.147(0.084-0.26; P< 0.000). In addition, educational status was significantly associated with likelihood of satisfaction - Elementary (AOR = 5.45(1.99-15.12; P< 0.001) in the adjusted model. In this analysis, satisfaction rating was significantly associated (p<0.05)with level of education, occupation, residence and hospital. Patients with college level qualification 35(59.3%) were comparatively less satisfied with laboratory service at the two institutions (p< 0.008). laboratory services offered at Orotta hospital had a higher rating 210(87.1%) compared services to Halibet hospital 65(50%)(P <0.000).



**Figure 1:** Level of satisfaction of patients at selected hospitals

Analysis of the level of satisfaction in the two institutions was evaluated. In this analysis, the level of satisfaction among patients was higher in Orotta Referral Hospital for all the measured items. The overall satisfaction rating was 24.6% in Halibet. On the contrary, Orotta had an overall satisfaction rating of 76.4%. Figure 1.

The overall satisfaction of clinicians towards laboratory services is 85.3%.The lowest satisfaction ratings included availability of requested tests (74.6%); getting urgent result on time (74.6%) critical value notification (79.4%). Missing laboratory results (81.4%) was also flagged as a serious issue by some physicians. Courtesy of laboratory staff received the highest rating (94.9%). See on supplementary materials(Supplementary Table 2).

## DISCUSSION

Measurement of customer satisfaction brings customer preferences into the quality assessment process and may correct false assumptions about particular aspects of service. In particular, dissatisfaction associated with laboratory service provision may undermine laboratory service utilization and increase physician's turnover or early retirement [2, 11, 12]. This may have negative impact on continuity and quality of health care.

In this study, the overall rate of satisfaction by patients was 74.1 %. Lower satisfaction ratings have been reported in other settings in the region - 59.7% at Tikur Anbessa Specialized hospital in Addis Ababa [13]. Conversely, a study conducted at a student run medical clinic in Ethiopia reported a mean satisfaction rating of 4.41 [14]. However, the percentage of satisfaction was similar to a study on laboratory services in antiretroviral therapy clinics in Addis Ababa, Ethiopia [15]. Higher

rates of patient's satisfaction were on the availability of laboratory staff during working hours and willingness to conduct laboratory investigations. A lower rating was obtained on provision of appropriate information to patients. Several factors may be invoked to explain the observed disparities including differences in age of the institution (design requirement for modern hospital are different); institutional culture; funding and staffing disparities.

The relationship between level of satisfaction and specific institutional and demographic factors was also explored. In this analysis, we noted that patients from Halibet hospital were less likely to be satisfied with laboratory services offered at the institution. The association between educational status and level of satisfaction is unique as it differs from other reports [16, 17]. A plausible explanation for the observed difference is largely unclear. Multivariate modelling also demonstrated a connection between hospital and level of satisfaction. The wide disparity in satisfaction rating between the two hospitals may be due to several administrative factors including service prioritisation. In particular, the connection between basic infrastructure differences and level of satisfaction corroborates reports from a study in Ethiopia [18]. In this study, cleanness and location of toilets (difficulty associated with locating specimen collection point like toilets) had the lowest satisfaction rating. These findings emphasises the significance of all laboratory environments on client satisfaction. Therefore, location of laboratory toilet should be a key factor in hospital design.

The lowest satisfaction for clinical service providers included availability of requested tests, turnaround time for results on emergency cases and missing results. Malfunction of equipment and shortage of basic consumable reagents may explain some of these findings.

## CONCLUSIONS

Although the overall level of satisfaction was high, this study identified considerable room for improvement in several indicators including services such as waiting area, the cleanness of latrines, information given during specimen collection outside laboratory and cost of laboratory services. The practice standards set by the Eritrean MOH should also be set based on needs assessment considering all stakeholders including patient needs so that the cost of setting up a laboratory considers the cost of patient service requirements. To these end, the need to relate the effectiveness of clinical laboratory services and evidence-based quality indicators will be paramount.

### Limitations

This study has several limitations. First, the study used self-reported questionnaires which are generally subject to response biases. Rating of satisfaction level was also subjective. Moreover, the study was limited to two referral hospitals in Asmara. Therefore, generalization of the findings to other facilities within the country may be inappropriate.

### Abbreviations

AIDS: Acquired Immunodeficiency Syndrome; HIV: Human Immunodeficiency Virus; MCH: Maternal and Child Health; OPD: Out Patient Department; SPSS: Statistical Package for Social Sciences; WHO: World Health Organization; HCSDD: Health Care Service Delivery Division



## Declarations

## Ethical approval and consent to participate.

Ministry of Health Eritrea and research ethical committee approved the study.

## Consent for publication.

Not applicable

## Availability of Data and Materials.

Not applicable.

## Competing interest

All the authors declare that they have no conflict of interest associated with the publication of this manuscript.

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## Authors contribution.

FH and EG designed the study, collected, analyzed, interpreted the data and drafted the manuscript. YT participated in data collection, designing of the study and write up of the proposal. AT and SN contributed significantly in collecting data, advising, editing, reviewing of both the proposal and manuscript.

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