

**ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF ALLIED HEALTH SCIENCES
DEPARTMENT OF MEDICAL LABORATORY SCIENCES**



**Quality Perception and Utilization of Clinical Laboratory Test
Results to Increase Physicians towards Laboratory service in
Hospitals of South West Ethiopia**

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This is to certify that the thesis prepared by Natal Demeke, entitled:

Quality Perception and Utilization of Clinical Laboratory Test Results to Increase Physicians towards Laboratory service in Hospitals of South West Ethiopia and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Medical Laboratory Sciences (Clinical Laboratory Management and Quality Assurance Specialty Track) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abstract

Background: Medical laboratory work is composed of the technical activities that produce laboratory results for patient care and the management activities that support the technical work. It is crucial for proper treatment of patients and surveillance of the disease. However, laboratory diagnosis in Ethiopia is constrained by inadequate infrastructure, consumables and insufficient skilled personnel. Furthermore, the perceptions and attitude of physicians on the quality of laboratory services also present a significant challenge in the utilization of the available services.

Objectives: The objective of the study is to assess the quality perception and utilization of laboratory test result among physicians.

Methodology: A prospective and retrospective hospital based cross sectional study design was conducted to assess the quality perception and utilization of clinical laboratory test results among 227 physicians on 12 hospitals of south-west Ethiopia from January to March, 2018. The reliability of the response was checked using Cronbach's alpha and it was 69%. The data entry and analysis were double checked before result reporting.

Result: Of 214 total respondents, 167(77%) were male and the age of participant's lies 18-46. The participants 144(67.3%) and 110(51.4%) had poor quality perception and utilization of laboratory test result respectively. Participants' educational level and type of institution had significant association with quality perception and utilization in addition formal customer handling training, system for physician feedback, physician survey & internal audit and service interruption had significant association for quality perception while participants' working department type, quality perception level and recording of results on patients' card had significant association for utilization of laboratory result.

Conclusion: The overall findings illustrate that formal customer handling training, system for physician feedback, physician survey & internal audit, service interruption, good quality perception creation and recording of results on patients' card are factors for quality perception and utilization of laboratory test result among physicians and intervention that should focus on those factors.

Key words: *Perception, Physicians, Quality, Test result and Utilization*

1. Introduction

1.1 Background

Medical laboratory work is composed of the technical activities that produce laboratory results for patient care and the management activities that support the technical work. It is crucial for proper treatment of patients and surveillance of the disease. However, laboratory diagnosis in Ethiopia is constrained by inadequate infrastructure, consumables and insufficient skilled personnel **(1, 2)**.

One of the dimensions used to measure the quality of care which provided by institutions and health professionals is laboratory test result. It is used as an indicator of provider performance in addition to clinical guidelines for the determination and management of disease which enable the service to meet its goal only if the test result passed through quality and utilized efficiently **(3)**.

Since laboratory is a corner stone for the clinical decision making; covering up to 70% of medical diagnoses and treatments, securing the quality of laboratory is essential for accurate, cost effective and the fast treatment leading to the overall good health outcome and customer satisfaction**(4, 5)**. Five percent of all healthy patients will get abnormal test results and false findings or trivial abnormalities can lead to unnecessary further and expensive testing, and potentially risky interventions which ends with poor patient outcomes **(6)**.In cases of Sub-Saharan Africa, without basic laboratory test diagnosis of disease only based on clinical symptom and signs is considered as advancement rather looking for the drawback that leading to inappropriate treatment, increased morbidity and unnecessary mortality. Inaccurate and unreliable laboratory test result also have the same drawback to the above and makes poor perception to the laboratory and regarded unhelpful leading to under-utilization of laboratory test result **(7)**.

Even though there is variability between physician to physician practice on using of laboratory test result, looking for the problems of not utilizing the test results by physicians enable for future strategic direction on the utilization of laboratory testing aiming at cost-effective and high quality patient care service **(8)**.In addition to these looking for the reasons why and how far it goes is a crucial because one of the factor which is absurd results can lead to extra invasive testing, redundancy of the tests, making low quality perceptions on the physician (low confidence on the laboratory results to use) and increased TAT which can lead to patients extra cost to hospital due to increased bed utilization and length of stay **(9)**.

Even if the laboratories analytic quality may not directly measured by physicians perceptions, they are an important performance measure on which laboratories can get base for continuous quality improvement activities in both service and analytical aspects of performance(10). To provide a higher quality care for patients and to make them safe cooperating and working by team among clinicians, the specialists and laboratory workers is mandatory. To make this identifying the gap between them to narrow it and make them closer is crucial because they are dependent on each other (11).

The international growing attention and needs for continuous improvement on the quality of healthcare services made for the establishments of accreditation bodies to recognize by the quality management system (QMS). One of the organization which specific for the clinical laboratories and enable the clinical laboratories to have uniform standards is International Organization for Standardization (ISO: 15189), which is a base for the achievement of QMS and accreditation by fulfilling the standard (12).Currently, accreditation which enables the organization laboratories internationally accepted and presence of consistent service is a big issue in Ethiopian laboratories for providing a better healthcare basing on (ISO:15189) specifically to clinical laboratories by a quality management system, which oversees the entire system to achieve the highest level of laboratory performance. Laboratory processes can be grouped into pre-examination, examination and post-examination categories (13). Among those processes post-examination is a concern in which this study is working from part of it. All laboratory activities are organized into twelve laboratory quality essentials by quality management system model; listed as Organization and Supervision, Personnel, Equipment, Purchasing and Inventory, Document and Record, Process control, Information management, Occurrence management, Assessment, Customer service, Process improvement and Facilities and Safety (14).

Furthermore, the perceptions and attitude of physicians on the quality of laboratory services also present a significant challenge in the utilization of the available services. This study will be conducted to assess Quality Perception and Utilization of Laboratory test results among physicians in south-west Ethiopia.

1.2 Statement of the problem

From time to time the medical laboratory becomes advanced using different costly technologies. The laboratories reagent consumption for laboratory analysis has high impact on global economic balance of the laboratory due to increased laboratory utilization and

inflationary trends **(15)**. In developed countries physicians are estimated to control up to 80% of health care costs and more than half their decisions believed to be influenced by laboratory data **(16)**. In another side, the inappropriate utilization of laboratory tests become increasing with 25% up to 40% range in worldwide **(17)**. This includes over utilization, underutilization and miss-utilization of laboratory test result among physicians. Poor quality perception is one of input for improper utilization of laboratory test result while the reverse for proper utilization.

Since laboratory improvement is a gradual and slow activity, it has to be worked on the basement of quality as a building culture by increasing knowledge **(18)**. Defect on one or more of the twelve quality essentials in the QMS affect the others on the total quality of laboratory in one or another way. Any information or feedback taken from physicians who are the main users of laboratory service output used as input for the achievement of quality by making clinical laboratories to look themselves standing on quality essentials. Understanding of the quality perception and utilization of laboratory test result among physicians enables the clinical laboratories to practice quality essentials such as customer service by identifying their strength and weakness, occurrence management to implement corrective action from physicians complaints, information management for a better result releasing mechanism by communicating with physicians as part and those quality essentials effectiveness leads to take part for a better process improvement of the clinical laboratories **(19)**.

Studies on the inappropriate utilization of or response to laboratory results are a few. From the overall errors of test result estimation of 75% errors produce results still within reference interval, that 12.5% produce wrong results that are not considered clinically and remaining 12.5% errors may have effect on patient health **(20)**.

For proper utilization of laboratory test results by physicians, the result should be qualified and analytically reliable because quality is conceptualized as providing of appropriate service for appropriate people of appropriate time with efficient practical and humanistic manner according to customers requirement and if there is a presence of uncertainty on laboratory test result among physicians has an impact for informing of the test result for patients by physicians **(21)**. These points explain that laboratory has to work on technical but also on the minds of customers.

Therefore laboratories need to look for the physicians attitudes towards their quality service and identifying the gap and filling it is crucial activity for the better utilization and in another

way status of utilization of laboratory test result become indication for the quality of service(22).

In Ethiopia, studies are done on specific hospitals, on specific laboratory disciplines and based on test costs either for the quality perception or utilization of laboratory test among physicians indifferently. Inconsideration to these the researcher tries to address the factors for both quality perceptions and utilization of laboratory test result among physicians in widely located in south western Ethiopia hospitals at the same time.

1.3 Significance of the study

Since, Laboratory test result influence majority of medical decisions; resources limited country like Ethiopia, proper utilization of laboratory test result in cost-effective manner with high quality for good patient outcome is very crucial. Once, physicians have a good quality perception towards laboratory test result means there will be minimum chance of redundancy of laboratory test which makes proper time usage and proper resource usage abstaining from extravagancy. In general, the outcome of this study will be identifying the factors for negative and positive quality perception of laboratory test result and then giving direction for the solution and strengthening as it is respectively. The other is identifying the utilization practice of physicians towards laboratory test result and looking for the solution. It also becomes as baseline for reduction of laboratory test utilization by applying on educational programs, utilization audits, development and implementation of guidelines, economic incentives and used as standing point for those who want to study on the area of topic. Moreover it can be a spring board for policy makers and the scientific community for further programmatic and research endeavor.

2. Literature Review

2.1 Quality perception of laboratory test result

From a systematic review of the literature on the attitude of health care professionals towards accreditation one qualitative study done on Australia on 72 doctors explained generally those doctors are unaware of accreditation and skeptical of it because their concern was on how quality of care was to be measured. They explained that they had not felt accountable for accreditation bodies rather they felt for professional framework, to themselves, the patient and family, their peers and to their professional **(25)**.

From the college of American Pathologists Q-probes study of 81 Institutions covering 82.7% from United States, 6.2% United Arab Emirates, 2.5% from Qatar and 1.2% Brazil, starting from year of 2007 up to 2014. Those institutions which have formal customer satisfaction training 64 (54.7%) and out of 2400 overall satisfaction of 2015(84%) physicians were excellent and good while 277(11.5%) average and 108(4.5%) were below average and poor. 2286(94.5%) of physicians responded as willingness to recommended their laboratory to another physicians, of 1938 the level of satisfaction for access to laboratory manager 1579(81.5%) excellent and good while 254(13.1%) average and 105(5.5%) were below average and poor, of 2286 the access to the laboratory staff 1873(81.9%) excellent and good while 288(12.6%) average and 125(5.4%) were below average and poor. Of 2317 and 2407 test menu adequacy 2011(86.8%) excellent and good while 232(10.6%) were below average and poor and quality of results 2157(89.6%) excellent and good while 191(7.9%) average and 59(2.4%) were below average and poor respectively **(26)**.

A study done by paper-based survey of 5-likert scale on 63 physicians of the Maternity and Children Hospital in Makkah at 2014 indicates that greatest satisfaction rate with a mean of 3.4, 3.2, 3.1 and 3.0 related to courtesy of laboratory personnel, accuracy of laboratory results, staff support to research projects, and adequacy of laboratory point of care testing support and the format of clinical report respectively. In another side with a mean rate of 2.6, 2.8 and 2.5-2.6 analysis showed negative perception for the accessibility of managers, staff availability, and handling telephone enquiries and major negative perception of laboratory service was the TAT for state tests, and routine test for inpatient and outpatient respectively **(27)**.

A cross-sectional study conducted in Al-Khobar area, Eastern province of Saudi Arabia in 1995 of 5 PHC with 20 physicians responded that the attitude of the physicians (80%)

towards laboratory service was negative and 60% of them worked more than ten years, 10% were neutral, and the rest 10% had good attitude. Respondents perceived that laboratory is importance for patient management most of the time were 15% and did not always 30%. Physicians who indicated for the quality of laboratory service with good to excellent 40%, satisfactory 30% and deficient 30%. In opinion of 65% of respondents indicated that their laboratory service is inadequate, whereas 35% of the rest respondents indicated that satisfactory **(28)**.

A study conducted in South Africa by a three focus groups comprising 27 primary care doctors showed that 51% of respondents not receiving results timely, 37% problems with availability of previous test result, incompatibility with patients clinical picture (27%) or a laboratory error (28%), laboratory to contact the clinician with critically abnormal results is very useful 82%, difficulties in contacting the person who could answer (36%) and not having a working relationship with laboratory professionals 27% and reason not to contact is they felt that they received unreliable information during previous interactions 11% and 2% of them reported wherein perceiving that laboratory staff were unhelpful regarding inaccurate, lost and urgent results **(29)**.

A cross-sectional study conducted in 2012 at 22 health facilities of Malawi and 216 physicians with response rate were involved. 135(63%) and 66(30%) clinicians reported interacting with laboratory staff either all of the time or some of the time respectively. 63(22%) and 55(19%) clinicians respond the need in improvement turn-around times and consistent services availing reagent and supplies respectively and 47(16%) need for additional tests, 41(14%) need for additional personnel, 13(4%) need for qualified or skilled personnel. 73(91%) of laboratory test result were noted as having been used by clinicians for patient management **(30)**.

From study done in 12 hospitals of Addis Ababa, Ethiopia in 2012 and 2013 found that the participation rate of hospitals at proficiency testing was 44.79%. Throughout the six cycles of participations 88.9% failed in tests of gram-stain **(31)**.

A study conducted in Gondar University Hospital based on cross-sectional study in 2012 showed, among 69 physicians 67% dissatisfied with the quality of work, 50% with the availability of requested tests, 48% with the reporting of reference ranges, 48% with the clinician handbook and 44% with the timely reporting of critical value. Sixty-one percent of physicians dissatisfied with TAT and 86.7% have faced lost laboratory test results 66.7%

responded number of laboratory personnel disproportional with the available workload and 62.6% faced unavailability of laboratory personnel to answer their questions **(32)**.

2.2 Utilization of laboratory test result

A six years longitudinal study was conducted in United Kingdom and Ireland general practices. 647 practices(83.2%) reported hazards on the laboratory results management system, inadequate processes for matching test requests and results received 350(54.1%), failing to communicate that the results data set is incomplete 195(30.1%), depending on test results 166(25.7%), communicating incorrect results 80(12.3%), failing to action clinically abnormal results received 69(10.7%), lack of system standardization how General Practitioners review and action test results which are varied and, inconsistency 61(9.4%) and test results received which ordered by colleague 54(8.3%) **(33)**.

Study done on Oulu University Hospital, Finland on senior physicians and nurses using questionnaire in 2001 and repeating after corrective action by year 2004 result showed that strongly agreed/agreed for laboratory users' handbook is fit for use 68(85.2%) in 2001 and 91(90.2%) in 2004 and those strongly agreed/agreed for reference value booklet is fit for use were 49(61.2%) in 2001 and 79(64.5%) in 2004**(34)**.

Inappropriate utilization of test result occurs due to ignorance and not taking into account in the further management of patient. Regarding this the study done on the National district Hospital in Bloemfontein of South Africa in 2005 using descriptive study from 400 laboratory tests done and among the reported 70.4% of the test result, 59.1% test results were incorporated into the physicians management plan for the patient**(35)**.

From the study done on 80 physicians in the Konfo Anokye Teaching hospital located in Kumasi, Ghana in 2005 reviewing Medical and laboratory test records retrospectively showed that 82% of physicians frequently or always believed in the accuracy of laboratory test result; 88% of them stated that they frequently or always rely on laboratory tests to diagnose infections in their patients and laboratory test results changed their treatment or management of patients were 44%**(36)**.

The study conducted in 2007 at six districts of Tanzania covering a total of 36 health facilities and 61 clinicians were involved. Among them only 25(41.4%) clinicians reported to always honor and use laboratory results for management of patients while 35(57.4%) sometimes honored the results and one (1.6%) clinicians rarely honored laboratory results**(37)**.

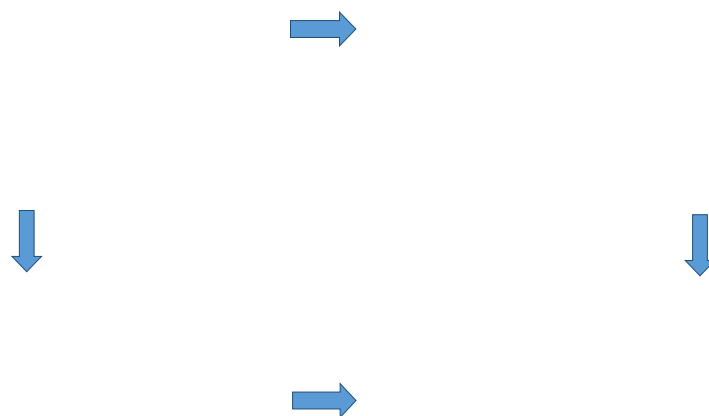
A cross-sectional study conducted in 2012 at 22 health facilities of Malawi and 216 physicians with response rate were involved. Physicians who respond reason tests they ordered 70% replied always used for patient management and 30% replied sometimes used for patient management. 140(67%) of clinicians request repeat test for the most commonly doubted test results Hb/FBC, 110(53%) for malaria testing and 41(22%) for CD4 testing. Based on the level of confidence on test results clinicians responded 105(52%) most confident in glucose test result, 51(30%) least confident in bacteriology test results **(30)**.

Overall, with shortage of literature identifying the factors and addressing the gap on the quality perception and utilization of laboratory test result highly contributes to the concerned parts as input.

2.3 Conceptual Framework

A conceptual framework is a structure of connected idea or concept that indicates how it is put together. It guides the researcher during the development of the study and enables the researcher to link the findings to the body of knowledge **(38)**. The conceptual framework for this study try to show using diagrammatically for the socio-demographic characteristics and the main study part which are quality perception and utilization of laboratory test result with its outcome.

Figure 1: The conceptual frame work of Quality Perception and Utilization of Clinical Laboratory Test Results among Physicians in Hospitals of South-West Ethiopia, 2018



3. OBJECTIVES

3.1 General Objective

The general objective of this study is to assess the quality perception and utilization of clinical laboratory test results to increase physicians towards laboratory service those working in hospitals of South-West Ethiopia.

3.2 Specific Objective

The specific objectives of the study are to:-

- Identify the quality perception level of laboratory test result among physicians
- Identify the utilization practice level of laboratory test result among physicians
- Determine the factors associated with the quality perception and utilization of laboratory test result among physicians

Hypothesis

H₀: There are no factors affecting quality perception of laboratory test result among physicians

H₀: There are no factors affecting utilization of laboratory test result among physicians

4. Methods

4.1 Study setting

This study was conducted in South-West Ethiopia, comprising a total of 12 hospitals, of which, 2 university hospitals, 3 Non-governmental organizations' (NGOs) hospitals and 7 general public hospitals found under 7 zones. The study area is selected due to large area coverage having different levels and types of hospitals found distributing distantly and for the best of my knowledge there is not research data in line with this topic.

Tullu-Bollo Hospital (TBH) which is district hospital found in Tullu-Bollo city covering for a population of 275,000 with 70 beds and 6 General Practitioners, Wolliso Saint Luke Hospital St. Luke's Catholic Hospital and College of Nursing and Mid-wifery (WSLH) which is the other NGO hospital found in Wolliso city covering for a population of 350,000 with 192 beds and, 3 specialists plus 10 General Practitioners (39) and Attat Hospital (ATH) which is the one of NGO hospital found on the road from Wolkite town to Hosanna covering for a population of 800,000 with 162 beds and 8 General Practitioners (40); are located 60 km, 105 km and 175 km south west of Addis Ababa respectively.

Jimma University Medical Center (JUMC) and Shenene Gibe Hospital (SGH) are found in Jimma town which is located 350 km southwest of Addis Ababa. JUMC is the teaching and referral hospital in southwest part of the country, serving the service for 15 million population with 600 beds, 196 residents and, 63 specialists and 33 General Practitioners. SGH is newly established hospital located on other end of the city and serves communities of the city and surrounding areas serving for 850,000 population with 85 beds with 11 General Practitioners and 3 specialists (41). Limu-Genet Hospital (LGH) is a district hospital found in Limu-Genet town that is located 430 km south west of Addis Ababa and south of Jimma town covering for a population of 190,000 with 65 beds and 9 General Practitioners (42, 43) and Seka Hospital (SKH) is also another district hospital found in Seka town to that located 371 km south west of Addis Ababa and north-west of Jimma town providing for 290,000 population with 50 beds and 7 General Practitioners.

A general hospital Gebre-Tsadik Shawo Hospital (GTSH) found in Bonga city is located 460 km south west of Addis Ababa at the same direction of Mizan Teppi University Hospital (MTUH) covering a population of 675,000 with 120 beds and 9 General Practitioners (44). The other university hospital found in the south west part of the country is (MTUH) found in Mizan-Aman city that is located 560 km to south west of Addis Ababa and west of Jimma town providing a service for 1.3 million people with 170 beds and, 13 General Practitioners (45).

Agaro Hospital (AGH) which is district hospital found in Agaro city serving a service for 350,000 population with 62 beds and 8 General Practitioners; Bedelle Hospital (BH) which is zonal hospital found in Bedelle city providing a service for 450,000 people with 110 beds and, 10 General Practitioners and are located 260 km, 105 km and 45 km south west of Jimma town respectively. Mettu-Karl Hospital (MKH) which is NGO hospital found in Mettu city providing healthcare service for a population of 1.7 million with 182 beds and 3 specialists plus 14 General Practitioners (46).

The overall physicians found both in governmental and non-governmental hospitals of the study area were 288.

4.2 Study design and Period

A prospective and retrospective hospital based cross sectional study design was conducted to assess the quality perception and utilization of clinical laboratory test results among physicians on Hospitals of south-west Ethiopia from January to March, 2018.

1.1 Population

1.1.1 Source population

The source populations were physicians who were working in hospitals in South West Ethiopia.

1.1.2 Study population

The study population was physicians who were participated in this study and those fulfilled the inclusion criteria working in selected hospitals in south-west Ethiopia.

1.2 Inclusion and Exclusion criteria

The inclusion criteria for physicians were those who were working as full-time workers, with a working experience greater than six months within the current hospital they are volunteer

for participating in this study were included for the study. Physicians who were worked for less than six months and those working with a short period of service with contract agreement and physician working the private owned hospital were all excluded from the study.

1.3 Study Variables

4.5.1 Dependent Variables

The dependent variables of the study are quality perception and utilization of laboratory test result.

1.1.1 Independent variables

Age, Gender, Educational status, type of hospitals, working experience, Laboratory service Interruption, Participation of the hospitals' laboratory on proficiency testing, Presence of laboratory handbook, System for physician feedback, Writing result on patients card, Authorized release of report, Programmed meeting between physician and laboratory personnel, Presence reference value on the report, Participating in (Stepwise Laboratory Improvement Program towards Accreditation)SLIPTA, Type of department physicians work, Formal customer handling training program, Satisfaction survey of physicians and internal audit, interpretation of the test result, result delivery system, Critical result reporting and training out of the country are the independent variables.

4.6 Measurement and data collection

4.6.1 Sample Size Determination

Physicians working in government and non-governmental hospitals which were found in the study area and fulfill the inclusion criteria were studied for their quality perception and utilization of laboratory test result were determined by using single population proportion formula and then subsequently estimating the proportion for finite population formula. The sample proportion taken as 0.5 due to absence of previous study within the country and since the study area were not many enough doing these enable to get the maximum sample size.

$$n = \frac{z^2 * p * q * N}{e^2 (N-1) + z^2 * p * q} \dots\dots\dots (47)$$

$$z = 95\% = 1.96 \quad n = ? \quad N = 348 \quad p = 0.5 \quad q = 1 - p = 0.5 \quad e = 0.05$$

$$n = \frac{(1.96)^2 * 0.5 * 0.5 * 348}{(0.05)^2 * (x-1) + (1.96)^2 * 0.5 * 0.5} = \frac{334.22}{1} \approx 183$$

With a 10% response rate from previous study $n = 191$

$$n = 191 \pm 5$$

Where the above symbols stand for:-

z = the value of the standard variate at a given confidence level in

p = sample proportion, $q = 1 - p$;

n = size of the sample;

e = estimate of the percent defective within 5% of the true value with 95% probability

N = size of population

Even if the sample size was calculated for framing and deciding with minimum number based on the time frame and finance available, but the total number of physicians was studied i.e. 227.

The sample size of physicians for interview was 22 based on educational level and taking one physician from each level of education.

4.6.2 Sampling Method

Convenient sampling technique was applied. The physicians from each hospital were sampled according to their willingness to participate and fulfill the criteria. Those all institutions which were governmental public hospitals, non-governmental hospitals and university teaching hospitals found in the south west Ethiopia were sampled using census sampling method. The physicians who were interviewed was selected using purposive sampling technique from different level of education to get more deepen information and sampled according to their willingness to participate.

4.6.3 Data collection Procedure

The prospective data were collected using structured questionnaire, open ended questions, observation check list, and face to face interview; whereas the retrospective data were

collected from regarded office documentation by observational check list.

Quantitative data were collected from physicians working in the study health facilities using structured questionnaires whereas Qualitative data were collected using open ended questions and face to face in depth interview from physicians while observation check list for documents review of laboratory and patient cards.

The total number and qualifications of physicians working in the study health facilities were collected using questionnaires from the human resource department of the facility. Questionnaires were also used to assess quality perception and utilization of Laboratory tests results among Physicians in their respective health facilities and the questions were adapted from different literature reviews (48).

Physicians were interviewed to obtain further information on demographic information, their professional training, reasons for requesting laboratory tests, perception about quality and reliability of the test results, waiting time for results and use of laboratory results and feedback management as well as result archival was collected. All questionnaires in this survey were administered face to face where the interviewer present a series of standardized questions orally to the interviewee. To validate the responses provided by the respondents, questions with yes/no responses were followed by a cross-check request for further explanations.

In addition to the above information each facilities laboratory services were assessed by observational checklist for the way they deliver results, for the presence, and way of internal audit customer satisfaction survey and their involvement on proficiency testing, and the questions are adopted from checklist for medical laboratories of ISO: 15189:2012(48) and the result archival system of physicians on patients' card history sheet were observed.

1.1 Data quality assurance

The questionnaires were pre-tested two weeks before the actual data collection at Nekemte hospital. One day training were given for data collector and questionnaire were also prepared by medical professional working language(English) since the terms are commonly understood with these language which could help minimizing biases, considering all the participants were understand English language ,we did not prepared local language, to get unbiased data collection. Data collectors were instructed to check the completeness of each questionnaire at the end of each interview. The supervisor rechecked the completeness of the

questionnaire immediately after interview at the spot. The principal investigator also checked the completeness of the data immediately when the data was submitted. The reliability of the response was checked using Cronbach's alpha and it was 69% which is acceptable (49). The data entry and analysis were double checked before result reporting.

4.8. Data Analysis and Interpretation

Data were entered using EPI-Data version 3.1 and exported and statistical analysis were performed using SPSS version 20(Statistical package for the social science) respectively. The quantitative data that were collected using different techniques were analyzed using simple descriptive statistics i.e. percentages, frequency, and mean. Data were also be interpreted using statistical tests like, Chi-square, P value, OR, regression and confidence interval and finally results were presented as tables and figures. The qualitative data was obtained from face to face interview, observation check-list and open ended questions was summarized and discussed regarding to the specific thematic area.

4.9 Operational definition

Good quality perception: - when there is an average response in the 5-point Likert scale with mean greater than 3-point

Good utilization: - when there is an average response in the 5-point Likert scale with mean greater than 3-point and result recording of physicians on patients' card sheet.

Poor quality perception: - when there is an average response in the 5-point Likert scale with mean less than or equal to 3-point.

Poor utilization: - when there is an average response in the 5-point Likert scale with mean less than or equal to 3-point and not recording of results by physicians on patients' card sheet.

Proper utilization of laboratory test result: - is using of laboratory report which is in the hand of physicians by themselves for interpreting and correlating of test result to the patients' clinical history for effective prognosis, diagnosis and treatment of patients.

Quality perception of laboratory test result: - is the attitude of physicians about the laboratory test result they received among physicians.

4.10 Definition of terms

Laboratory test result: - is the reported finding of requested laboratory test from laboratory

and got on the hands of physicians.

Quality: - is conceptualized as providing of appropriate service for in need people at needed time with efficient practical and humanistic manner according to customers requirement.

Recording of results:-writing of results on patients' card by physicians assessed per day for length of data collection stay in the hospital

Utilization of laboratory test result: - is usage of laboratory test result once they received the result among physicians and result recording of physicians on patients' card sheet.

4.11 Ethical consideration

Before conducting the research, ethical clearance was obtained from the Department Research and Ethical Review Committee (DRERC) of Addis Ababa University College of Health Sciences School of Allied Health Sciences Department of Medical Laboratory Sciences. Beside this, formal and official letter of cooperation was obtained from Department of Medical Laboratory Sciences to the study sites and also a permission letter was got from the hospitals. The information that was collected by the study was stored in a file, without mentioning the name of the study site (institution), but a code numbers were assigned to assure confidentiality of the laboratories. The institutions code number also used as a code for data collectors for the sake of confidentiality. The respondents were only involved when they were will to participate and agreed based on the consent form and none of the participants were pressured to participate.

4.12 Dissemination of results

After the study is completed the result was submitted to Addis Ababa University department of Medical Laboratory Science. Final result report was sent to respective regional health bureau, zonal health department office and health facilities (hospitals). It will be available in the library to serve as a reference material for students, researchers, experts or policy makers for intervention. This result also will be disseminated for publication in peer reviewed local and international journals and presenting in related conferences and seminars.

5. Results

Quality Perception and Utilization of Laboratory Test Result among Physicians in all Hospitals of South West Ethiopia study were conducted from January to March 2018. All finding results presented based on their sequential order. Out of 227 administered questionnaires a total of 214 Physicians responded the questionnaire with 94% response rate, and 13 were refused to respond. There is no any missed value on the result.

5.1. Socio-Demographic Characteristics of the Study Population

Men

comprised 167 of the 214 respondents (77%). The mean age of respondents was 30 years and the modal age category was the 26–30 age-group, comprising 85 (39.7%) respondents. The median years of service as physicians was four (interquartile range: 2–6). The distribution of the type of institutions where the respondents were working was as follows: university hospitals (n = 100; 46%), general hospitals (n = 88; 41%) and non-governmental hospitals (n = 28; 13%). A majority of respondents were general practitioners (n = 97; 45.3%), (n = 45; 21%) were residents and (n = 21; 10%) were specialists. Table 1 summarizes the demographic characteristics of the physicians who participated.

Table 1: Socio demographic characteristics of physicians towards quality perception and utilization of laboratory test Result working in all hospitals of south west Ethiopia 2018 (n=214)

Variables	Category	Number	Percent (%)
Gender	Male	166	77.6
	Female	48	22.4
Age in years	18 – 25	10	4.7
	26 – 30	85	39.7

	31 – 39	83	38.8
	40 – 50	36	16.8
Educational level			
	General Practitioner	97	45.3
	Residents I	26	12.1
	Residents II	28	13.1
	Residents III	22	10.3
	Residents IV	7	3.3
	Specialist	34	15.9
Work experience			
	6 month-1 year	0	0.0
	1-2 year	70	32.7
	3 – 5 year	95	44.4
	6– 9 year	32	14.9
	10 – 14 year	16	7.5
	>14 year	1	0.5
Department			
	Internal medicine	70	32.7
	Gynecology	46	21.5
	Surgery	51	23.8
	Pediatrics	47	22.0

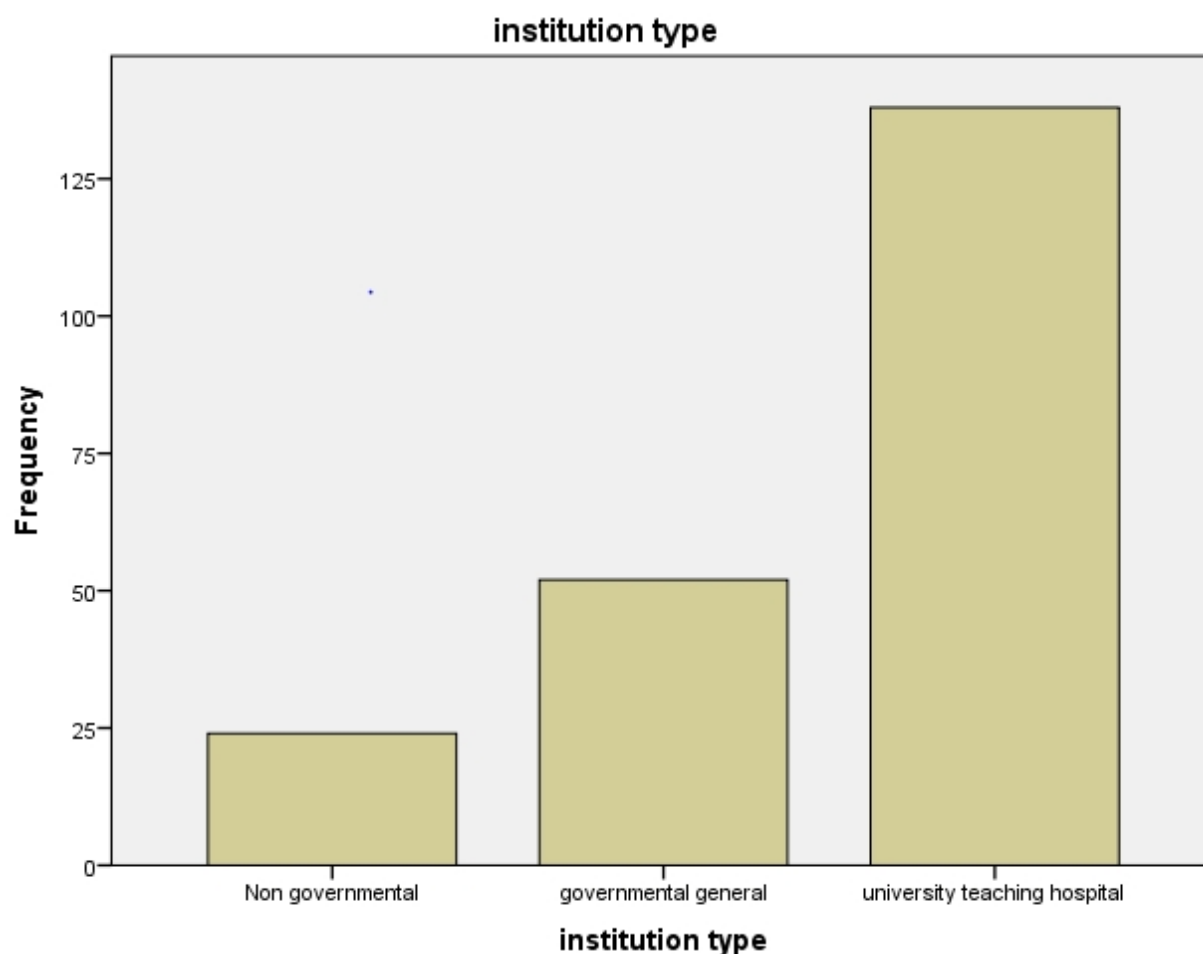


Figure 2: Frequency of distribution based on the type of institution of Physicians towards quality perception and utilization of laboratory test result working in all hospitals of south west Ethiopia, 2018. (n=214)

5.2 Quality Perception of Physicians towards Laboratory test result

Most of the physician's 110(51.4%) agreed the importance of laboratory test result quality. More than half 143(66.8%) of physicians unaware about continuous laboratory quality improvement like accreditation while 18(8.4%) aware and 1(0.5%) familiar of it. Courtesy of laboratory personnel is poor 83(29.4%), 87(40.7%) unfair and only 1(0.5%) of respondent responded as excellent. For a 119(55.6%) of respondents disagreed on the adequacy of point of care testing (POC) and 2(0.9%) strongly agreed on It. 167(78%) of physicians disagreed on the menu of laboratory request and 18(8.4%) agreed on it. From the respondents 33(15.4%) agreed on the accessibility of laboratory manager and 98(45.8%) disagreed on it. Among the respondents 14(6.6%), 80(37.4%) agreed on the TAT and exposure to false

respectively while 128(59.8%) and 50(23.4%) disagreed on TAT and exposure to false result report. Respondents general feeling about the laboratory is 59(27.6%), 96(44.9%) and 27(12.6%) had negative, unsure and good respectively. Laboratory test result 113(52.8%) frequently and 17(7.9%) rarely contribute for patient management according to the respondents. Most of respondents 105(49.1%) frequently believe in accuracy of laboratory test result while 6(2.8%) believe rarely. Communication between physician and laboratory personnel believed frequently 103(48.2%) while rarely by 6(2.8%) of the respondents. 86(40.2%) and 89(41.6%) of physicians satisfy with the quality of laboratory service sometimes and rarely respectively while none of the respondents satisfy always. All tests that are necessary performed rarely 109(50.9%), not at all 68(31.8%) and always 2(0.9%) according to the respondents. Recommending the laboratory to other colleague is unlikely by 118(55.1%) and likely by 24(11.2%) study participants.

Table 2: Quality perception of physicians towards laboratory test result working in all hospitals of south west Ethiopia 2018 (n=214)

Quality perception items	Response	Number	Percent (%)
Importance of laboratory test result quality	Strongly disagree	1	0.5
	Disagree	3	1.4
	Unsure	1	0.5
	Agree	110	51.4
	Strongly agree	99	46.3
Awareness about accreditation	Unaware of it	143	66.8
	Little aware of it	52	24.3
	Aware of it	18	8.4
	Familiar of it	1	0.5
Courtesy of lab. personnel	Poor	63	29.4
	Unfair	87	40.7
	Fair	57	26.6
	Good	6	2.8
	Excellent	1	0.5
POC adequate enough	Strongly disagree	3	1.4
	Disagree	119	55.6

	Unsure	13	6.1
	Agree	77	40.0
	Strongly agree	2	0.9
Menu of lab. request	Strongly disagree	3	1.4
adequacy	Disagree	167	78
	Unsure	26	12.1
	Agree	18	8.4
Accessibility of lab. Manager	Strongly disagree	8	3.7
	Disagree	98	45.8
	Unsure	75	35
	Agree	33	15.4
Turnaround time	Strongly disagree	25	11.7
	Disagree	128	59.8
	Unsure	47	21.9
	Agree	14	6.6
Exposure to false	Strongly disagree	1	0.5
Result report	Disagree	50	23.4
	Unsure	79	36.9
	Agree	80	37.4
	Strongly agree	4	1.9
General feeling about the lab.	Negative	59	27.6
	Unsure	96	44.9
	Neutral	30	14
	Good	27	12.6
	Very good	2	0.9
Contribution of test result	Rarely	17	7.9
For patient management	Sometimes	71	33.2
	Frequently	113	52.8
	Always	13	6.1
Believing in accuracy of	Rarely	6	2.8
Laboratory Test result	Sometimes	57	26.6
	Frequently	105	49.1

	Always	46	21.5
Communication Between Physician Vs personnel	Rarely	6	2.8
	Sometimes	22	10.2
	Frequently	103	48.2
	Always	83	38.8
Satisfaction to the quality Of lab. Service	Not at all	23	10.7
	Rarely	89	41.6
	Sometimes	86	40.2
	Frequently	16	7.5
Performing all tests That are necessary	Not at all	68	31.8
	Rarely	109	50.9
	Sometimes	26	12.1
	Frequently	9	4.2
	Always	2	0.9
Recommendation of The laboratory	Very unlikely	2	0.9
	unlikely	118	55.1
	Somewhat likely	70	32.7
	Likely	24	11.2

5.3 Quality perception level of physicians towards laboratory test result

The participants quality perception towards the laboratory test result evaluated based on a 5-point Likert scale of thirteen requests and the study discovered that standard deviation 0.33 followed by 2.95 mean of quality perception score. Accordingly to the study evaluation 144(67.3%) physicians were categorized as having poor quality perception and the rest 70(32.7%) were scored good quality perception on laboratory test result.

5.4 Associated factors affecting quality perception level of physicians towards laboratory test result

The study result indicated that associated factors which affect the quality perception level of participants using binary logistic regression; institution type(P=0.000), educational level(P=0.011), and formal customer handling training(P=0.000), system for physician

feedback(P=0.000), physician survey with documented internal audit(P=0.013), Service interruption(P=.0.000) and participating in SLIPTA(P=0.000) were found strongly associated with quality perception level of physicians towards laboratory test result with a result. [Table 3].But the study data did not show other significant association with gender, age, working experience, working department and training out of the country.

Table 3: Physicians quality perception and associated factors on laboratory test result working all hospitals of south west Ethiopia, using binary logistic regression, 2018(n=214)

Variable	<u>Quality perception</u>		Chi-Square	P value	Odds ratio (OR)	<u>95% C.I for OR</u>
	Poor	Good				
Gender						
Male	109(65.7%)	57(34.3%)	0.890	0.347		
Female	35(72.9%)	13(27.1%)			0.710	(0.348 -1.449)
Age in years						
18-25	8(80.0%)	2(20.0%)				
26 – 30	63(74.1%)	22(25.9%)			1.397	(0.295-7.085)
31 – 39	53(63.9%)	30(36.1%)	5.124	0.163	2.264	(0.451-11.360)
40 – 50	20(55.6%)	16(44.4%)			3.200	(0.595-17.224)
Educational Level						
GP	75(77.3%)	22(22.7%)				
Residents I	21(80.8%)	5(19.2%)			0.812	(0.274-2.402)
Residents II	14(50.0%)	14(50.0%)	15.513	0.011*	3.409	(1.414-8.220)
Residents III	12(54.5%)	10(45.5%)			2.841	(1.083-7.452)
Residents IV	4(57.1%)	3(42.9%)			2.557	(0.532-12.297)
Specialist	18(52.9%)	16(47.1%)			3.030	(1.329-6.909)
Work Experience						
6 month-1year	0(0.0%)	0(0.0%)				

1-2 year	55(78.6%)	15(21.4%)				
3 – 5 year	60(63.2%)	35(36.8%)	9.339	0.079	2.139	(1.055-4.337)
6– 9 year	21(65.6%)	11(34.4%)			1.921	(0.761-4.850)
10 – 14 year	7(43.8%)	9(56.2%)			4.714	(1.506-14.753)
> 14 year	1(100.0%)	0(0.0%)			0.000	.000

Department

Internal medicine	47(67.1%)	23(32.9%)				
Gynecology	25(54.3%)	21(45.7%)	6.391	0.102	1.717	(0.799-3.689)
Surgery	40(78.4%)	11(21.6%)			0.562	(0.244 1.293)
Pediatrics	32(68.1%)	15(31.9%)			0.958	(0.435 2.112)

Type of Hospital

Non-governmental	7(29.2%)	17(70.8%)				
General(public)	44(84.6%)	8(15.4%)	22.940	0.000*	0.075	(0.024-0 .238)
University Teaching	93(67.4%)	45(32.6%)			0.199	(0.077-0.515)

Customer Handling

Training

Yes	0(0.0%)	0(0.0%)				
No	144(67.3%)	70(32.7%)	Constant	0.000*	0.486	

System for physician

Feedback

Yes	0(0.0%)	0(0.0%)				
No	144(67.3%)	70(32.7%)	Constant	0.000*	0.486	

Physician survey

& internal audit

Yes	18(47.4%)	20(52.6%)				
Partial	7(87.5%)	1(12.5%)	9.295	0.013*	0.129	(0.014-1.149)
No	119(70.8%)	49(29.2%)			0.371	(0.181-0.760)

Service interruption

Yes	114(67.3%)	70(32.7%)	Constant	0.000*	0.486	
No	0(0.0%)	0(0.0%)				

Participating in

SLIPTA					
Yes	114(67.3%)	0 (32.7%)	Constant	0.000*	0.486
No	0(0.0%)	0(0.0%)			
Training out of the country					
Yes	37(68.5%)	17(31.5%)	0.050	0.24	
No	107(66.9%)	53(33.1%)			1.078 (0.556-2.090)

* Those which are significantly associated

Using a multiple binary logistic regression analysis quality perception physicians towards laboratory test result was significantly associated with P value results having non-governmental hospitals (P=0.002), general public hospitals (P=0.000), general practitioners (P=0.009), residents with level (II (P=0.001) and III (P=0.006)) and specialists (P=0.007). Physicians found in non-governmental and governmental hospitals had the same quality perception towards laboratory test result by exactly 1.0 odds ratio. Physicians with educational level of resident ship of level (II and III) and specialists had 7.098, 5.915 and 4.391 times more likely to utilize laboratory test result respectively, relative to general practitioners.

Table 4: Physicians quality perception and associated factors on laboratory test result working all hospitals of South West Ethiopia, using multiple binary regression, 2018(n=214)

Variable	<u>Quality perception</u>		P value	Odds ratio (OR)	95% C.I for OR
	Poor	Good			

Physician survey & internal audit

Yes	18(47.4%)	20(52.6%)	0.560		
Partial	17(87.5%)	1(12.5%)	0.433	0.389	(0.037-4.120)
No	119(70.8%)	49(29.2%)	0.060	0.266	(0.067-1.060)

Type of hospital

Non-governmental	7(29.2%)	17(70.8%)	0.002*		
General (public)	44(84.6%)	8(15.4%)	0.000*	1.0	(0.028-0.363)
University Teaching	93(67.4%)	45(32.6%)	0.051	0.193	(0.037-1.010)

Educational

Level

GP	75(77.3%)	22(22.7%)	0.009*		
Residents I	21(80.8%)	5(19.2%)	0.447	1.690	(0.437-6.543)
Residents II	14(50.0%)	14(50.0%)	0.001*	7.098	(2.147-23.467)
Residents III	12(54.5%)	10(45.5%)	0.006*	5.915	(1.679-20.833)
Residents IV	4(57.1%)	3(42.9%)	0.064	5.324	(0.910-31.158)
Specialist	18(52.9%)	16(47.1%)	0.007*	4.391	(1.500-12.855)

* Those which are significantly associated

5.5 Utilization of Laboratory test result among Physicians

Most of respondents 114(53.3%) use laboratory result for patient management frequently and none of the respondents not use at all for patient management. Only 1(0.5%) responded that laboratory test result had changed patient treatment or management always and 86(40.2%) and 79(36.9%) changed rarely and sometimes respectively. Fitness of reference value is fair for 103(91.1%) of respondents and none of responded good and very good for the fitness. The comparability of laboratory result report with clinical finding is sometimes for 114(53.3%) of physicians, not at all for 2(0.9%) and none of responded always. Few 6(2.8%) of physicians repeat to doubted result but most of 84(39.3%) and 64(29.9%) repeat sometimes and rarely respectively. The result report information easiness to understand is poor for 1(0.5%), fair 81(37.9%) and very good 84(39.3%) of physicians. Most of the physicians 86(40.2%), 75(35.0%) loss results after gaining frequently and sometimes but none of physicians not loss at all. Almost 211(98.6%) of respondents order laboratory test for patient management and only 3(1.4%) to satisfy needs. 101(47.2%) of physicians disagreed and none strongly agreed for the format of report enough to interpret. Most of respondents 108(50.5%) sometimes rely on laboratory test result and only 13(6.1%) always rely on and none of not to rely at all. Technical support of laboratory is sometimes 88(41.1%), rarely 74(34.6%) and always only 1(0.5%) according to the respondents. Rarely 93(43.5%) of the

laboratory report include all information needed based on the respondents and none of said always.

Table 5: Utilization of Laboratory test result among Physicians working in all Hospitals of South West Ethiopia 2018 (n=214)

Utilization of lab. result Items	Response	Number	Percentages
Rate of result use for Patient management	Rarely	22	10.3
	Sometimes	42	19.6
	Frequently	114	53.3
	Always	36	16.8
Lab. Test result Impact on patient treatment/management	Not at all	20	9.3
	Rarely	86	40.2
	Sometimes	79	36.9
	Frequently	28	13.1
	Always	1	0.5
Fitness of Reference value	Poor	53	24.8
	Fair	103	48.1
	Good	51	23.8
	Very good	7	3.3
Fitness of Laboratory Handbook	Not available	195	91.1
	Poor	11	5.1
	Fair	8	3.7
Comparability of result	Not at all	2	0.9
Report With clinical finding	Rarely	69	32.2
	Sometimes	114	53.3
	Frequently	29	13.6
Habit of repeat to doubted initial report	Not at all	19	8.9
	Rarely	64	29.9
	Sometimes	84	39.3
	Frequently	41	19.2
	Always	6	2.8

Easiness of result report	Poor	1	0.5
Information to	Fair	81	37.9
Understand	Good	48	22.4
	Very good	84	39.3
Loss of result after	Rarely	30	14.0
Gaining of it	Sometimes	75	35.0
	Frequently	86	40.2
	Always	23	10.7
Reason for lab. Tests order	To satisfy patients	3	1.4
	Patient management	211	98.6
Format of report	Strongly disagree	18	8.4
interpreted enough	Disagree	101	47.2
	Unsure	29	13.6
	Agree	66	30.8
Frequency of relying	Rarely	55	25.7
On laboratory test	Sometimes	108	50.5
Result for patient	Frequently	38	17.8
management	Always	13	6.1
Technical support of	Not at all	29	13.6
Staff	Rarely	74	34.6
	Sometimes	88	41.1
	Frequently	22	10.3
	Always	1	0.5
All information	Not at all	19	8.9
Included in the	Rarely	93	43.5
Report	Sometimes	66	30.8
	Frequently	36	16.8

5.3 Utilization level of physicians towards laboratory test result

The respondents utilization towards the laboratory test result assessed by a 5-point Likert

scale of thirteen requests and the study found that standard deviation 0.38 followed by 3.0 mean of utilization score. According to the study assessment 110(51.4%) physicians were categorized as poor utilization and the rest 104 (48.6%) were scored good utilization of laboratory test result.

5.4 Associated factors affecting utilization level of physicians towards laboratory test result

The study result revealed using binary logistic regression that Institution type ($P = 0.000$), Educational level ($P = 0.009$), Department ($P = 0.000$), Quality perception level ($P = 0.000$) and Recording of results on patients card assessment ($P = 0.006$) were significantly associated with utilization of laboratory test results by physicians. There is no significant association of laboratory test result among physicians with gender, age, working experience, Participating in SLIPTA, Result delivery system, Training out of the country, Participating in EQA, Presence of laboratory hand book, Critical result reporting, Interpretive comments on the report, authorized release of report, Programmed meeting between physicians and Laboratory personnel and presence of reference value [Table 6].

Table 6: Physicians utilization and associated factors on laboratory test result working all hospitals of South West Ethiopia, using binary logistic regression, 2018(n=214)

Variable	Utilization		Chi-Square	P value	Odds ratio (OR)	95% C.I for OR
	Poor	Good				
Gender						
Male	86(51.8%)	24(50.0%)	0.049	0.825		
Female	80(48.2%)	24(50.0%)			1.075	(0.565-2.044)
Age in years						
18-25	5(50.0%)	5(50.0%)				
26 – 30	53(62.4%)	32(37.6%)			0.604	(0.162-2.249)
31 – 39	38(45.8%)	45(54.2%)	7.394	0.064	1.184	(0.319-4.401)
40 – 50	14(38.9%)	22(61.1%)			1.571	(0.384-6.431)

Educational level							
GP	61(62.9%)	36(37.1%)					
Residents I	11(42.3%)	15(57.7%)			2.311	(0.958-5.573)	
Residents II	13(46.4%)	15(53.6%)	16.489	0.009*	1.955	(.836-4.571)	
Residents III	8(36.4%)	14(63.6%)			2.965	(1.134-7.755)	
Residents IV	6(85.7%)	1(14.3%)			0.282	(0.033-2.441)	
Specialist	11(32.4%)	23(67.6%)			3.543	(1.548-8.111)	
Work experience							
1-2 year	44(62.9%)	26(37.1%)					
2 – 5 year	45(47.4%)	50(52.6%)	6.854	0.222	1.880	(1.001-3.532)	
6– 9 year	13(40.6%)	19(59.4%)			2.473	(1.051-5.822)	
10 – 14 year	8(50.0%)	8(50.0%)			1.692	(0.567-5.050)	
>14 year	0(0.0%)	1(100.0%)			0.000		
Department							
Internal medicine	23(32.9%)	47(67.1%)					
Gynecology	21(45.7%)	25(54.3%)	22.404	0.000*	0.583	(0.271-1.252)	
Surgery	38(74.5%)	13(25.5%)			0.167	(0.075-.374)	
Pediatrics	28(59.6%)	19(40.4%)			0.332	(0.154-0.715)	
Type of Hospital							
Non-governmental	6(25.0%)	18(75.0%)					
General (public)	41(78.8%)	11(21.2%)	24.2	0.000*	0.089	(0.029-0.279)	
University Teaching	63(45.7%)	75(54.3%)			0.397	(0.149-1.060)	
Laboratory handbook							
Yes	6(31.6%)	104(53.3%)	3.280	0.078			
No	13(68.4%)	91(46.7%)			0.404	(0.147-1.106)	
Critical result reporting							
Yes	0(0.0%)	12(100.0%)	13.446	0.999			
No	110(54.5%)	92(45.5%)			0.000	0.000	

Patient card						
Not at all	6(54.5%)	5(45.5%)				
Rarely	52(65.8%)	27(34.2%)			0.623	(0.174-2.229)
Sometimes	29(50.0%)	29(50.0%)	14.989	0.006*	1.200	(0.329-4.375)
Frequently	18(32.1%)	38(67.9%)			2.533	(0.682-9.414)
Always	5(50.0%)	5(50.0%)			1.200	(0.216-6.676)
Participating in EQA						
Yes	95(50.5%)	93(49.5%)				
Partial	7(53.8%)	6(46.2%)	0.623	0.735	0.876	(.284-2.703)
No	8(61.5%)	5(38.5%)			0.638	(0.201-2.023)

* Those which are significantly associated

Using a multiple logistic regression analysis the institution types both general public hospitals and non-governmental hospital were significantly associated with (P value=0.005) and (P-value=0.003) respectively and from the department types Internal medicine, Surgery and Pediatrics were significantly associated with (P value=0.000, P value=0.000 and P value=0.001) respectively and also good quality perception of physicians towards laboratory result significantly associated with (P value=0.000) with the utilization of laboratory test result. Physicians found in general public hospitals were 0.126 times less likely to utilize laboratory test result relative to those found in non-governmental hospitals. Among the department types physicians working Surgery and Pediatrics 0.087 and 0.167 times less likely to utilize laboratory test result relative to those working in Internal medicine. Based on the educational level of physicians specialists are significantly associated with (P value=0.047) and 3.855 times more likely to utilize laboratory test result than general practitioners. Those physicians who had good quality perception had utilize 8.248 times more likely than those who had poor quality perception.

Table 7: Physicians utilization and associated factors on laboratory test result working all hospitals of South West Ethiopia, using multiple binary regression, 2018(n=214)

Variable	Utilization		P value	Odds ratio	95% C.I for OR
	Poor	Good			

(OR)

**Institution
type**

Non-governmental	6(25.0%)	18(75.0%)	0.003*		
General (public)	41(78.8%)	11(21.2%)	0.005*	0.126	(0.029-0.540)
University Teaching	63(45.7%)	75(54.3%)	0.546	0.649	(0.159-2.645)

Department

Internal medicine	23(32.9%)	47(67.1%)	0.000*		
Gynecology	21(45.7%)	25(54.3%)	0.080	0.369	(0.121-1.28)
Surgery	38(74.5%)	13(25.5%)	0.000*	0.087	(0.027-0.286)
Pediatrics	28(59.6%)	19(40.4%)	0.001*	0.167	(0.056-0.498)

Educational level

GP	61(62.9%)	36(37.1%)	0.092		
Residents I	11(42.3%)	15(57.7%)	0.244	2.034	(0.617-6.710)
Residents II	13(46.4%)	15(53.6%)	0.815	1.167	(0.320-4.253)
Residents III	8(36.4%)	14(63.6%)	0.376	1.832	(0.480-6.993)
Residents IV	6(85.7%)	1(14.3%)	0.082	0.099	(0.007-1.340)
Specialist	11(32.4%)	23(67.6%)	0.047	3.855	(1.017-14.618)

Quality perception

Poor	96(66.7%)	48(33.3%)			
Good	14(20.0%)	56(80.0%)	0.000*	8.248	(3.481-19.546)

Recording result**On patients card**

Not at all	6(54.5%)	5(45.5%)	0.360		
Rarely	52(65.8%)	27(34.2%)	0.050	0.220	(0.049-0.997)
Sometimes	29(50.0%)	29(50.0%)	0.084	0.249	(0.052-1.204)
Frequently	18(32.1%)	38(67.9%)	0.101	0.234	(0.041-1.326)
Always	5(50.0%)	5(50.0%)	0.118	0.120	(0.008-1.707)

* Those which are significantly associated

5.5 Observational Assessment Result

To maintain and support the evaluation of qualitative data, the study area facility laboratories were assessed by observational checklist during data collection moment. The assessment covered by this observational checklist was reviewing of documents and records of the laboratory recording of laboratory test result on the patients' cards, result delivery system of the laboratory handbook on the physicians' sides.

Out of all hospital laboratories two of the laboratories did not participate at proficiency testing (16.7%) for the last one year and one of them did not participate at one world accuracy and only participate for REQAS (Regional External Quality Assurance System) on TB-AFB (Tuberculosis of Acid Fast Bacilli) and malaria blind checking. From those participated the lowest record was for microbiological tests specially gram-stain(88.9%) except a single laboratory for clinical chemistry(11.1%) and almost all participated had scored higher in hematological tests.

Only two sites had a laboratory handbook that easily accessible by physicians in which none of the others did. None of the laboratories had compliance handling system within the laboratory that enables physicians to give feedback or present complain except informal communication orally. Any of the laboratory professionals at any study sites got formal customer handling training program. All of the laboratories had reference value for most tests on the report except one.

A system in built for the result releasing were by runners on the three laboratories and the rest laboratories directly to third party or for the patient if they able to come to the laboratory.

Almost in all study sites there were a document which defined reference intervals, comparing procedures, equipment and methods used, authorized personnel review the results, format and medium of the report, correctness of transcription of laboratory results; but except two sites which practiced all the listed above and the rest practiced only reference intervals except one site which did not.

The test request form found in all laboratories included patient identification, name or other unique identifier of person legally authored to request included except for the three of them, type of primary sample not included at all sites, clinically relevant information about the patient and the request not included for four sites and, date and time of sample receipt not included for three sites. All sites request included examinations requested.

The result report did not include interpretation of result and measurement procedures in all sites, only two sites included comments such as cautionary or explanatory notes and name or unique identifier of the requester and contact details. Among all sites four of them include authorized release of the report and identification of the laboratory issued the result. From all sites nine of them include examination results reported in applicable units, five of them include date of primary sample collection and all sites participate in SLIPTA. Only two sites communicate critical result reporting.

5.6 Findings from the in-Depth Interview

To fortify the qualitative study part and to spot extending of the physicians quality perception and utilization of laboratory test result, in-depth interview was conducted with the principal investigators for a better understanding. The interviewees were five female and seventeen male, had two up to sixteen years of work experiences, had 29 up to 44 years of age range and had educational level from general practitioner to specialist at different departments. The interview was enclosed about quality perception and utilization of laboratory test result issue how far problems deepen and direction to the solution. The enquiry was including relevant issues based on the study subject.

Communication

Communication is the major tool and a better way for efficient working and solving the gaps in a team work institutions. Regarding this issue all respondents explained that *‘unavailability of formal communication system which enables specified responsible body. Among different ways for communication having of programmed meeting between laboratory professionals and among physicians, participating of laboratory professional on the morning meeting of physicians and presenting of feedback system from the side of the laboratory’*. From their experience *‘trying to communicate the laboratory personnel individually by oral communication did not give a change’*.

Service Interruption

All participants agreed that, *'it is common and the leading problems of the service. The response given for them from the laboratory side was the absence of reagent and machine failure was the reasons for the service interruption'* according to the interviewees. *Presence of service interruption would had effect for poor quality perception towards the laboratory and the cause for dissatisfaction among physicians. Therefore the laboratory management needs to choose strategies for consistent service'*.

Laboratory Result Interpretation

Only four respondents believed that *'interpreting of laboratory test result is mandatory. Since there are limitations to the laboratory test explaining the limitations minimize inappropriate test result usage'*. In addition *'explaining about the test method used, specificity and sensitivity about the test also had great role for better utilization of laboratory test result'*.

Turn Around Time

All the participants had the same opinion on the improper time usage. *'Using of electronic based service will improve the time usage. Presence of adequate point of care for state tests is another addition problem solving method. Not reporting of critical results enable not to utilize the results on time of need'*.

Service Improvement

All the participants' opinion on the service improvement were the same. One of the problem was *'the laboratories work tests not on the basis of physicians need and not ready to deliver service and choose with communicating physicians rather the laboratories did as they interest only'*.

Laboratory Personnel Performance

About the laboratory personnel performance most of the participants agreed that *'they are not confident enough on the personnel performance due to false result reporting, not giving scientific explanations when communicating with them rather their response was based on negligence and giving biased information'*.

Laboratory result reporting

Five of the participants have the same opinion that *'laboratory result reporting is not clear and neat plus did not contain needed information fully'*. The other participants agreed on the

‘reference interval is not fit enough and delivered with the third party which had influence not delivering properly for the proper patients, loss of result and the results were not confidential enough’.

Educational program

All of the participants agreed on the improvement of educational program. According to them *‘there should be standard for utilization of laboratory test result for more efficiency. In addition there should be training in time management, interpretation of results, customer handling and etc. those had effect for providing quality service among laboratory staffs’.*

6. Discussion

This study assessed quality perception and utilization of laboratory test result among physicians of south west Ethiopia. Because quality is a burning issue for developing country and proper utilization of laboratory test result since there should be limited utilization of human or capital resources like Ethiopia in medical institutions.

6.1 Quality Perception of laboratory test result

In this study 143(66.8%) and 19(8.9%) of respondents were unaware and aware of about accreditation respectively which has a difference with the study done in Australia, which are all 72 doctors who were unaware about continuous laboratory quality improvement like accreditation (25). This difference could be due to sample size difference.

Regarding to satisfaction of laboratory service 11(5.1%) of respondents had excellent to good

and 80(37.4%) had average while 123(57.5%) had below average and poor responses but none of the institution having formal customer satisfaction training in which the result is different from the Q-probes study of 81 institutions from united states, united Arab emirates and brazil having formal customer satisfaction training 64(54.7%) out of 2400 overall satisfaction of 2015(84%) physicians were excellent and good while 277(11.5%) average 108(4.5%) were below average and from the study done in Al-khobar(Saudi Arabia) among 20 physicians 35% were satisfied and the rest 65% were not **(26, 28)**. This variation could be due to working environment difference.

The willingness to recommend their laboratory to other colleagues were 94(43.9%) and the reason of 50% of them were not confident enough with the result according to this study finding which is not consistent with the Q-probes study of 81 institutions from united states, united Arab emirates and brazil having 2286(94.5%) of willingness to recommend their laboratory**(26)**. This inconsistency could be due to satisfaction and study design difference.

In this study 33(15.4%), 75(35%) and 106(49.5%) of respondents were excellent to good, average and below average for the accessibility of laboratory manager respectively with a mean of 2.85 which is consistent with the study done on Makkah with mean of 2.6 but different from the Q-probes study of 81 institutions from united states, united Arab emirates and brazil out of 1938 access to laboratory manager 1579(81.5%) excellent and good while 254(13.1%) average and 105(5.5%) were below average**(27, 26)**. This possibly due to difference in organizational policies.

Accessibility of laboratory staff in this study finding were 7(3.3%) excellent to good, 57(26.6%) average and 150(70.1%) below average with a mean of 2.8 result which is consistent with a study done on Makkah with mean of 2.8 and a study in Gondar University Hospital among 69 physicians 62.6% faced unavailability of laboratory personnel**(27, 32)**. But not consistent with the Q-probes study of 81 institutions from united states, united Arab emirates and brazil of 2286 the access to the laboratory staff 1873(81.9%) excellent and good while 288(12.6%) average and 125(5.4%) were below average and also with the study done in South Africa by a three focus group comprising 27 primary care doctors were 36% difficulties in contacting the laboratory person **(26, 29)**. This possibly due to difference in type of institution.

Based on the above cases participants put their comments during in depth interview that since there is no any formal communication system which also observed during observational

assessment it is difficult to communicate specified responsible body and from their experience trying to communicate the laboratory personnel individually by oral communication did not give a change; rather most of time made them to get biased information.

Regarding to the laboratory test menu adequacy 18(8.4%) of respondents had excellent and good while 170(79.4%) were below average according to the finding of this study different from the findings of the Q-probes study of 81 institutions from united states, united Arab emirates and brazil of 2317 test menu adequacy 2011(86.8%) excellent and good while 232(10.6%) were below average and poor **(26)**. This possibly due to difference in resources and facilities availability.

In this study 70(32.7%) and 144(67.3%) of respondents replied excellent to good and below average to the quality of laboratory test results respectively not consistent with the Q-probes study of 81 institutions from united states, united Arab emirates and brazil of 2407 quality of results 2157(89.6%) excellent and good while 59(2.4%) were below average **(26)**. This possibly due to difference in study area and study design.

The average mean response for the courtesy of laboratory personnel towards physicians were 2.86 according to this study result different from a study done on physicians in Makkah with a mean of 3.4 **(27)**. This difference could be due payment and, type and number of institution involved.

Adequacy of laboratory point of care testing support were mean of 2.8 in this study finding result different from a study done on physicians in Makkah with a mean of 3.0 **(27)**. This difference could be due resources and facilities availability.

.On the subject of turnaround time for state and routine tastes, this study found that dissatisfaction of 153(71.5%) and mean of 2.8 which is different with 63(23%) but consistent 61% out of 69 physicians dissatisfaction in Malawi of 22 institutions and Gondar university hospital respectively result also consistent from a study done on physicians in Makkah with a mean of 2.6 while different from study in South Africa among 27 primary care doctors having 51% not receiving results timely **(27, 30, 32, 29)**. The variation could be due to number of staffs, sample size and data collection tool difference involved.

Among the study participants of this study had 59(27.6%) negative, 30(14%) neutral and 29(13.5%) good for the general feeling of their laboratory service which is different for the

negative perception from the study done in Al-khobar(Saudi Arabia) of 20 physicians having 80% physicians negative attitude, 10% neutral and 10% good **(28)**. This variation could be due to different in co-workers, study period and type of institution.

According to the participants of this study 71(33.2%) sometimes and 113(52.8%) frequently had replied for the importance of laboratory test result for patient management which is inconsistent from the study done in Al-khobar(Saudi Arabia) of 20 physicians having 15% most of the time and 30% sometimes **(28)**. This difference could be due to study period and type of institution.

The quality of laboratory service among the participants of this study 16(7.5%) were good to excellent, 86(40.2%) satisfactory and 112(52.3%) deficient which is different from the study done in Al-khobar (Saudi Arabia) of 20 physicians having 40%, 30% and 30% good to excellent, satisfactory and deficient respectively and relatively consistent with a study done Gondar university hospital having 67% of 69 physicians **(28, 32)**. This possibly be due to different in sample size, study period and type of institution.

Interaction of the study participants with the laboratory staff were 22(10.2%) sometimes and 83(38.8%) always from this study finding which is inconsistent from the study done in Malawi of 135(63%) always and 66(30%) sometimes **(30)**. This inconsistency could be due to different in co-workers and the number of institutions done.

In this study 11(5.1%) of participants got consistent laboratory service and all of the hospital laboratories got service interruption which is inconsistent from the study done in Malawi of 55(19%) **(31)**.This variation could be due to working environment.

From the results of in depth interview the participants put the reason for the above problem i.e. service interruption as when they ask from laboratory side was absence of reagent and machine failure were the reasons which replied redundantly.

Regarding to the need of additional laboratory tests in this study were 170(79.4%) which is inconsistent from the study done in Malawi of 47(16%) **(30)**.This difference could be due to the number of institutions done.

Among the participants of this study 147(68.7%) showed a need for additional personnel which is inconsistent from the study done in Malawi of 41(14%)but consistent with a study done Gondar university hospital having 66.7% of 69 physicians **(30, 32)**.This variation could be due to organizational policies.

On the subject of exposure to laboratory error, this study found that 84(39.3%) which is consistent with the study done on South Africa by a three focus group comprising 27 primary care doctors having 28% of laboratory error(29).

Availability of requested test were 11(5.1%) on the finding of this study which is inconsistent with a study done Gondar university hospital having 50% of 69 physicians (32). This could be due to the sample size and number of institutions in which study were done.

There were no literature in search of my review till these discussion was composed on the association between factors which are type of hospital, educational level and physician's feedback system with quality perception of laboratory test result among physicians. But in this study finding, physician's working in non-governmental and general public hospitals found significant factors in addition to educational levels with general practitioners, resident ship levels (II and III) and specialists. Regarding this physicians found in non-governmental and governmental hospitals had the same quality perception towards laboratory test result by exactly 1.0 odds ratio. Physicians with educational level of resident ship of level (II and III) and specialists had 7.098, 5.915 and 4.391 times more likely to utilize laboratory test result respectively, relative to general practitioners.

6.2 Utilization of laboratory test result

Among the participants of this study used of laboratory test result for patient management were 150(70.1%), 42(19.6%) and 22(10.3%) always or frequently, sometimes and rarely respectively in which the result is consistent with study done in Malawi were 73(91%) always while inconsistent with finding of Tanzania on 61 physicians that 25(41.4%) always, 35(57.4%) sometimes and 1(1.6%) rarely use laboratory result for patient management(30, 37). This could possibly be due to the difference in satisfaction and number and, type of institution involved.

On the subject of fitness of laboratory handbook, this study found that 206(96.2%) were strongly disagreed or disagreed reasoning there was no laboratory handbook to their side in which the result is completely different with the study done on Oulu university hospital (Finland) which strongly agreed or agreed were 68(85.2%) in 2001 and 91(90.2%) in 2004 and the study finding of Gondar university hospital with 48% dissatisfaction out of 69

physicians **(34, 30)**. This difference could be due to the number of institution, managerial leadership and study design.

Results changed participants treatment or management were 29(13.6%) always or frequently on the finding of this study inconsistent with the study findings of Konfo Anokye Teaching Hospital of Ghana among 80 physicians 44% of laboratory test results changed their treatment or management of patients **(36)**. This inconsistency could be due to satisfaction and number of institution.

In this study 151(70.6%) always or frequently believe in the accuracy of laboratory result which is consistent with the study findings of Konfo Anokye Teaching Hospital of Ghana among 80 physicians 82% frequently or always believe in the accuracy of laboratory result **(36)**.

Repeating of tests results those doubted among participants were 47(22.0%) and those who do not repeat took action based on only clinical finding according to this study finding which is different from the study finding of 22 health facilities on Malawi among 216 physicians 140(67%) repeat test for the most commonly doubted results **(30)**. This variation could be due resources and facilities availability and number and, type of institution involved.

Regarding to the dependency of participants on the test result were 51(23.9%) always or frequently according to the finding of this study consistent with study done in United kingdom and Ireland on general practitioners among 166(25.7%) physicians while inconsistent from the study of Konfo Anokye Teaching Hospital of Ghana among 80 physicians 88% frequently or always rely on the laboratory test result to diagnose **(33, 36)**. This variation could be due to educational level and number and, type of institution involved.

In this study 109(50.9%) always or frequently faced loss of laboratory test result of respondents in which the result is inconsistent with study finding Gondar university hospital with 86.7% out of 69 physicians**(32)**. This possibly was due to result recording system and number and, type of institution involved difference.

The format of clinical report adequacy were mean of 2.86 in this study finding relatively consistent with the study finding done on Makkah with a mean of 3.0 **(27)**.

In this study 11(5.1%) of participants got consistent laboratory service in which the result is consistent with the study findings of Malawi with 55(19%) consistency of service **(30)**.

Incorporation of laboratory test result into the physician's management plan according to this study finding is 40.1% which is somewhat different from the finding 59.1% out of 282 at National district Hospital in Bloemfontein (South Africa) **(35)**. This difference could be due to the difference in the number and type of Hospital involved.

Incompatibility of laboratory test result with patients' clinical picture was 13.6% in this study finding relatively consistent with the study findings of South Africa of 27 primary care doctors having 27% incompatibility **(29)**.

In this study 58(27.1%) agreed and 53(24.8%) dissatisfied due to absence of the reference range totally or not categorized with age and sex based which is inconsistent with the study Oulu University Hospital (Finland) on senior physicians were strongly agreed or agreed 49(61.2%) in 2001 and 79(64.5%) in 2004 in addition with study on Gondar University Hospital among 69 physicians 48% dissatisfied with reporting of reference ranges **(34, 32)**. This possibly due to difference with sample size, study period and study design.

According to the result from the observational checklist in this study the participation rate of hospital laboratories at proficiency testing for the last one year was 83.3% and 88.9% lowest recording for tests of gram stain which is somewhat far from the study done in Addis Ababa city hospitals for the participation with 44.79% while consistent for percentage of lowest recording test with 88.9% **(31)**. The difference could be due to the different number of participation cycles of proficiency testing for the assessment.

There was no literature in search of my review till this discussion was composed on the association between factors which are type of hospital, educational level and physician's quality perception level and department type with utilization of laboratory test result among physicians. But in this finding physicians working in non-governmental hospitals and general public hospitals, their working department (Internal medicine, surgery and pediatrics), educational level (specialists) and good quality perception were found significant factors for utilization of laboratory test results. Physicians found in general public hospitals were 0.126 times less likely to utilize laboratory test result relative to those found in non-governmental hospitals. Among the department types physicians working Surgery and Pediatrics 0.087 and 0.167 times less likely to utilize laboratory test result relative to those working in Internal medicine. Based on the educational level of physician's with specialist were 3.855 times more likely to utilize laboratory test result than general practitioners. Those physicians who had good quality perception had utilized 8.248 times more likely than those who had poor

quality perception.

7. Strength and Limitation

7.1 Limitation

Interviews relied on self-reported information and are thus subject to bias. Physicians' responses may not have been an accurate representation of laboratory test request and result usage practice as they might have been biased towards what they know they were supposed to do as opposed to what they actually do. To minimize these observational checklists was used.

7.2 Strength

Using of observational checklist to this study for assessment of the hospital laboratories decreased the bias to self-reported information from the physicians and covering large area using mixed data collection tools that is qualitative and quantitative approach approaches

were strengths' of the study.

8. Conclusions and recommendations

This study highlights the patterns and possible factors and barriers related to the quality perception and utilization of laboratory test results by physicians in hospitals in south western Ethiopia. It also highlights the challenges inherent in the hospital laboratories and among physicians in Ethiopia and points to opportunities for improvement. The overall finding revealed that physicians who were participated in this study 67.3% had poor quality perception and 32.7% had good quality perception towards laboratory test result. About 51.4% had poor utilization and 48.6% had good utilization of laboratory test result among physicians. Limited test menus, longer turn-around times, poor quality, low confidence and inconsistent availability of tests were the major gaps that were identified in the hospital laboratories tier system in South west Ethiopia from the physicians' perspective. Physicians

educational level and type of hospital were both significant factors for both poor quality perception and utilization laboratory test result among physicians in addition absence of formal customer handling training, absence of system for physicians feedback, absence of regular physician survey and, internal audit and service interruption were significant factors for poor quality perception while type of department physicians worked, physicians quality perception level and type of institution were significant factors for utilization of laboratory test result among physicians. These gaps can deter utilization of laboratory services by physicians in hospitals in South west Ethiopia.

The key recommendations from this study are the need for continuous solicitation of feedback from physicians of laboratory services in order to improve these services for a better utilization. In addition, strengthen the laboratory quality management systems in order to restore confidence and increase utilizations of laboratory tests in patient management. A follow-up study would provide a platform for evaluating Ethiopia's National Laboratory Strategic Plan and impact on the use of laboratory tests by physicians. Further similar studies need to be done based on longitudinal study design way.

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ANNEXES-I

English Version Subject Information Sheet

ADDIS ABABA UNIVERSITYS SCHOOL OF ALLIED HEALTH SCIENCE

DEPARTMENT OF CLINICAL LABORATORY SCIENCE

Questionnaire for Quality Perception and Utilization of Laboratory Test Result among Physicians in all Hospitals of South West Ethiopia, 2017/2018.

Identification: Type of Facility_____ Name of
Facility_____ Institution code_____

Address: Sub City_____ Kebele_____ Telephone_____

My name is..... I am currently a student of Addis Ababa University, Department of Medical Laboratory Sciences going to conduct a research. I would like to collect information from you by self-administer questionnaires about Quality Perception and Utilization of Laboratory Test Result among Physicians in all Hospitals of South West Ethiopia. Objective of the study is to assess the quality perception and utilization of clinical laboratory test results among physicians and to identify factors affecting the quality perception and utilization of laboratory test result those physicians working in Hospitals. It will contribute a lot for continuous laboratory quality improvement and for providing a better health service for the community. Your cooperation and willingness for answering the questionnaires will be very helpful in identifying the problems or gaps which related to the issue. I assure you all the collected information by these questionnaires will never release to any parties and kept strictly confidential. Your participation is voluntary and you are not obliged to answer any questions that you do not wish to answer. Please, be aware that all information you provide us is valuable and very important. Do I have your permission to continue? If yes, continue to the next page for the interview if no, continue to the next participant.

For any information you can contact: Mrs. Fatuma Hassen.
E-mail:-fatuma2000@yahoo.com Tel: +251 911418062 and Mr. Natal Demeke E-mail:
demekenatal@gmail.com Tel: +251 932 46 47 11

ANNEXES-II

English Version Consent Format

Consent form to participants on the study of Quality Perception and Utilization of Laboratory Test Result among Physicians in all Hospitals of South West Ethiopia.

I have read the information sheet on the topic above stated and verbal discussion from the supervisor and clearly understood the purpose as well as the anticipated benefit of the research. I hereby need to assure with my signature below that I have decided to voluntarily take part in the study without any coercion or forceful act by the research coordinators to contribute my part for the successful completeness of the research on Quality Perception and Utilization of Laboratory Test Result among Physicians in all Hospitals of South West

Ethiopia

Unique code no. _____ Signature _____ Date _____

Supervisors' Name _____ Signature _____

Thank you for your cooperation.

ANNEXES-III

English Version Questionnaire

Study Area Code: _____ Participant Code: _____

Structured self-administered questionnaire for Quality Perception and Utilization of Laboratory Test Result among Physicians in all Hospitals of South West Ethiopia, 2017/2018.

Part I Socio-Demographic Characteristics of the Respondent

Dear participant, the following questions are targeted to differentiate your Socio Demographic characteristics Please circle the best proper choice of answer code.

No	Questions	Coding Classification	Code
101	Gender	Male = 1 Female = 2	
102	Age in years	18 – 25 = 1 26 – 30 = 2 31 – 35 = 3 36 – 40 = 4 41 – 45 = 5 ≥ 46 = 6 (specify_____)	
103	Educational level	General Practitioner = 1 Resident= 2(I, II, III or IV) Specialist = 3	
104	Employment condition	Contract = 1 Permanent = 2 Other(specify) = 3 N.B. If your answer is Code 1 do not pass to the next	
105	Work experience	≤ 6 months = 1 6month-1 year=2 1-2 year=3 2 – 5 year= 4 6– 9 year= 5 10 – 13 year= 6 ≥ 14 year = 7 (specify_____) N.B If your answer is code 1 do not pass to the next.	
106	Current working department	Department completed by n	

	rtment	ame _____ _____	
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Part II Quality Perception Questions

Dear participants, the following questions are target to see your Quality Perception towards laboratory test result. Please circle the best choice of you answer code.

No	Questions	Coding Classification	Code
201	Do you agree that quality of laboratory test result important?	1.Strongly disagree 2.Disagree 3.Unsure 4. Agree 5.Strongly agree	
202	What do you perceive about accreditation?	1. No need to know it 2. Unaware of it 3. Little aware of it 4.Aware of it 5.Familiar of it	
203	Is your hospital laboratory personnel ready for good responsiveness of your questions?	1.Strongly disagree 2.Disagree 3.Unsure 4. Agree 5.Strongly agree	
204	Why do you order laboratory tests?	1.For patient management 2. To satisfy patients need for the laboratory test unless they feel they are not treated. 3. Just to get rest at the	

		middle till the result arrive 4. Without any reason 5. For unexplained reason	
If you have additional comment here.			
205	Does laboratory point of care support adequate enough?	1.Strongly disagree 2.Disagree 3.Unsure 4. Agree 5.Strongly agree	
206	Does the menu of laboratory testing request is enough?	1.Strongly disagree 2.Disagree 3.Unsure 4. Agree 5.Strongly agree	
207	How likely are you to recommend your hospital laboratory to a colleague or other practices?	1.Very unlikely 2.Somewhat likely 3.Do not know 4.Likely 5.Very likely	
If you are not likely what is the reason?			

208	Using any number from 0 to 5 where 0 is the worst service possible and 5 is the best service possible, overall how would you rate your laboratory services?	0(worst possible) 1 2 3 4 5	
209	Does the format of clinical report interpretive enough?	1.Strongly disagree 2.Disagree 3.Unsure 4. Agree 5.Strongly agree	
210	Does the laboratory manager easily accessible when you need him/her?	1.Strongly disagree 2.Disagree 3.Unsure 4. Agree 5.Strongly agree	
211	Do you agree that the number of laboratory staff is enough for the work-load available?	1.Strongly disagree 2.Disagree 3.Unsure 4. Agree 5.Strongly agree	
212	Does the Turn Around Time (TAT) for state tests is in time?	1.Strongly disagree 2.Disagree 3.Unsure 4. Agree 5.Strongly agree	

213	Does the TAT for ne routi tests is in time?	1.Strongly disagree 2.Disagree 3.Unsure 4. Agree 5.Strongly agree	
214	What do you feel in ge neral about your hospi tal laboratory?	1.Negative 2.Neutral 3.Unsure 4.Good 5.Very good	
215	Does the laboratory te st result contribute for the management of pat ients?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
216	Does the quality of lab oratory service satisf actory?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
217	Does the laboratory re sult comparable with p atients' clinical picture s?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
218	Have you ever faced l aboratory test result wi th error?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	

219	Do you believe that nt coacting of laboratory personnel to the physi cian important when c ritically abnormal resu lts occur?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
220	Do you believe that co ntacting of laboratory i mportant when there is critically abnormal res ults or error occur?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
221	Have you faced loss of laboratory test result a fter gaining of it?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
If you faced what action you took?			
222	Do you believe in the accuracy of laboratory test result?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
223	What do you think of t he laboratory level of t echnical support in rel	1.Poor 2.Unfair 3.Fair	

	ation to work ed? perform	4.Good 5.Very good	
If you have any additional comment put it here.			

Part II Utilization of laboratory test result Questions

Dear participants, the following questions are target to see your utilization towards laboratory test result. Please circle the best choice of you answer code.

No	Questions	Coding Classification	Code
301	Have you ever used laboratory test result for the management of patients?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
302	Have you rely on laboratory test result for th	1.Not at all 2.Rarely	

	e diagnosis of disease in your patients?	3.Sometimes 4.Frequently 5.Always	
Why you do or do not rely on?			
303	Do you feel that laboratory test result that changed your treatment or management of patients?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
304	The patient results, interpretations and comments provided on the laboratory report, easy to follow/ understand and complete.	1.Strongly disagree 2.Disagree 3.Unsure 4. Agree 5.Strongly agree	
If you do not agree why?			
305	Can the laboratory always perform all the tests you think are necessary?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
306	How easy are to contact with the staff of the laboratory?	1.Poor 2.Fair 3.Good 4.Very good 5.Excellent	

307	Does the result report include all the information you need to have?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
Comment if there is left information:-			
308	Would you repeat if you have any doubt of initial laboratory result ?	1.Not at all 2.Rarely 3.Sometimes 4.Frequently 5.Always	
If you do not repeat what would you do?			
309	Does the laboratory users' handbook is fit for use?	0.Not available 1.Poor 2.Fair 3.Good 4.Very good 5.Excellent	
If it is not fit enough why?			
310	Does the reference value is fit for use?	1.Poor 2.Fair	

		3.Good 4.Very good 5.Excellent	
If it is not fit enough, what is left?			
If you have any comment put here.			

Thank you very much for your participation and genuine response!

ANNEXES-IV

English Version In-Depth Interview Questionnaire Consent Form

I want to thank you for taking your precious time to meet with me today. My name is _____ and I am currently a student of Addis Ababa University, Department of Medical Laboratory Sciences going to conduct a research on Quality Perception and Utilization of Laboratory Test Result among Physicians in all Hospitals of South West Ethiopia. I would like to collect information from you by in-depth interview about Quality Perception and Utilization of Laboratory Test Result. The interview should take about an hour. I will be recording the interview session because I don't want to miss any of your ideas and comments. Although I will be taking some notes during the interview session, I can't possibly write faster enough to get it all down. Because we are on recording, please be sure to speak up loud and relax so that I don't miss your important and valuable comments. All responses will be kept confidential and secured not transfer to other third party. This means your interview responses will only be shared with research team members and we will ensure that any information we include in our report does not identify you as the respondent. Remember, your participation is voluntary and you don't have to talk about anything you don't want to and you may end the interview at any time, if any dislike conditions happen during the interview. Please, be aware that all information you provide us is valuable and very important. Are there any questions about what I have just explained?

Are you willing to participate in this interview?

Interviewee Code No. _____ Signature _____ Date _____

For any information you can contact: Mrs. Fatuma Hassen.
E-mail:-fatuma2000@yahoo.comTel: +251 911418062, Mr. Abay Sisay
E-mail:-abusis27@gmail.comTel: +251 911547032 and Mr. Natal Demeke E-mail:
demekenatal@gmail.com Tel: +251 932 46 47 11

ANNEXES-V

English Version In-Depth Interview Questions

Deep interview questionnaire for Quality Perception and Utilization of Laboratory Test Result among Physicians in Hospitals of South West Ethiopia, 2017/2018.

1. What do you feel about your hospital laboratory?
2. How you think that laboratory can secure quality of result?
3. . How could the service of your hospital laboratory be improved?
4. Whom do you think that the responsible body for quality of laboratory service?
5. How you utilize laboratory test results?
6. What are the gaps for proper utilization of laboratory test result?

Thank you for your cooperation!

ANNEXES-VI

English Version Observation Checklist

Study Area Code _____

Date: _____

No	Questions	Yes	Partial	No	Remark
701	Is there any document for the participation of laboratory in proficiency testing with a minimum of the last one year?				
702	What is the system inbuilt for the result releasing?				
703	What tests are recorded as the most and the least score for proficiency test in the last one year?				
704	Is there any compliance handling system within the laboratory that enable physicians to give feedback or present their complain?				
705	Is there any laboratory handbook that easily accessible by physicians?				
706	Is there any formal customer satisfaction				

	ction training program for all oyees empl?				
707	Does physicians archive test results on the patients' card sheet after the y receive?				
708	Is there any documented internal audit about customer satisfaction and feedback filled by physicians?				
709	Does the request form or an electro nic equivalent allow space for the inclusion of, but not be limited to, the following: a) Patient identification, including gender, date of birth, and the location/contact details of the patient, and a unique identifier b) Name or other unique identifier of clinician, healthcare provider, or other person legally authorized to request examinations or use medical information, together with the destination for the report and contact details c) Type of primary sample and, where relevant, the anatomic site of origin d) Examinations requested; e) Clinically relevant information a				

	bout the patient and the request, for examination performance and result interpretation purposes .f) Date and, where relevant, time of primary sample collection g) Date and time of sample receipt.				
710	Does the laboratory have defined reference intervals or clinical decision values, document the basis for the reference intervals or decision values and communicate this information to users.				
711	Does the laboratory ensure the quality of examinations by performing them under defined conditions which are appropriate pre and post-examination processes be implemented?				
712	Is there a defined means of comparing procedures, equipment and methods used and establishing the comparability of results for patient samples throughout the clinically appropriate intervals?				
713	Does the laboratory have procedures to ensure that authorized personnel review the results of examinations before release and evaluate them against internal quality control and, as appropriate, available clinical information?				

	ormation and previous examination results?				
714	Does The laboratory defined the format and medium of the report (i.e. electronic or paper) and the manner in which it is to be communicated from the laboratory?				
715	Does the laboratory have a procedure to ensure the correctness of transcription of laboratory results?				
716	Does the laboratory ensures that the following report attributes effectively communicate laboratory results and meet the users' needs: a) comments on sample quality that might compromise examination results b) comments regarding sample suitability with respect to acceptance/rejection criteria c) critical results, where applicable d) interpretive comments on results, where applicable, which may include the verification of the interpretation of automatically selected and reported results				
717	Does the report include, but not be limited to, the following: a) a clear, unambiguous identificati				

	on of the examination including, he wre appropriate, the examination pr cedure b) the identification of the laborator y that issued the report; c) identification of all examinations that have been performed by a refer ral laboratory d) patient identification and patient location on each page e) name or other unique identifier o f the requester and the requester's contact details; f) date of primary sample collectio n (and time, when available and relevant to patient car e) g) type of primary sample; h) measurement procedure, where a ppropriate i) examination results reported in S I units, traceable to SI units, or other applicable units j) biological reference intervals, cli nical decision values, or diagrams/monograms' supporting c linical decision values, where applicable				
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	k) Interpretation of results, where appropriate l) other comments such as cautionary or explanatory notes (e.g. quality or adequacy of the primary sample which may have compromised the result, results/interpretations from referral laboratories, use of developmental procedure) m) identification of examinations undertaken as part of a research or development programme and for which no specific claims on measurement performance are available n) identification of the person(s) reviewing the results and authorizing the release of the report (if not contained in the report, readily available when needed) o) date of the report, and time of release (if not contained in the report, readily available when needed);				
718	Does the laboratory participate in SLIPTA?				

Declaration

I, the undersigned, declare that this M.Sc. thesis is my original work, has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been duly acknowledged.

M.Sc. candidate: Natal Demeke (B.Sc.)

Signature: _____

Date of submission: _____

This thesis has been submitted with our approval as advisors.

Advisor: Fatuma Hassen (MSc, PhD candidate)

Signature: _____

Date: _____

Place: Addis Ababa, Ethiopia.

Advisor: Abay Sisay (MSc,)

Signature: _____

Date: _____

Place: Addis Ababa, Ethiopia.