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Evaluation of Laboratory Request and Report Form Completeness and Legibility in Tuberculosis Diagnostic Laboratory at Hiwot Fana Specialized University Hospital, Harar, Ethiopia

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Abstract

Background: The laboratory plays a crucial role in patient care. Laboratory requests and reports forms are used as a communication agent between clinicians and laboratory professionals. Completing laboratory request and report forms reduce errors associated with customers' results that have negative impact on both diagnosis and management of the patients including extra loss of resource and time.

Objective: This study aimed to Evaluation of Laboratory Request and Report Form Completeness and legibility in Tuberculosis Diagnostic Laboratory at Hiwot Fana Specialized University Hospital, Harar, Ethiopia from September 1, 2019 to December 30, 2019.

Methods: A cross-sectional study was conducted on completeness and legibility of 1,356 patient's laboratory request and report. The data were collected on excel spread sheet and entered into EpiData software 4.2 and analyzed by using the Statistical Product and Service Solution version 21.

Results: From a total of 1,356 laboratory request and report evaluated, 72.9% of laboratory requests and 81.7% of laboratory reports were fully completed with all information. The only 100% complete information appeared on both laboratory request and report form was the patient name. About 74% of laboratory request and 78% of laboratory report are concise and legible handwriting.

Conclusion: According to this study about 27% of the information on both laboratories request and 18% reports form has not well completed with all parameters, and around 26% of clinician and 24% of laboratory personnel handwriting were not legible that faces customers for unnecessary wastage of time and resources. Furthermore, it has a great role for lengthening turnaround time of result dispatch. Therefore, to fill this gap all important information concerning all parameters in both request and report formats must be clearly addressed with legible hand witting.

Keywords: Completeness; Legibility; Laboratory request; Laboratory report;

List of Abbreviations: IHRERC: Institutional Health Research Ethics and Review Committee; HFSUH: Hiwot Fana Specialized University Hospital; OPD: Outpatient Department; TAT: Turn Around Time; TB: Tuberculosis; MDR TB: Multidrug Resistance of Tuberculosis; ISO: International Standardization Organization; SPSS: Statistical Product and Service Solutions

Background

Medical laboratory request and report forms are used as a link of communication among physician, laboratory staff, patients, and other health professionals [1]. Approximately 60-70% of all decisions about patients' diagnosis, hospital admission, treatment and discharge depend on medical laboratory results [2,3]. Effective completion of these forms revealed care and conscientiousness in one's responsibility and to ensure the correct communication among them.

Most of hospitals and health centers in the developing countries give little attention to the information supplied in laboratory request and report form. Incomplete lab request and report have negative impact on communication and patients' results may be wrongly used by another patient or sent to another clinician that can result in a life-threatening outcome and difficulty in control infectious disease like multidrug resistance of tuberculosis as well as cause unnecessary wastage of time and resources. Particularly if a critical result is there

in the laboratory report, a patient is in imminent danger unless appropriate therapy is initiated promptly [4-6].

International Organization for Standardization (ISO) 15189 states that the request and report form shall contain patients' a unique identifiers, like gender, age, contact address, name, card number, name and signature of test requester, type of sample, date and time of primary sample collection; date and time of sample receipt, a signature of the laboratory personnel who does the test, result approval name and signature, report date and report time [4,7-9]. So that, filling both laboratories request and report with legible and adequate manner insight a vital role in the definitive diagnosis. It also strengthens the quality management system and quality of laboratory results that ultimately have a positive outcome on patients' management and significantly increase customer satisfaction by decreasing Turn Around Time (TAT) of each result [10,11].

Assessments of laboratory requests and report formats have been done in different countries. A study conducted in Nigeria revealed that information on clinical details and patient's age were only provided in 55.6%, and 42.1% respectively and the least provided information was time with 0.7% and date of specimen collection with 3.6% [10]. Another study done in Addis Ababa, Ethiopia showed that the percentage of requests with patients' card number, name, age, sex, OPD, patient history, and type of test were 77.37%, 100%, 76.67%, 95.19%, 80.2%, 76.9 %, and 97% respectively [4].

Additionally, inappropriate filling of these laboratory forms come up with untrusted customer on the organizational service which evidenced by study done at eastern Ethiopia hospitals in which customer satisfied by the laboratory services providers was 80.0% [12] and another study done at Debre Markos hospital that level of patient satisfaction towards clinical laboratory services was only 48.3% that likelihood high in patient with who had an occasion of missing results [13].

Generally, adequate and legible filling of both laboratory request and report has a great benefit that increases the flow of information between clinician and laboratory service provider to give a better diagnosis as per of international standard quality in the health system as well as increase level of customer satisfaction towards clinical laboratory services. In Ethiopian, most of health care services are not computerized system rather than it is communicated with manual system like requesting and reporting result with hand writing, which results out illegibility that brings missing of patients result. Lack of enough training and low understanding on good clinical laboratory practice challenge to miss essential parameter in request/report forms if it is not evaluated appropriately before sample reception by laboratory professionals or *vice versa* by physicians on request paper [4]. However, there is limited research reported from Ethiopia. Therefore, this study aimed to evaluate the completeness and legibility of information on Tuberculosis (TB) laboratory request and report forms at Hiwot Fana Specialized University Hospital, Harar, Ethiopia.

Materials and Methods

Study area and period

Harar is the capital city of Harari regional state and one of the oldest and most historical cities of Ethiopia which is 526 Km away from Addis Ababa the capital city of Ethiopia. According to the central statistical agency of 2007, the total population of Harari Regional state was 183,415, of whom 91,099 were females and 92,316 were males. This study was conducted on Tuberculosis laboratory diagnosis at Hiwot Fana Specialized University Hospital (HFSUH), Harar, Ethiopia in the period of September 1, 2019 to December 30, 2019. Hiwot Fana Specialized University Hospital is one of the biggest hospitals in Eastern Ethiopia that currently serves about 5.6 million people around Harari regional state and neighboring regions like Dire Dawa administrative council, Oromiya, and Ethiopian Somali Regional State. The laboratory services provided by this hospital include: parasitology tests, clinical chemistry tests, urine analysis, serology, hematology, CD4 count, Genexpert and others [14].

Study design and sampling technique

A cross-sectional study was conducted by following convenient selection method of laboratory request and report form concerning to the completeness and legibility that sent from Tuberculosis (TB) clinic and different department of Hiwot Fana Specialized University Hospital (HFSUH) and from other referral center.

Method of data collection and study instrument

Standardized checklist was developed from International Standardization Organization (ISO) 15189, and a laboratory quality management for clinical laboratories to evaluate the request and report forms during data collection. Information on the laboratory request during entry to the laboratory Tuberculosis (TB) reception and laboratory report result before handled by patients were collected by using an excel spreadsheet as yes or no for the presence or absence of the particular information including legibility of their hand writing. This information contain name, age, sex, card number, contact address, type of sample, name, date, and signature of clinician who order the test, name of the test examiner and signature, date and time of specimen received, date and time of result dispatched, verifier name and a signature, and report date. This laboratory requests sent to laboratory Tuberculosis (TB) diagnosis from different department and Tuberculosis (TB) clinic are not directly returned, instead, it retained and use similar laboratory report forms to dispatch. Both laboratory request and report formats used by the clinician, patients and laboratory personnel during the data collection period were included in the study and those formats that are not used for diagnosis are excluded from this study.

Quality Control

Pre-tested check list was used to data collection to increase the quality of data; in addition training was given for data collectors. The data was collected by two trained laboratory technicians. The collected data were double crosschecked by the investigator to reduce mistakes.

Statistical Analysis

Depends on our resource data the collected data were entered into EPI-data software Version 4.2 and analyzed by using SPSS (IBM Statistics, USA) software version 21. Descriptive statistics of different variables were evaluated and presented in the form of texts, and tables. Summary measures such as percentages were used to generalize the results accordingly.

Results

In this study, a total of 1,356 laboratory requests and 1,356 laboratory reports have been evaluated for the completeness and legibility status of necessary information as stated in both formats. From a total of 1,356 laboratory requests sent to the Tuberculosis (TB) laboratory department from different department and Tuberculosis (TB) clinic; the proportion of completed laboratory requests with patient name, age, sex, patient history, and address are 100%, 99.6%, 99%, 97.1%, and 79.7% respectively. Concerning to information filled by the clinician;

the name of the clinician ordering the test was 94.2%, while 96.8% of clinicians were signed by them. The completed type of sample ordered for testing was 74.3% from the requests. About 74% of laboratory requests were concise and legible handwriting (Table 1).

The information indicated on laboratory report forms are shown in (Table 2).

From the in completed laboratory requests, 728(53.7%) was dispatched out of the stated Turn Around Time (TAT), while 601 (95.7%) of completed laboratory requests, have dispatched within the stated TAT of Hiwot Fana specialized University Hospital laboratory (Table 3).

Table 1: Completeness of TB diagnosis laboratory request format at Hiwot Fana Specialized University Hospital, Harar, from September to December, 2019.

Lab request parameter	Complete		Incomplete	
	Number	Percent (%)	Number	Percent (%)
Name of patient	1356	100	0	0
Age	1350	99.6	6	0.4
Sex	1351	99.6	5	0.4
MRN	1347	99.3	9	0.7
Address	1081	79.7	275	20.3
History of patient	1317	97.1	39	2.9
Type of sample test	1008	74.3	348	25.7
Ordered clinician name and sign	1277	94.2	79	5.8
Date of test ordered	1273	93.9	83	6.1
Time of sample collection	1301	95.9	55	4.1
Legibility of clinician writing on request paper	1004	74	356	26

Abbreviation: MRN: Medical Record Number

Table 2: Completeness of Tuberculosis (TB) diagnosis laboratory report parameter at Hiwot Fana Specialized University, Harar, from September to December, 2019.

Lab report parameter	Laboratory report parameter			
	Complete (No)	Percent (%)	Incomplete (No)	Percent (%)
Name of patient	1356	100	0	0
Age	1301	95.9	55	4.1
Sex	1347	99.3	9	0.6
MRN	1355	99.9	1	0.08
Name of lab test done and sign	1303	96.1	53	3.9
Report date	1356	100	0	0
Name of test approval and sign	1108	81.7	248	18.3
Report time	1342	99	14	1
Legibility of lab personnel writing on report form	1058	78	298	22

Table 3: Relationship between completion of laboratory requests form and TAT at Hiwot Fana Specialized University Hospital, Harar, from September to December, 2019.

Complete Laboratory Requests			Incomplete Laboratory Request		
No of lab request	**Test dispatched within TAT**	**Test dispatched out of the stated TAT**	**No of lab request**	**Test dispatched within TAT**	**Test dispatched out of the stated TAT**
628	601 (95.7%)	27 (4.3%)	728	600 (82.4%)	128 (17.7%)

Discussion

Laboratory results have a great contribution to patient care and estimated to affect about 70% of medical diagnoses [2]. The correct interpretation of the test results is a core point to patient management that highly based on the information given on the request and report form. Several studies have shown deficiencies in the filling of laboratory requests and report forms world widely [5,11,15-18].

In this study, the overall fully completed request and report format is only 72.9% and 81.7% respectively. This is higher than comparing proportionally a study from Nigeria in which only 5 (0.2%) was fully completed [11]. However, lower than study from Addis Ababa, Ethiopia that 77.37 % of lab requests and 87.15% of laboratory report formats were fully completed [4]. The observed difference might be due to different level of laboratory quality management implementation status/may some laboratories undergo accreditation process or others may not.

The name of the patient in this study was the only parameter that presents in all the laboratory requests and reports forms. This is proportion is similar to the findings of other studies [15,17,19-21] that the name of the patient was fully completed. This might be due to the fact that patients' names were as simple as it appears to be first in many requests and report format [6] and may also be due to rejected at the reception of any request form that has no patients' name.

The age was appeared in about 99.6% in request laboratory formats and 95.9 % in a report format in this study. This proportion is higher than the finding of 42.1% and 39% in Nigeria [11,15] and similar to study from North India that age was completed with 99.8% of Blood bank and 99.7% blood chemistry laboratory requests [16]. The observed difference might be due to a different level of awareness of clinician and laboratory personnel about the importance of demographic and clinical information of patient that may have a negative influence on many diseases conditions and drug dose for treatment which specifically depend on certain age groups.

In this study, sex was completed in 99% of both laboratory requests and report forms. This proportion is more comparable with studies reported from Tanzania 99.5% [6] and 97.8% in Nigeria [11]. So that sex is an important parameter that clinicians use appropriately during interprets test results. The hospital registration number provided was about 99% in both requests and report lab in this study. This is higher than the results of 78.8% and 87% from Nigeria [11,15]. However, it is more comparable with a study from North India with 97% [17] and 100% Kenya [20]. The hospital registration number is important when samples from different subjects have similar names and other information in identifying and sorting out both the subject and samples as to fast-tracking the process of making the diagnosis.

The clinical history of patients' appeared in this study was about 97.1%. This proportion is higher than study from Nigeria 75%, 84.5%

[15, 19] and Kenya 14.9% [20]. However, it was comparable with a report from North India 98% [17]. The difference might be due to different level of laboratory quality management implementation status/may some laboratories undergo accreditation process or others may not. Filling clinical history appropriately is important for correct interpretation of laboratory results and omitting of clinical information leads to unnecessary additional tests, resource loss and other demand implications.

About 79.7% of patients' address was provided in this study. This proportion is lower than report from Nigeria 90.4% [6] and 96.9% [19]. The occurred difference might be due to different level of knowledge about the importance of patients' address. This may help in an epidemiological survey of a particular disease observed to be common in a certain locality and especially in cases of critical results like Multidrug Resistance of Tuberculosis (MDR-TB) which require urgent action to control the infectiousness of the disease. Further, it has great implication to reduce the disease by giving care and testing in pre-movement.

The names of physicians and signature and date of test ordered appeared in 94% and 93.8% respectively. This proportion is consistent with a report of 93.2% and 93.8% in Nigeria [11,21]. However, it was higher than the study from Tanzania 7.7% [20]. This may be due to variations to considering time constraints that might be experienced in a busy clinic and accident department.

Name and signature of person testing the sample, name and signature person approved the result were provided in 96.1% and 72.9% of reports, respectively. This proportion is higher than the study from Addis Ababa, Ethiopia in which name of test done and a sign was 79.2% and test done approval name and sign was 15.6%. The gap of test done approval name and sign was a great impact on result reliance by customer and rechecking of error before the result was dispatched. From the assessed request forms, 99% of laboratory report has the time of result released. This proportion is higher compared to the study from Addis Ababa, Ethiopia that only 55.6% has the time of result released. The observed difference might be due to various use of information system that some Laboratory Applies Information System (LIS) or computerized system and others may did not use it.

About 26 % of laboratory request and 22% of laboratory report are illegible handwriting that faces challenge in most health care services. Most of lab request and report in Ethiopia are not computerized that legibility of one's lab request and report are dependable on individual handwriting. So, an illegible handwriting weaken the communication between clinician and laboratory professionals during requesting and reporting result exposes patients to extra wastage of money and time, due to losing of results.

From the total of 728 incomplete laboratory requests, 600(82.4%) were done within stated Turn Around Time (TAT) and the rest of 128 (17.7%) was reported in the stated Turn Around Time (TAT). Moreover, out of 628 completed laboratory requests, 601 (95.7%) have reported within stated Turn Around Time (TAT) and the rest 27 (4.3%) have taken a longer time than stated Turn Around Time (TAT), that implies incomplete laboratory requests have taken more time than that of the completed ones. During the study period about 24 samples were rejected by laboratory staffs. Actually this problem is somewhat not only lack of incompleteness of laboratory requests; but also unlabeled sample, and especially those problems that can directly influence the test results of the patients or specimens with unknown essential patient information were rejected. If we were rejecting all samples with incomplete forms, this would mean at least 27% of the request forms were rejected which leads to challenging patients in case of resource and time wastage.

Conclusion

The study revealed that there were incomplete in filling of the required information in both the laboratory request and report form. Fully completing both forms have advantage in the identification of the gap occurs and the responsible personnel for each work in the testing of sample. Additionally, these completed formats have great benefit in simplifying communication between health professionals and patients. Furthermore, completed formats reduces the workload, ensures quality and timely results to the specified patient.

Recommendation

Based on this study, all Clinicians and laboratory professionals must be properly fill all laboratories request and report parameter forms and also being part of their daily activities. Upgrade the awareness of clinicians and laboratory personnel on the importance of adequate and complete filling of laboratory request and result forms. Furthermore, regular follow up should be provider to all laboratory personnel and clinician. Other study needed to identify the reasons for the inadequate filling of the laboratory request forms by the clinicians and result form by laboratory personnel should be carried out.

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Author's Note

D.B conceived and designed the study; participated in data collection, analysis, interpretation and write-up; drafted the manuscript and critically revised the manuscript. M.E designed the study; participated in data collection, analysis, interpretation and write-up; drafted the manuscript and critically revised the manuscript. Z.A designed the study; participated in data collection, analysis, interpretation and write-up; drafted the manuscript and critically revised the manuscript. All authors made substantial intellectual contributions to data analysis and gave final approval of the version to be published and agree to be accountable for all aspects of the work.

Ethical Consideration

The study was approved by the ethics of the College of Health and Medical Sciences, Haramaya University the Institutional Research Ethics Review Committee. Permission was obtained from Hiwot Fana Specialized University Hospital, where the study was conducted. Based on the objective of the study, an official letter was sent to Hiwot Fana Specialized University Hospital. Confidentiality related to patient, laboratory personnel and physician were kept/not captured on the datasheet for analysis.

Declaration of Conflict Interests

The authors declare that they have no competing interests in this work and with publication of this article.

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