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Original Research Article

Assessment of Lab request forms: How do our clinicians communicate with Laboratory?

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ABSTRACT

Central clinical laboratory is an important division in the health care setup. Laboratory results help clinical decisions, follow up care and ensure patient safety. Laboratory request Form [LRF] is an important medium between the patient, a treating clinician and Laboratory. A meticulously filled LRF is important for patient care. Providing accurate and complete information in LRF is the doctor's responsibility. Erroneous LRF will have an impact on the quality of laboratory results. Present study evaluates the degree of completeness and correctness of quality indicators on laboratory request forms [LRF] to examine preanalytical standards of laboratory services.

This study is a single center, prospective, cross sectional, descriptive type conducted at a 650 bed teaching hospital from Gujarat. In the span of a six months study period, 3735 [20% of total] LRFs were selected by simple random sampling method from the total LRF received at OPD blood collection center. They were analyzed for patient, clinician and sample identifier quality indicators along with completeness and correctness. Qualitative information was converted to quantitative by using two point scale, 0 score for incomplete information and 1 score for complete information.

Among patient identifier quality indicators name, age, gender and location were filled in more than 75% forms whereas, very poorly filled 2% provisional diagnosis and 42% MRD number. Clinician identifier quality indicator was attended to in less than 50% forms. Time and date of request were absent on 100% forms. Sample identifier quality indicator shows 97% forms with the nature of the sample and 92% having investigation requests. Test requests on one third forms were invalid and inappropriate. 38% forms were incomplete and inappropriate whereas 46% forms had error in filling one or other data indicators.

Appropriately filled LRF communicates well with the Central clinical laboratory. It will help in providing quality reports in time and benefit clinicians to manage quality care for patients. Hand written, poorly legible, inappropriately abbreviated, erroneous LRF are misleading and may compromise laboratory service and patient safety. Training and change in attitude towards LRF writing is required to maintain the standard of the health care system.

1. Introduction

Central clinical laboratory is an important division in the health care setup. Results from clinical laboratory and radiology have become obligatory for clinical assessment in today's modern medical practice. Uncertainty in a clinician's mind can be cleared off with the support of lab reports. It ensures patient safety and supports clinical decisions. Follow up care has also been sustained by clinical laboratory results.[1,2] [Laboratory Request Form [LRF], though the most ignored temporary piece of paper, is an important medium between the treating clinicians, Laboratories and laboratory service users. Patient's information and required laboratory investigations

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along with samples is communicated through these forms. It serves as two way communication between clinician and laboratory staff. A meticulously filled LRF is important for laboratory people to communicate the right result at the right time and to the right person. This will ease clinician to arrive at conclusion and plan line of patient care.[3]

Every hospital and a diagnostic setup will have a formulated LRF. Normally any basic LRF will have provision for patient's information, doctor's Information, Nature of sample and request for required investigations. Providing accurate and complete information in LRF is the doctor's responsibility. Proper precautions need to be taken while filling this form. Incomplete and erroneous information could lead to rejection of samples, performing unwanted laboratory investigations, generating wrong results, inter-change of results between patients, delay in reporting or communicating results to a wrong doctor. Such problems are common in large hospitals due to excessive patient load. Existing evidence indicates 50 to 70% laboratory errors occur due to preanalytical phase including erroneous LRF.[4,5] Though most clinicians are trained and aware about the importance of LRF but due to tight schedule, excessive patient load, laziness or dependency on fellow health care workers; it remains incomplete or with mismatched information. All these will contribute to preanalytical error and have impact on quality of laboratory and health care services. National Accreditation Board for Hospitals [NABH] and IFCC Working Group Project have suggested quality indicators for health care providers. There are a good number of reports available on assessment of quality indicators from overseas hospitals however; such information from Indian hospitals is rare.[3,6] The objective of the present study is to evaluate the degree of completeness and correctness of quality indicators on laboratory request forms [LRF] to assess the preanalytical standard of clinical laboratory facilities. This is also a part of an initiative to bring awareness among doctors about the importance of LRF in patient care management and a step towards proper documentation practice required for NABH accreditation.

2. Materials and Methods

2.1. Study design and data collection

Present study is a single center, prospective, cross sectional, descriptive study conducted at a six hundred fifty bedded teaching hospital from Gujarat. In the span of six months study period from January to June 2022 we received a total 18,750 LRF at OPD blood collection center; out of which 3735 [20%] LRFs were selected by simple random sampling method for analysis. Selected LRFs were reviewed and systematically evaluated for completeness and correctness of three quality indicators. Observations were categorized and assessed based on International Federation of Clinical Chemistry Working Group [IFCC WG] guidelines – 2017.[7] The Data obtained was clustered into following three quality indicator categories viz,

1. Patient identifiers – which includes: name, age, gender, patient's ID, location and provisional diagnosis.
2. Clinician identifiers – includes: consultant's name, name of test requesting doctor, date and time of request, legible signature of requesting doctor.
3. Sample identifiers – includes: type of sample, requested investigations and appropriateness of test request.
4. Completeness of information - based on above three quality indicators completely filled or not filled on LRF.
5. Correctness of LRF – appropriate if information of three identifiers is correctly filled and incorrect if information on three identifiers is erroneous.

2.2. Analysis of data

Qualitative descriptive information on LRF was converted to quantitative data by using two point scale; score 0 was given for incomplete /inaccurate information and score 1 was given for complete /correct information on LRF. Data obtained was statistically analyzed by Medical online software. Study was approved by the institutional ethic committee.

3. Result and Discussion

The OPD blood collection center of our hospital is on the ground floor. The hospital receives on an average one hundred twenty-five patients per day for lab support after consultations from various OPD clinics. This equals nearly 18,750 patient's LRF in a six-month study period. Out of these 3735 (20% of total) LRFs were selected by random sampling and evaluated for 14 data characters grouped under three quality indicators.

A well formulated printed Laboratory Request Forms [LRFs] are available with all the clinicians of our hospital in their OPD clinics. All OPD consultants and nursing staff are trained for detailing the form and instructed regarding the importance of requirement of LRF for lab investigations. This LRF form contains the space for all the standard information required under quality assessment in laboratory services. Patient's and doctor's information are descriptive type whereas, test request is tick pattern. Separate space for clinical history/ diagnosis, date, time, and signature is provided on LRF. We monitored three basic quality indicators viz. Patient identifier, Clinician identifier and Sample identifier along with completeness and correctness of LRFs in the present study.

Table 1: Completeness of LRFs submitted to OPD blood collection centre during six month study period

	Criteria on TRF	TRF having criteria filled n(%)	TRF having criteria not filled n(%)
1	**Patient identifier**		
1.1	Name of patient	3436 (92%)	299 (08%)
1.2	Age	2839 (76%)	896 (24%)
1.3	Gender	2913 (78%)	822 (22%)
1.4	Patient's ID number	1569 (42%)	2166 (58%)
1.5	Location of patient	3249 (87%)	486 (13%)
1.6	Provisional diagnosis	75 (02%)	3660 (98%)
2	**Clinician's identifier**		
2.1	Name of clinician	1830 (49%)	1905 (51%)
2.2	Name of requesting doctor	1718 (54%)	2017 (46%)
2.3	Signature of doctor	1419 (38%)	2316 (62%)
2.4	Date of request test	00 (00%)	3735 (100%)
2.5	Time of request test	00 (00%)	3735 (100%)
3	**Sample identifier**		
3.1	Type of sample	3623 (97%)	112 (03%)
3.2	Investigation requested	3436 (92%)	299 (08%)
3.3	Correct/ appropriate test request	1419 (38%)	2316 (62%)
4	**Completeness of LRF**	2316 (62%)	1419 (38%)
5	**Correctness of LRF**	1718 (54%)	2017 (46%)

3.1. Patient identifiers quality indicator

3.1.1. Name of the patient: (Figure 1)

Name of the patient was filled on practically 92% [3436] forms whereas on 08% [299] LRFs patient's name was not written. Among 92% LRF showing patient names only 43% [1478] forms were having complete legible names, rest all were either with first name only or name was not legibly written.

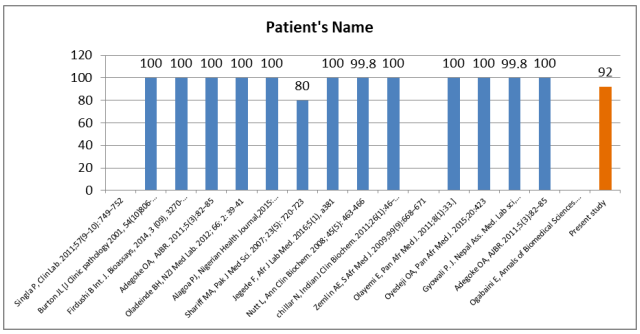

Fig. 1:

Our results were low as compared to 100% forms showing proper name on lab request observed in studies conducted by Burton JL[8] Australian study, Firdushi B[9] Guwahati Medical College, Adegoke OA[10] Nigerian hospital, Oladeinde BH[11] a rural tertiary hospital in Nigeria, Alagao PJ[12] Niger delta University teaching hospital, Jegede FE[13] infectious disease hospital, Kano, Nutt L[14] a tertiary hospital in South Africa, Chhillar N,[15] North Indian Neuropsychiatric institute, Olayemi E,[16] a Ghanaian tertiary hospital, Oyedeji OA[17] a diagnostic center in Lagos, Gyawali PJ[18] Nepal. Patient name and the name of requested investigation are the basic minimum information must be present; omission of these will make the form useless.

3.1.2. Age and gender (Figures 2 and 3)

Present study observed that age of the patient was mentioned on 76% [2839] LRFs and gender was correctly ticked on 78% [2913] forms. Our results were low as compared to results presented by Burton JL[8] [99%], Firdushi B[9] [93.8%] Sheriff MA[19] [94%] Jegede FE[13] [98%] Nutt L[14] [98%] Chhillar N[15] [98%] and Gyawali PJ[18] [94%] But much better when compared to Oyedeji OA[17] [68%] Oladeinde BH[11] [57%], Olayemi E[16] [25.6%]. Knowledge of age and gender is important for lab staff as few diseases are sex linked and reference value of some lab parameters are age related. Information on age and gender makes it easy for lab staff to correlate the results and interpret unusual values which otherwise need repeat testing.

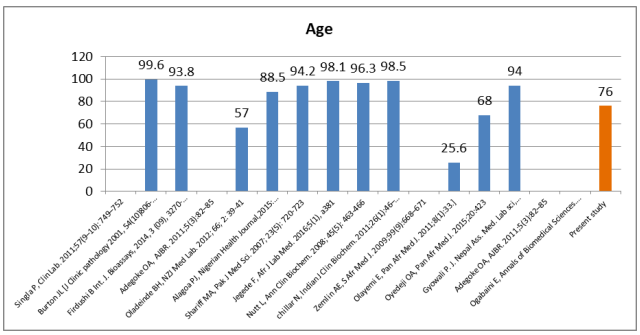

Fig. 2:

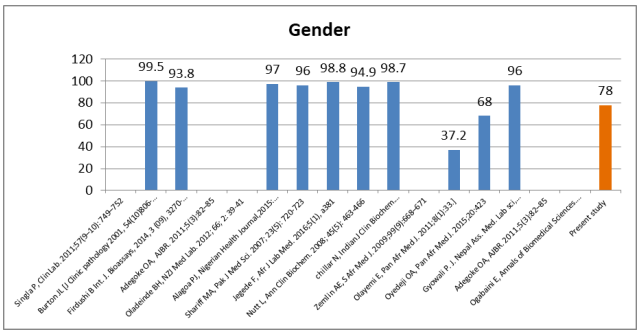

Fig. 3:

3.1.3. Patient's ID: MRD number (Figure 4)

The MRD number is a patient identity indicator available on the LRF. This will help in correctly identifying a patient in the hospital patient record. All clinicians and health care workers know the importance of MRD number even then only 42% [1569] LRFs cited Patient's MRD number whereas 58% [2166] LRFs were either lacking this information or the number was wrongly written. Our results are very poor when related with results of Oyedeji OA[17] who reported 100% Burton JL[8] [99.8%], Firdushi B[9] [99%] Jegede FE[13] [98.6%] Nutt L[14] [99.7%] Chhillar N[15] [99.1%] Gyawali PJ[18] [95%]. Few more studies reported availability of MRD numbers in the range of 52 to 100%.

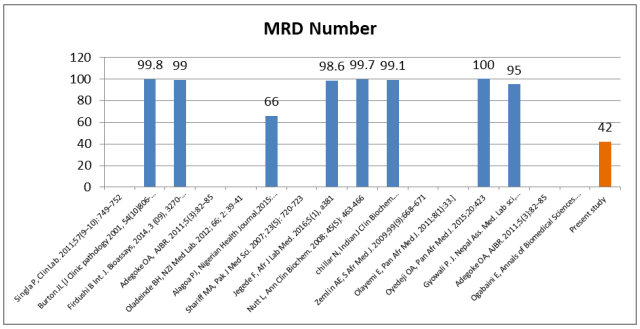

Fig. 4:

3.1.4. Location of the patient: (Figure 5)

Location of the patient in OPD indicates the department from which the patient was referred for laboratory investigation. Though this information at OPD has less value, sometimes communicating critical results can help in urgent patient care. In case of an indoor patient, location will help in communicating a result in time. Also, sometimes information like mismatched sampling or asking for a repeat sample can be communicated. We observed 87% [3249] LRFs indicating this information correctly. Our results are again very poor as compared to 100% completeness observed by Jegede FE[13] infectious disease hospital, Kano; 98.4% completeness observed by Firdushi B[9] [99.8%] by Burton JL[8] 90.4% by Alagao PJ[12] Niger delta University teaching hospital. Nutt L[14] at a tertiary hospital in South Africa found 95% and Chhillar N,[15] North Indian Neuropsychiatric institute 96% completeness. Whereas Oladeinde BH[11] noted 78% but Gyawali PJ[18] reports only 38% LRF filled for location.

3.1.5. Provisional diagnosis: (Figure 6)

A clinical note or provisional diagnosis is also a quality indicator which helps lab staff to interpret any unexpected/critical values. Many times information of physiological condition of a person like pregnancy, menopause, fasting, known case of illness and having history of medication provided by clinician can assist lab

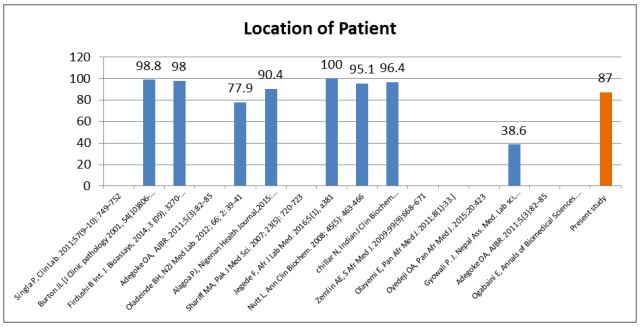

Fig. 5:

scientist in correlating critical results. At our center we observed 98% [3660] LRFs without a patient's clinical history. This incompleteness was much higher as compared to any other reports so far reported. Available information of declaring provisional diagnosis on LRFs varies from as low as 12% in the Indian study to the highest 99.8% by Northwest Nigerian hospital[13] Incompleteness of clinical history reported by Cape Town hospital[14] was 20.8%; Guwahati medical college study[9] reports 62.74%; Neuro psychiatric institute in north India[15] observed 61.2%; Bayelsa state, Niger delta University teaching hospital[12] 16.5% and College of American pathologists[20] reported less than 16% incompleteness. On the other hand Tertiary hospital in south Africa[14] observed 25.3% forms having clinical note in abbreviated forms and 22.7% lab request filled for provisional diagnosis in a study by Ghana Tertiary Hospital[16] diagnostic center, Lagos Nigeria[17] observed 65.9% complete for clinical note. Nepal university Tertiary hospital[18] reported 77% LRF with Provisional diagnosis; Nigerian teaching hospital[10] stated 93.2% forms having provisional diagnosis.

Among patient identifier quality indicators name, age, gender and location were filled in more than 75% forms whereas provisional diagnosis and MRD number were very poorly filled.

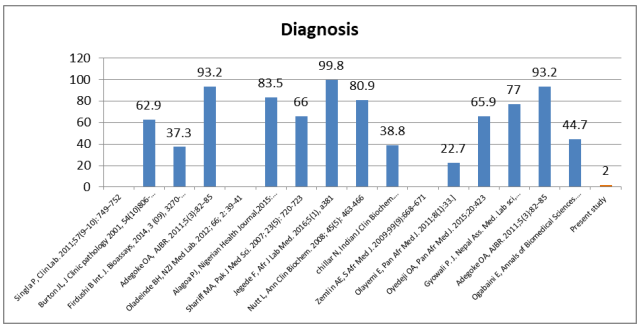

Fig. 6:

3.2. Clinician identifiers Quality indicator

Under Clinician's information quality indicators monitored in present study are Name of Clinician, Test requesting doctor, Time, date of request and signature of ordering doctor. In addition, a standard LRF of a good hospital should have the contact number of the clinician. This will help lab staff to inform critical results in time, and also get help from the doctor to know the status of the patient while interpreting puzzling values obtained from sample analysis.

3.2.1. Name of clinician and investigation requesting doctors: (Figures 7 and 8)

In our observation we found the name of the clinician was blank in 51% [1905] LRFs whereas the name of the investigation requesting doctor was missing from 46% [1718] LRFs. As usual there is a large variation observed on this point from different studies. Oladeinde BH[11] observed 100% forms having Name of clinician but no provision for requesting doctor's name on LRF. Nutt L[14] at South Africa found 92.6% forms having Clinicians name but only 10.4% forms having name of requesting doctor. Bayelsa state, Niger delta University teaching hospital[12] observed 74.7% forms having clinicians name and 84.5% requesting doctor's name on their LRF. Jegede FE[13] reported 85.5% forms with Clinicians name and 90.1% forms having requesting doctor's name on LRF. We reviewed a few studies which reported only investigations requesting doctor's name. This may be due to lack of provision on LRF. Oyedeji OA[17] observed 99% forms with requesting doctor's name, Gyawali PJ[18] Nepal hospital 52%, Zemin AE[14] found 34.8% on thyroid function test LRF, Australian study by Burnett L[21] show 43%, Ogbaini E[22] reported 71% and Sharif MA[19] and Nutt L[14] reported 23% and 10.4% respectively.

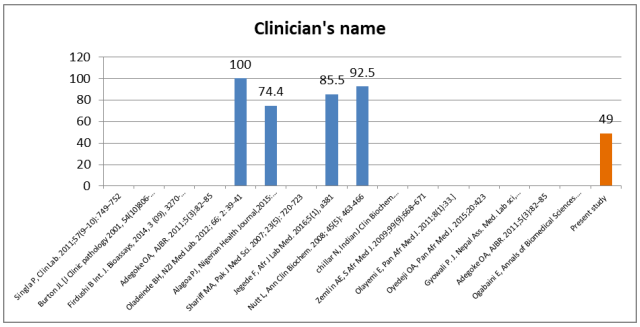

Fig. 7:

3.2.2. Time, date and signature: (Figures 9, 10 and 11)

Time, Date and signature are important criteria to be filled on LRF as per NABH guideline none of the LRF in our hospital study have shown date and time of investigation request. On more than 62% [2316] LRFs either doctor's

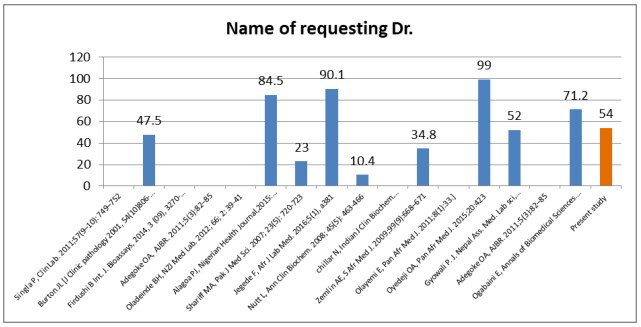

Fig. 8:

signature was not available or it was indecipherable and cannot be considered as a signature. Our findings are similar to Burton JL,[8] Alagao PJ,[12] Jagede FE,[13] Chillar N[15] who also reported very low frequency for this parameter on LRF.

Clinician identifier quality indicator was very poorly attended in present study. This will handicap the lab staff to contact and communicate on critical values. This may cause delay in reporting to the right person at the right time affecting quality of laboratory services.

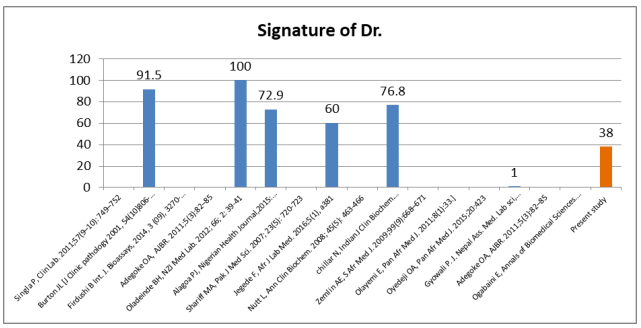

Fig. 9:

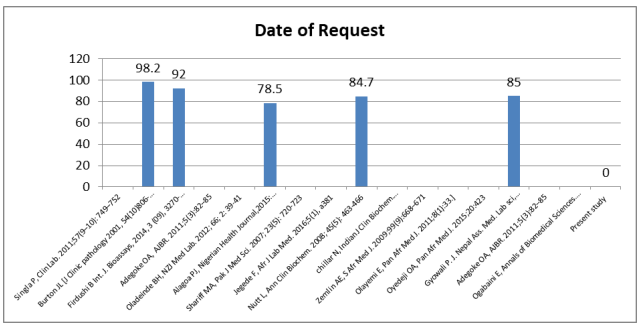

Fig. 10:

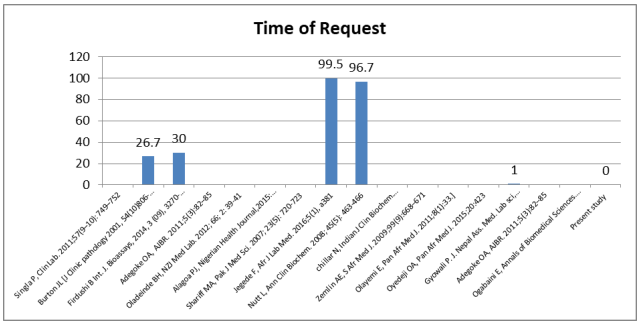

Fig. 11:

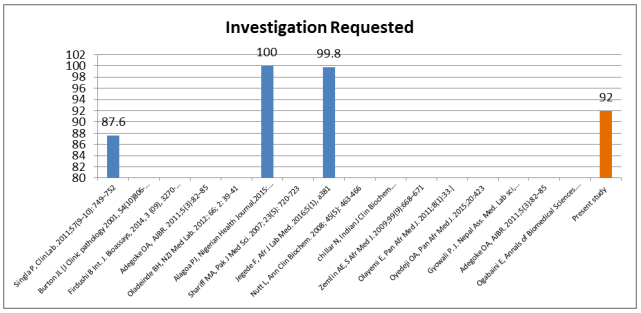

Fig. 13:

3.3. Sample identifier quality indicator: (Figures 12 and 13)

Among the sample identifier quality indicators, we examined marking for nature of sample and specific investigation request on LRF. It is requesting doctor's responsibility to state clearly on LRF about the nature of sample and name of investigations required, any deviation will lead to wrong analysis and erroneous reporting. Our observation revealed 97% [3623] LRFs have informed the type of sample and 92% [3436] forms show tick marks for required investigation but, among these 31% [1065] forms had inappropriate and baffling requests. Overall 62% [2316] erroneous and unwanted test requests were ordered on LRF in present study. Our findings were comparable with the reports from Firdushi B[9] 86.4%, Adegoke OA[10] 89.9%, Alagao PJ[12] 89%, Jagede FE[13] 99.7%, Nutt L[14] 89%. In contrast Chhillar N[15] 12% and Ogbaini E[22] 3.7% reported very badly filled sample identifier information on LRF. Gandhi TK et al[23] reported failure to request appropriate test in 59% cases for imaging diagnosis.

Sample identifier quality indicator was simple as it needed a tick mark against the nature of the sample and the investigation request. Most forms were filled for test requests but more than one third requests were invalid and inappropriate.

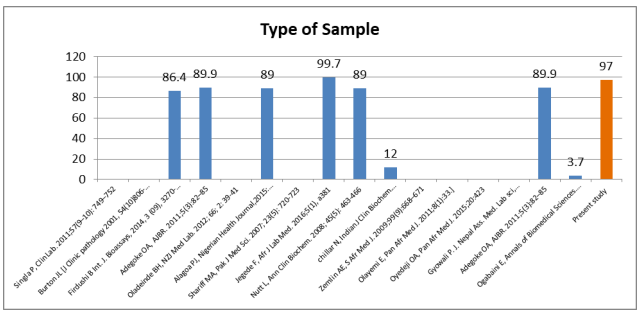

Fig. 12:

3.4. Completeness of LRF: (Figure 14)

As stated incomplete and inaptly filled information on LRF causes error in diagnosis and included under pre-analytical error of laboratory services. The onus of this error mainly lay on the clinician side. Present study reports 38% incompleteness in filling the forms. Results from various studies indicate that incompleteness on lab requests range from 10% to 98%. Observations of incompleteness by Firdushi B[9] Guwahati, India 98.7%, Ogbaini E,[22] Benin city hospital- Nigeria 97.5%; Oyedeji OA[17] Lagos Nigerian hospital 97.37%; Burnett L[21] Australian hospital 43%. Whereas Adegoke OA[10] and Jagede FE[13] observed 85 to 95% completed forms received at Nigerian hospitals. Chillar N[15] and Gyawali P[18] observed 82.7% and 63% completeness respectively.

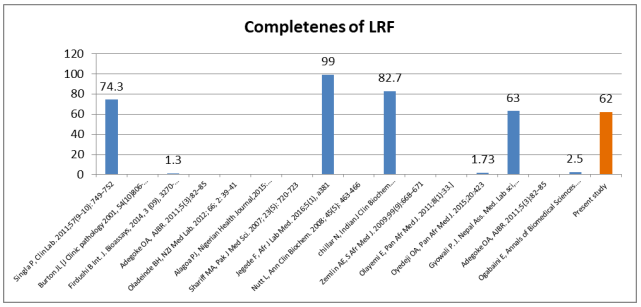

Fig. 14:

Providing incomplete or wrong information in poorly legible writing on LRF is common among clinicians and associate health care workers. Due to prevailing power differences clinicians feel low to receive directives from Laboratory personnel. Also, the attitude of healthcare workers towards writing complete information on LRF cannot be overlooked as they feel such documentation is useless, an extra burden and waste of time. Sometimes an excessive number of patients to be attended in limited OPD hours can be a factor, but a change in attitude and accepting the responsibility will surely improve the condition.

3.5. Correctness of LRF: (Figure 15)

Correctness in present study means appropriate test request at appropriate time intervals and proper readability of the information provided by clinician on the LRF. We observed 54% LRFs having correctness of presentation, remaining 46% forms had shown errors in filling one or other data indicators. The most error was observed while ticking the required investigation and minimum interval of repeat request. Our observation is very poor when compared with reports from Firdushi B,[9] Jagede FE[13] and Chillar N[15] who observed 94.8%, 99%, 80% correctness respectively while requesting investigation.

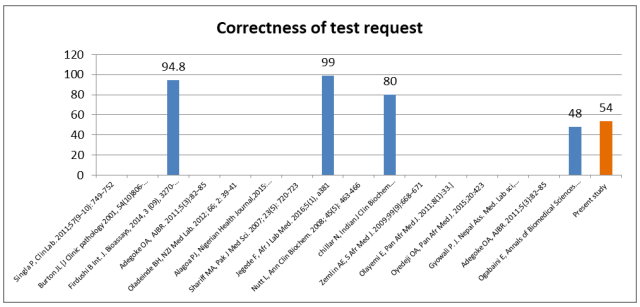

Fig. 15:

4. Conclusion

In the computer and automated analyser's era, analytical errors are greatly reduced. However, preanalytical errors which are not in control of laboratories have shown relative increase. Any mistake occurred from requesting a test by filing of LRF to dispatch of sample at respective laboratories fall in preanalytical error phase. The role of LRF is important because wrong details or incomplete information will lead to faulty lab results which in turn affect diagnosis or treatment and compromises the care and safety of patients. Appropriately filled LRF serves as a medium of communication between laboratory personnel to provide timely quality reports and for clinicians to manage quality care of patients. Hand written, poorly legible, inappropriately abbreviated erroneous LRF are misguiding and can compromise patient care and safety. Also, it is a big obstacle in getting NABH accreditation.

Repeated training to concerned clinicians and paramedical staff along with change in attitude towards LRF writing is the need of the day to minimize preanalytical errors and improve the standard of the healthcare system.

5. Source of Funding

None.

6. Conflict of Interest

None.

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