Original Research Article

Audit and Assessment of Communication through Laboratory Referral Forms Submitted To Haematology Department of University of Nigeria Teaching Hospital, Enugu Nigeria

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Abstract

Background: Good communication between the clinics and the laboratories and among the health professionals enhances diagnostic capability, efficiency and better management of the patient and is necessary for accurate and precise results. The study was carried out to audit and assess communication flow between the clinic and laboratory at the Haematology Department of the University of Nigeria Teaching Hospital - Enugu. *Method:* A total of 1000 laboratory request forms were collated in the study and each of these forms was monitored from time of inception till dispatch. Information in the laboratory request forms were grouped into four categories; patient's biodata, clinical information, laboratory parameters and administrative parameters and analyzed statistically. *Results:* In patients biodata; age, sex and ethnic group fell short by 74.7%, 13.3% and 35.7% respectively. In clinical information category; clinical detail, provisional diagnosis, previous haematological requests and nature of specimen were insufficiently completed in 68.0%, 14.0%, 84.4% and 7.4% of the forms respectively. Ward, referring doctor and hospital reference number, were deficient by 1.2%, 2.4% and 65.0% respectively. Date, time of collection and date of arrival in the laboratory were lacking in all the forms. Out of the 1000 samples that arrived to the laboratory, 2% were inadequately collected or clotted and hence rejected. The information about these specimens was not communicated to the clinic/ward either through telephone or immediate dispatch for necessary repeat collection. *Conclusion:* We observed poor information communication between the clinicians and the laboratory and this may affect the accuracy of results. The inclusion of formal training in investigations, collection and handling of pathological samples in medical curriculum and training of practicing doctors through continuing education is recommended. Advances in technology or change in procedure should be adequately communicated to all concerned in the utility of laboratory results. Pathologists should play the critical roles of not only interpreting the results of the tests but also the continuing education of young doctors.
Keywords: Audit Assessment, Communication, Laboratory Referral Form, Haematology Unit, UNTH.

INDRODUCTION
BACKGROUND

Clinical laboratories provide information and services that contribute to maximizing the effective delivery of care in healthcare system by assuring that the correct test is performed on the right person, at the right time, producing accurate test results that enable providers to make the right diagnostic and therapeutic decisions using the right level of health care resources [1]. Laboratory information enables physicians and other healthcare professionals to make appropriate evidence-based diagnostic or therapeutic decisions for their patients. Clinical laboratory services are the most cost effective, least invasive source of the objective information used in clinical decision-making. Clinical laboratory services have a direct impact on many aspects of patient care including, but not limited to, length of stay, patient safety, resource utilization, and customer satisfaction [1] and these are directly related to the availability of accurate, reliable and timely laboratory testing and reporting of results [2].

The practice of good communication among health professionals is integral for the development of meaningful and trustworthy relationships beneficial to them and the patients and greatly enhances diagnostic capability and better management of the patient [3-5]. For the clinicians likewise the laboratory staff; proper information about the nature, course and prognosis of

the disease is important [3]. Hospital-based "Clinical Laboratory Information (Consulting) Centers" has been established in most advanced countries aimed to improve medical care by providing accurate and up-to-date information on clinical laboratory tests and interpretations [6]. Continuing education and information flow are necessary among health-care personnel and even with patients [7-9].

The laboratory investigation is prone to errors from the time it is received as a request until the written report is received from the laboratory. The specimens received for examination in a laboratory are subject to technical and clerical attention, the objectives of such attention being to provide accurate reports for the clinician. This enables the laboratory scientist not to leave any stone unturned in seeing that the reports sent to the clinician are accurate and precise to yield relevant and useful information. In order to obtain an efficient laboratory work, effective liaison between the collection of the specimen and laboratory personnel is essential. The resulting report is the end-point of this liaison and can only reflect the care with which the specimen was collected, proper information about specimen or patient given, the speed with which it was delivered to the laboratory, relevance of the accompanying request, the skill and experience of the laboratory work. Good communication has been considered extremely important for medical practitioners [10-12] and the need to train medical professionals in this important yet ignored aspect in clinical medicine cannot be overemphasized [5]. One of the main goals of communication is creating a good interpersonal relationship, facilitating exchange of information [13] for better management of the patient.

The role of the laboratory in the diagnosis and treatment of diseases has become more pertinent as technical methods have improved. Errors in the collection and handling of specimen as well as paucity of relevant information may lead to inaccurate and misleading of reports and hence negatively affect the prompt management of the patient. These errors can be prevented by proper information between the clinic and laboratory.

The laboratory referral form (LRF) contains relevant information about the patient and sample. The patient's biodata, clinical information and laboratory data are all very important for diagnosis and clinical utility of laboratory results. Often times the request forms are not properly completed, leaving the laboratory forms with scanty or no information about the patient or sample. On the other hand, the clinicians are not communicated by the laboratory when there is a change of methodology, quantity of specimen to be collected for given investigation and suitable continuity when there is need for follow-up or repeat collection. Often, the report is not scrutinized by a Senior Medical Laboratory Scientist before it is dispatched or reports

not stated unequivocally and ambiguous reports leading to misunderstanding in interpretation of the report. Effective communication undoubtedly will help to put these problems to check.

We therefore reappraised the current methods of clinical communication using the LRFs between the laboratory and clinics as practiced in Haematology Laboratory of University Nigeria Teaching Hospital Enugu, to look into the factors that constitute barrier to communication flow between the laboratory and clinic and to highlight ways of improving communication between the laboratory, ward and doctor which is very important in providing quality in patient's care.

MATERIALS AND METHODS
Sampling & Sample size
The study was carried out at University of Nigeria Teaching Hospital, Enugu between October, 2018 and February, 2019. Data from 1000 Haematology Laboratory Referral Forms (LRFs) were monitored with accompanied samples and necessary information collated right from the time they arrived the laboratory, accompanied samples analyzed till the LRFs dispatched back to the clinic/wards noting the adequacies of relevant information (completeness or otherwise) of the patient's biodata, clinical and laboratory information as well as important clerical information (time and date of collection, date of arrival and laboratory reference number, signature of doctor and laboratory scientist, date reported and dispatched).

Data collation & Ethical Approval
Laboratory request forms/samples were monitored and assessed without interference right from inception from the clinic/ward to processing in the laboratory till dispatch taking note of the available important information, duration and means of communication of results back to the clinic. The method of sampling was by self-selection. The information assessed and collated were grouped into four; Patient's biodata (name, age, sex, ethnic group/tribe), Clinical informations (clinical details, provisional diagnosis, previous haematological request, examination required and nature of specimen), Administrative information (ward, referring doctor, hospital reference number, signature of referring Doctor/Medical Laboratory Scientist) and Laboratory data (laboratory results, date/time of arrival to the laboratory, report and dispatch). The samples were equally examined for clot, haemolysis, the anticoagulant bottle used for sampling and to ascertain the adequacy of volume.

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20 software. Ethical clearance was duly obtained from the UNTH Ethics & Research Committee

RESULTS

One thousand LRFs/samples were monitored and assessed for proper information as well as proper and sufficient sample collection. None of the 1000 forms analyzed presented with all the necessary information as designed (Table-1, Fig-1). In the biodata category; there was complete information in the name of the patient. The age of the patients were not given in 74.7% of the forms. Sex and ethnic group were also deficient in 13.3% and 35.7% of the forms respectively (Fig-2).

Information on the clinical parameters was also scanty. The provisional diagnosis and nature of specimen information were less observed (14.0% and 7.4% respectively). Clinical detail and previous haematological request were not supplied in 68.0% and 84.4% of the forms respectively (Fig-3).

Majority of the forms presented with scanty information in administrative parameters (Fig-4). Although all the forms were properly signed by the requesting doctor, the wards, name of doctors and the hospital reference number were deficient in 1.2%, 2.49% and 6.5% of the forms respectively. Regrettably; none of the forms presented with date and time of collection and arrival of specimens. However, all the forms were given laboratory reference number and were duly signed before dispatch. The processed laboratory results and even the clotted, haemolysed and insufficient samples were duly entered in laboratory log book before dispatch.

Results of all relevant laboratory test analyzed were duly completed. Out of the 1000 samples that arrived to the laboratory, 3% were not processed due to lysis, presence of clot or insufficiency. The information about these specimens were not communicated to the clinic/ward either through telephone or immediate dispatch with necessary repeat collection, instead, they were left in the laboratory. It was also observed that all the forms without ward or clinic were not dispatched.

Table-1: Rate of completeness of LRFs information (properly filled and not properly filled)

| Information	Number properly filled forms (%)	Number not properly filled forms (%)
Name	1000 (100%)	0 (0%)
Age	253 (25.3%)	747 (74.7%)
Sex	867 (86.7%)	133 (13.3%)
Ethnic Group	643(64.3%)	357 (3577%)
Clinical Detail	320 (32.0%)	680 (68.0%)
Provisional Diagnosis	860 (86.0%)	140 (14.0%)
Examination Required	1000 (100%)	0 (0%)
Nature of Specimen	926 (92.6%)	74 (7.4%)
Previous Haematological Request	156 (15.6%)	844 (84.4%)
Ward	988 (98.8%)	12 (1.2%)
Referring Doctor	976 (97.6%)	24 (2.4%)
Hospital Reference Number	350 (35.0%)	650 (65.0%)
Signature of Referring Doctors	1000 (100%)	0 (0%)
Signature of Laboratory Scientist	1000 (100%)	0 (0%)
Time of collection	0 (0%)	1000 (100%)
Date of collection	0 (0%)	1000 (100%)
Date of Arrival to the laboratory	0 (0%)	1000 (100%)
Date reported	1000 (100%)	0(%)
Laboratory Reference Number	1000 (100%)	0(%)
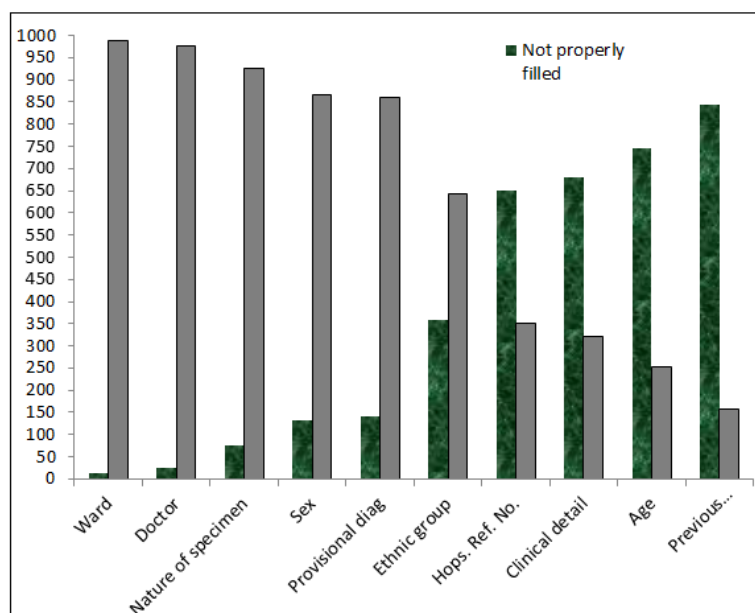
Fig-1: Completeness of some information (properly filled and not properly filled) with regard to patients' biodata, clinical and administrative)
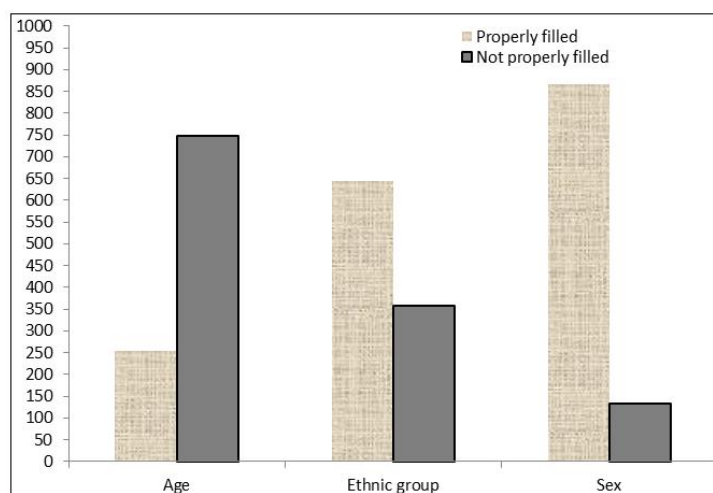
Fig-2: Completeness of patients' biodata information (Properly filled and not properly filled)
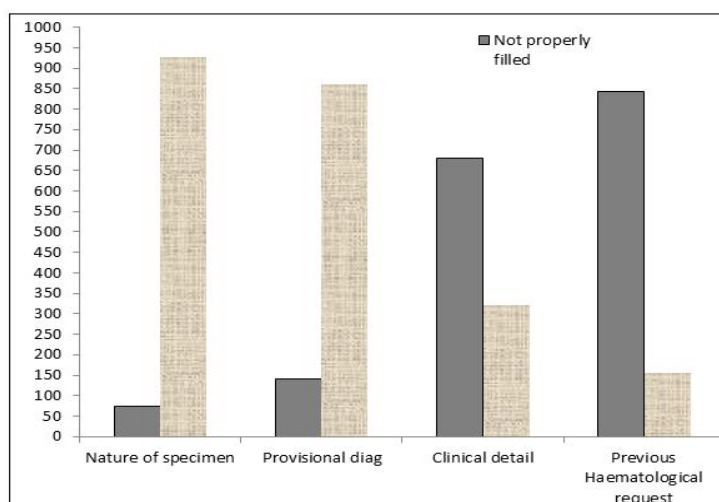

Fig-3: Completeness of clinical information (properly filled and not properly filled)
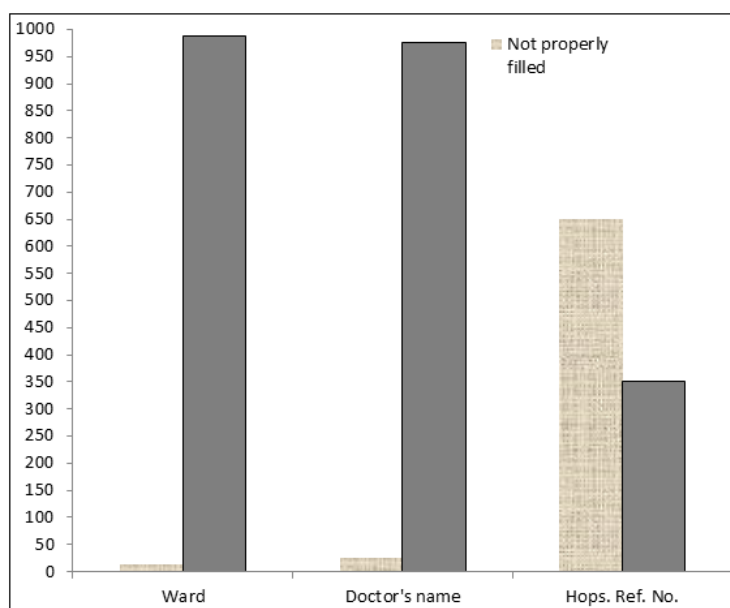

Fig-4: Completeness of administrative information (properly filled and not properly filled)

DISCUSSION

Good communication has been considered extremely important for medical practitioners in the western world since decades [5] and its significance is now being acknowledged the world over as integral for the development of meaningful trustworthy relationship among the health professionals in achieving better patients management [4, 10].

Relationship building among medical and health personnel's is of immense importance in achieving synergy necessary for efficient health care. In this study we audited and assessed the communication flow between the clinics/ward and the haematology laboratory using the LRFs as official means of communication for the investigations request and results. We focused on the haematology laboratory because most of the investigations are influenced by gender and age and are equally time dependent [14-17]. It has been observed in both humans and animals that haematologic parameters are largely influenced by age, sex, physical factors of the environment and physical activity; understanding the effect of age and sex on hematologic parameters will help to distinguish the boundaries between normal changes and diseases-related changes and to pave the way to identify other factors or conditions that may affect those parameters [18-21]. However, the understanding of the impacts of clinical and biochemical parameters on haematological indices is limited; hence the need for continuing education.

In this study regrettable, almost all the forms assessed lacked one or more information in biodata, clinical or laboratory assessment. Similar poor information in patients biodata were earlier observed in consultants referrals [22]. In a similar study in Northwest – Nigeria [23]; it was observed that only information on patient name, patient location and laboratory number had 100% completeness while some other information were incomplete. They therefore concluded that the level of completion of laboratory reference forms (LRFs) was suboptimal and underscores the need to review and redesign the LRF, improve on training and communication between laboratory and clinical staff and review specimen rejection practices. Poor standard of completion of request forms was also observed in a teaching hospital in Ghana [24] and the authors opined that this could lead to limitation in advice given by laboratory physicians and may increase the potential for errors.

Inconsistence with regard to age was observed as "adult" was commonly used in place of specific age. This is deficient and not useful to the laboratory analyzes and epidemiological studies. The provision of all the information needed on the forms will aid laboratory diagnosis and enhance patient care and save time and resources. Closer interactions/communications between clinicians and laboratory personnel should be encouraged to improve quality of services.

Some variations in human parameters are influenced by age. Such parameters like haemoglobin concentration, packed cell volume and reticulocyte count are usually higher in infants than normal adults [25]. The knowledge and understanding of physiological variations helps the laboratory scientist in correlation of results which is very important in quality assurance. Sex of patients in the request forms helps the laboratory to solve problems arising from two or more patients having identical names. Secondly, there are haematological examinations which vary with sex like ESR, PCV and Hb. The laboratory needs knowledge of the sex of patients so that these values will be monitored in individuals of different sexes. Ethnic group of patients to the laboratory scientist engender confidence and acts as an easy way to confirm some laboratory results following the fact that some areas are endemic with some diseases.

The person collecting the sample must accurately identify the patient. This might be done by questioning the patient, an accompanying family member, or by the use of an identifying wrist band or other device. The patients' full name should be given i.e. (the first name and surname) by the referring doctor. To the doctor concerned, 'Mrs Okoro' may be an individual while to the laboratory, she may be one of several hundred Okoros', which makes record hard to find in future and impossible to identify.

In our study and other related studies [22-24] in same environment; clinical information was insufficiently provide in the LRFs as well as provisional diagnosis and clinical details. The provisional diagnosis is the presumptive diagnosis from the referring doctor and is necessary for the laboratory to rule-out or confirm the diagnosis. Clinical details explain more the patient's clinical condition. Provision of sufficient information on the LRFs to staff in Clinical Diagnostic Laboratories enable them to apply the correct safety measures, control the risk of infections and also inform the assessment and further laboratory processing [1]. Good clinical information means faster and more reliable results [26, 27]. Too little clinical information may result in more diagnostic error since the focus of diagnostic testing is in finding an explanation for the patient's symptoms. If clinical details are inaccurate or incomplete or there is delay in disclosing new information to the laboratory then this can result in specimens being processed under insufficient laboratory containment conditions.

Hospital information (ward, reference number and consultants name) were found deficient in this study and other previous studies [22-24]. Hospital reference number which is the best tool for proper identification of a patient outside name was not

completed in 65% of the forms analyzed. Once a sample enters the laboratory, there are a number of steps needed prior to testing. These pre-examination steps include: verifying if the sample is properly labeled, adequate in quantity, in good condition, and appropriate for the test requested. The test request must be complete and include all necessary information; recording sample information into a register or log; enforcing procedures for handling sub-optimum samples, including sample rejection, when necessary since poor sample will not allow accurate results [1]. It is the responsibility of the laboratory to enforce its policies on sample rejection so that patient care is not compromised. Management should regularly review the number of rejected samples and reasons for rejections, conduct training on sample collection, and revise written procedures for sample management as needed. When rejecting a sample, it is important to: promptly inform authorized person that the sample is unsuitable for testing; request that another sample be collected following procedures outlined in the laboratory; retain rejected sample pending a final decision regarding disposition.

Completeness of information on ward/clinic of the patient was equally found deficient in our study. Ward/clinic enables the laboratory to know the location of the patient for specimen collection, emergency dispatch of laboratory results and most importantly information clarification and repeat collection which could be attributed to specimen collection inadequacy and clotted sample.

The quality of the work a laboratory produces is only as good as the quality of the samples it uses for testing, therefore; quality management system is paramount for accurate and reliability of results and confidence in laboratory diagnosis. The laboratory must be proactive in ensuring that the samples it receives meet all of the requirements needed to produce accurate test results [1]. Inaccuracies in testing can impact length of hospital stays, as well as hospital and laboratory costs. Inaccuracies can also affect laboratory efficiency, leading to repeat testing with resultant waste of personnel time, supplies, and reagents.

The laboratory can help to assure good samples by providing collection information to health care personnel at the collection site, making sure that appropriate containers and collection supplies are available, defining a good labeling system, and checking all samples carefully when they arrive in the laboratory. The laboratory should establish rejection criteria and follow them closely [2]. Accordingly, The Committee on Diagnostic Error in Health Care [28] recommended that it is the responsibility of the laboratory to enforce its policies on sample rejection so that patient care is not compromised. Management should regularly review the number of rejected samples and reasons for rejections, conduct training on sample

collection, and revise written procedures for sample management as needed.

It is necessary therefore; that more efficient methods of communication are employed for maximum efficiency. This can be achieved by the use of current laboratory information management systems (LIMS) that typically enable: recording of all requests for all tests on-line, real-time linking of the LIMS to automated analytical instruments, sample tracking and workflow management, worksheet generation for manual tests, automated validation of test results, real-time recording of quality control data, electronic delivery of results to clinical users, implementation of decision support systems to enhance clinical outputs and support of data analysis for audit, clinical risk management, disease surveillance and epidemiology [2, 29]. Telephone can be used to deliver critical results.

CONCLUSION
We observed generally poor communication between the clinicians and the laboratories and vice versa. Importance of standard communication is the bed rock of effective health care delivery. The authors therefore; recommend inclusion of formal training in laboratory procedures in medical curriculum, and training of practicing doctors through continuing education. Advances in technology or change in procedure should be adequately communicated to all concerned in the utility of laboratory results. Pathologists should play the critical roles of not only interpreting the results of the tests but also the continuing education of young doctors.

SIGNIFICANCE STATEMENT
Good communication between the clinics and the laboratories and among the health professionals is found to be deficient in Nigerian Hospitals. Communication enhances diagnostic capability, efficiency and better management of the patient and is necessary for accurate and precise results. Adequate patients' information enables physicians and other healthcare professionals to make appropriate evidence-based diagnostic or therapeutic decisions for their patients. Advocacy towards inclusion of formal training in investigations, collection and handling of pathological samples in medical curriculum and training of practicing doctors through continuing education is therefore necessary.

Conflict of Interest
The authors have no conflicts of interest to declare.

Authors' Contribution
- **Chukwurah Ejike Felix**: Designed the framework, wrote the protocol, anchored data collection and statistical analysis, interpreted the data, read and approved the draft and final manuscript.

- **Nwagbo Michael I:** Anchored the management of information garnered and interviews. Helped in literature searches, produced the initial draft, approved and read the final manuscript.
- **Chukwurah Felix Chinedum:** Anchored the management of information and laboratory referral forms and tracking of results.. Helped in literature searches, and statistical analyzes, produced the initial draft, approved and read the final manuscript.

ACKNOWLEDGEMENTS

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