ORIGINAL ARTICLE

An Audit of Chemical Pathology Laboratory Investigation Request Forms Received at A Private Tertiary Hospital in Nigeria.

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ABSTRACT

Context: Laboratory testing constitutes an integral part of patient management and has an extensive influence on medical decision-making. The completion of laboratory investigation request forms is a vital aspect of the highly variable pre-analytical phase of laboratory testing.
Aim: We aimed to assess the adequacy of completion of investigation request forms received at our laboratory.
Methods: An audit of systematically selected laboratory investigation request forms received over a six-month period at our laboratory was performed to assess the degree of completion of these forms by requesting clinicians. Data was analysed using Microsoft Excel®.
Results: Two hundred and fifty four request forms were reviewed. None of the reviewed forms was adequately completed. The clinician's contact number was missing in all the request forms. About two-thirds of the request forms did not have the patient's hospital number (66.1%) and the referring clinician's signature (66.9%) available on them. The clinical diagnosis of the patient was not stated in 18.9% of the request forms. The patient's name, gender and age were the most frequently completed parameters in 100.0%, 98.4% and 97.2% of the request forms respectively.
Conclusion: Basic information required for the accurate interpretation of laboratory results are missing in several request forms. This may have deleterious impact on laboratory turnaround time, healthcare costs and patient management as most medical decisions are influenced by laboratory results.

KEYWORDS: Laboratory investigation request forms, Completion, Pre-analytical Phase, Audit

Introduction

Laboratory testing is central in disease management and consists of three phases.[1] The pre-analytical phase of laboratory testing is error-prone with most of the errors occurring extra-laboratory.[2] The highly variable nature of the pre-analytical phase has a significant impact on patient outcome and the quality of laboratory services.[3, 4] The completion of request forms is an essential component of the pre-analytical phase. A Chemical Pathology test request may be viewed as a referral from the Clinician to the Chemical Pathologist, seeking specialist opinion on the patient being tested. Typically, the Laboratory Physician, only interacts with the request form, hence all relevant clinical information ought to be at the laboratory physician's disposal for an accurate interpretation of a test result.[5, 6] As part of the process of continuous quality improvement in our laboratory, we performed an audit to review the adequacy of the information provided on the test request forms received at our laboratory.

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Methods:

Study Setting:

The Chemical Pathology Laboratory is located within the grounds of a 140-bed private tertiary healthcare facility in the South-Western region of Nigeria. The laboratory renders services to the hospital, the staff and students of the University, and the local community. It also receives investigation requests from some primary, secondary and tertiary healthcare facilities within the South-Western region of the country.

Study Design

A laboratory-based audit was performed of request forms received at the laboratory and reviewed by a Chemical Pathologist, from July to December 2015. Ten (10) request forms were systematically selected for the audit each week. We selected the first and the last request forms to be received during routine work hours, on each of the five working days of the week, every week, throughout the study period. Inclusion criteria consisted of all laboratory investigation request forms received from the outpatient departments, the Accident and Emergency unit, the Intensive Care Unit, the wards within the hospital in addition to request forms from other healthcare facilities serviced by the Chemical Pathology Laboratory, during the study period. We excluded all laboratory request forms for Staff and Students' Screening Exercises, routine individual medical screening and requests received during emergency hours. Requests for the screening exercises are not made on laboratory investigation request forms and the results of requests received during emergency hours are typically released prior to review by a chemical pathologist.

Data Collection and Analysis

The ten quality indicators which were required for the completion of the Chemical Pathology Laboratory request form include the name of the patient, hospital number, age of patient, patient's gender, date of request, specimen type (urine, blood, fasting, random etc), name of requesting physician, physician's signature, phone number and the clinical details/diagnosis. Data on the level of completeness of each laboratory request form reviewed was entered onto a Microsoft Excel Spreadsheet and analysed using Microsoft Excel. Frequencies of the various quality indicators required for completion of a laboratory request form were estimated.

Results

During the study period, the Chemical Pathology Laboratory received 5,693 request forms excluding the requests for staff and student screening and routine individual screening exercises. A total of two hundred and fifty four (254) of these test request forms were reviewed during the study period based on a systematic selection. None (0.0%) of the reviewed forms was adequately completed; all the request forms had the clinician's and the patient's contact number missing. In two-thirds of the test request forms reviewed, the hospital number (66.1%) or the clinician's signature (66.9%) were missing. Thirty two (12.6%) test request forms did not have the name of the referring clinician while 48 (18.9%) test request forms did not have any clinical details or diagnosis available. About a third (33.1%) of the test request forms did not have the date of the test request and the details of the specimen type (36.6%). Majority of the test request forms had the age of the patient (97.2%) and the patient's gender (98.4%) completed. The patient's name was available in all (100.0%) the reviewed request forms. Table 1 shows details of completion of the test requests forms based on the ten quality indicators reviewed.

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Table 1. Level of Completion of Preanalytical Quality Indicators on the Chemical Pathology Request Forms Reviewed.

Quality Indicators	Number of forms present	Percentage complete (%)
Identification using patient's name and surname	254	100.0
Identification using hospital number	86	33.9
Age (years, months or days)	247	97.2
Gender	250	98.4
Name of requesting clinician	222	87.4
Requesting clinician's signature	84	33.1
Requesting clinicians contact number	0	0.0
Clinical summary / diagnosis	206	81.1
Identification of specimen	161	63.4
Date of request	170	66.9

Discussion

Laboratory-based clinical audits serve as a source of feedback to laboratory end-users and laboratory staff. As one of the key elements of clinical governance, they are pivotal in continuous quality improvement.[7] Laboratory results influence more than two-thirds of medical decisions and impact on the quality of healthcare delivery,[8] hence the prevention of laboratory errors is key to the delivery of quality healthcare services. Most of the errors in laboratory testing occur during the pre-analytical phase[9] and adequately completed test request forms, remain a simple but effective way of reducing some of the errors in the highly variable pre-analytical phase of laboratory testing.[10] Notwithstanding, reports from various parts of the world show inadequacies in the completion of laboratory test request forms.[5,6,11-15]

In our study, none of the reviewed test request forms was appropriately completed, with the clinician's contact phone number being the most common missing parameter in all the 254 (100.0%) request forms evaluated. This finding is similar to the report from a haematology laboratory in Ghana where none of the request forms evaluated had the requesting physician's telephone or fax number.[14] Oyedeji et al reported only 1.3% adequately-completed investigation request forms in their study but in contrast, the referring clinician's phone number was present in 99.0% of laboratory and radiology request forms submitted to a private multidisciplinary diagnostic centre in Nigeria.[13] This may be because the laboratory is an independent facility that must communicate results to multiple healthcare facilities unlike our laboratory that is an integral part of a specific health facility. In South Africa, only 39.8% of Chemical Pathology request forms had the clinician's

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contact telephone or pager number indicated.[11]

In addition to the absence of a contact number, the referring clinician's name was missing in one-eighth of the request forms received at our laboratory. Where there is no clinician's contact number provided on request forms, results with critical values cannot be communicated by phone. Critical values are laboratory results which are life-threatening and indicate a need for an urgent therapeutic intervention.[16] International regulatory and accreditation bodies require laboratories to promptly notify the patient's care giver of a critical value[17] in order to ensure patient safety. However, a critical value generated on an inadequately-completed request form with the clinician's contact number and name missing, complicates the job of the laboratory personnel who is responsible for the timely notification of the critical value to the clinician. Additionally, it wastes man-hours, delays the prompt therapeutic intervention needed in the patient and hence endangers the patient's life.

We observed a one hundred percent completion rate for patient's name in the forms we reviewed. This was comparable to the report from Ghana in which the patient's name appeared on all the forms evaluated.[14] Similarly, Oyedeji et al[13] and Nutt et al[11] reported 99.0% and 99.8% completion rate for patient's name, respectively. Although the patient's name was available on all the request forms we evaluated, the patient's hospital number was missing in two-thirds of the request forms. The Joint Commission National Patient Safety Goals requires at least two of three sources of patient identifiers – the patient name, birth date and hospital number before specimen collection. This requirement prevents a mix-up of requests and specimens in cases of patients with identical names and ensures the patient receives the right test and treatment.[18] At our laboratory, our request form requires patient's name and hospital number as two of the three sources of patient identifiers. Hence complete patient identification was lacking in two-thirds of the evaluated request forms which had no hospital number. Patient/specimen mix-ups can result in gross laboratory and diagnostic errors with potential ripple effects leading to inappropriate therapeutic interventions and loss of patient lives.[19, 20] Patient's demographic details such as the age and gender were not available in 2.8% and 1.6% of the evaluated request forms. These rates are similar to the ones observed in South Africa, where 5.1% of the forms had no record of the patient's gender and 3.7% of the forms had no record of the patient's date of birth[11]. However, Olayemi et al observed that patient's age and gender were not stated in 25.6% and 32.7% of request forms, [14] while Oyedeji et al reported the absence of patient's age in 32.0% of investigation requests and gender in 19.7% of investigation requests.[13] Patient's demographic details are required in the interpretation of laboratory results. A number of biochemical analytes such as serum creatinine, alkaline phosphatase and thyroid stimulating hormone have age-specific reference intervals, while other analytes such as the reproductive hormones have gender-specific reference intervals. Thus, the absence of demographic details on a laboratory request form can easily lead to a misdiagnosis on a patient and subsequent patient mismanagement.

More than a third of the request forms did not specify the type of specimen and the date and time of specimen collection. The details of the type of specimen is required in the interpretation of results particularly with respect to other body fluids apart from blood. For these fluids, the reference intervals for many analytes are different from those for serum/plasma. Therefore, in a case of bloody tap, available information on specimen type would prevent result misinterpretations arising from the inadvertent use of wrong

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reference intervals. The time of specimen collection is notably relevant in the interpretation of dynamic function tests, and tests for certain analytes whose reference intervals differ according to the time of the day.

Nearly one-fifth of the request forms had no clinical details or diagnoses available. This was comparable to the findings by Nutt et al, in which the patient's diagnosis was not indicated in 19.1% of the request forms. [11] In the United States however, a survey of 417 institutions revealed that 2.4% of surgical pathology request forms had no clinical information supplied in them.[21] The availability of relevant clinical information on a request form is essential for the pathologist's adequate interpretation of results and recommendations for further relevant investigations and/or management when these have not been requested and/or instituted respectively, in the patient. Conversely, the absence of clinical information can result in extraneous ancillary testing with resultant wastage of resources, patient discomfort and prolonged hospital stay.[15]

Our study was limited to the Chemical Pathology Laboratory of our institution and we did not evaluate the impact of the incompletely filled request forms on patient management and the turn-around time of laboratory results. Notwithstanding, our findings are likely to portray the standard of completion of request forms in the other departments of laboratory medicine at our institution and other tertiary healthcare laboratories in our environment. This is because it is the same set of referring clinicians who utilise the other laboratories. In addition, we have demonstrated that the rate of completion of request forms received at our laboratory is sub-optimal. Conspicuously-lacking in several request forms are vital information required for appropriate interpretation of results and early communication with the referring clinicians. Our findings may have deleterious effect on the quality of our laboratory service and healthcare delivery, due to the misinterpretations of results, delays in turnaround time, extraneous additional testing and prolongation of patient's hospital stay that may arise from the incomplete request forms. Consequently, there is a need for a re-orientation of referring clinicians by pathologists and continuous interaction of the pathologists and clinicians at interdepartmental seminars, chart reviews and hospital grand rounds to highlight the importance of adequate completion of request forms. The criteria for rejection of laboratory test requests at our laboratory may need to be reviewed to include certain missing parameters on incomplete request forms. Finally, we plan to include lectures and laboratory practical sessions on 'pre-analytical sources of error in laboratory testing', in the undergraduate medical training schedule and house-officers' orientation programmes.

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