INCOMPLETELY - FILLED DATA ON LABORATORY REQUEST FORMS AS A SOURCE OF PRE-ANALYTICAL ERROR IN A NIGERIAN SPECIALIST HOSPITAL

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ABSTRACT

Most clinical decisions are based on information derived from laboratory test results. However, errors occur in the delivery of laboratory testing, especially in preanalytical phase. We aimed to analyze data on laboratory request form to see its contribution to preanalytical errors. Laboratory request forms received at the Microbiology and Hematology units of Saint Charles Borromeo hospital, Onitsha were evaluated after the tests were completed. A total of 1850 request forms were analyzed for completeness of data in the standard laboratory request form. The overall completeness of data on the request forms was 14.3% as only 2 of 14 variables on the request forms were filled completely, i.e. patients surname and first name. Age/date of birth of patients were recorded in 92.6% of forms whereas gender was captured in 99.8% of forms. The patient's hospital numbers and ward addresses were filled in 1800(97.3%) and 1780(96.2%) of request forms respectively. The provisional diagnosis and clinical details made by requesting physicians were absent in 20% and 40.8% of forms respectively. History of previous medication was omitted in 58.6% of request forms. Time of specimen collection was written in only 771 request forms. Additionally, the name, signature and telephone numbers of requesting physicians was written in 99.5%, 54.1% and 20% of request forms respectively. The proportion of completeness of data in laboratory request forms was low (14.3%). Important items on the request forms were not properly documented. The absence of these essential information contributes to pre-analytical errors and affect clinical advice and interpretation of results.

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INTRODUCTION:
Clinical Laboratory investigations are important in the diagnosis, treatment, prevention, control and surveillance of infectious diseases. It has been estimated that more than 60-70% of clinical decisions (on admissions, discharge and medications) are based on information derived from laboratory test results [1]. Being a highly complex process, test reports must be timely, relevant, reliable and interpreted correctly [2].

Errors do have however, occur in the delivery of laboratory testing; mistakes occur frequently before (pre-analytical), during (analytical) and after (post-analytical) the test has been performed [1]. Most errors are due to pre-analytical factors (46-68.2% of the total errors) while a high error rate (18.5-47% of total errors) has been found in the post-analytical phase[1]. It has been established that errors due to analytical problems have been significantly reduced (7-13%) over time due to quality control methods and quality assessment programme[3].

Reliability can only be achieved in a clinical laboratory through the control of accuracy in all the three components of testing. However, pre-analytical variables can dramatically affect the results of laboratory test and cost to patients[4]. The pre-analytical phase starts with test request / completion of laboratory request forms , patient identification, sample collection and handling[1,5,6].

Laboratory request forms provide information about the laboratory investigation required and contain demographic data such as name, age, gender and subject address. Other details include ward address, laboratory serial number, physicians name and signature, provisional diagnosis, clinical details and date of request.

Insufficient data on laboratory request forms can make interpretative comments difficult and may delay communications with the requesting physician, more so in patients with life threatening medical conditions [3,7]. In a previous study [8] it was shown that 43% of request forms lack complete information. Since incomplete laboratory request forms may not be rejected at the laboratory, it is important that adequate filling of data on laboratory request form be emphasized. We therefore analyzed data on laboratory request form to see its contributions to pre-analytical errors in a specialist hospital in Nigeria.

MATERIALS AND METHODS
Study setting
The study was conducted in the laboratory section of Saint Charles Borromeo Hospital, Onitsha. It is a specialist hospital with well-equipped laboratories. The Microbiology and Hematology Laboratories receives over 200 specimens per day.

Study design and sample size
This was a descriptive, cross-sectional study aimed at assessing laboratory practices at the Microbiology and Hematology Laboratories. A total of 1850 laboratory request forms were evaluated.

Data collection and analysis
Laboratory request forms filled by physicians were received from subjects in the laboratory reception room. After identification of subjects, appropriate specimen containers were given to subjects and instructions on specimen collection. Phlebotomists collected blood specimens. Specimens were appropriately labeled and registered in laboratory work book and subsequently distributed to various sections for processing.

All laboratory request forms were evaluated after tests were completed to crosscheck information from the physician and correctness of results entered by the laboratory personal. Laboratory request forms were not separated on an in-or out-patient basis but we excluded request forms for hormonal assays.Data generated were analyzed using descriptive statistics of frequencies and categorical variables were expressed in percentages.

Ethical considerations
The study was approved by the institutions ethics committee.
RESULTS
The proportion of completeness of data on laboratory request forms are as presented in Table 1.

Table 1: Proportion of completeness of the laboratory request forms

<table>
<thead>
<tr>
<th>S/N</th>
<th>Variables</th>
<th>Number well written</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Patient’s surname</td>
<td>1850</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Patient’s first name</td>
<td>1850</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Age/date of birth</td>
<td>1806</td>
<td>97.6</td>
</tr>
<tr>
<td>4</td>
<td>Gender</td>
<td>1847</td>
<td>99.8</td>
</tr>
<tr>
<td>5</td>
<td>Patient’s hospital number</td>
<td>1800</td>
<td>97.3</td>
</tr>
<tr>
<td>6</td>
<td>Ward/clinic name</td>
<td>1780</td>
<td>96.2</td>
</tr>
<tr>
<td>7</td>
<td>Provisional diagnosis</td>
<td>1480</td>
<td>80</td>
</tr>
<tr>
<td>8</td>
<td>Clinical details</td>
<td>1101</td>
<td>59.5</td>
</tr>
<tr>
<td>9</td>
<td>Specimen type</td>
<td>1780</td>
<td>96.2</td>
</tr>
<tr>
<td>10</td>
<td>History of previous medication</td>
<td>766</td>
<td>41.4</td>
</tr>
<tr>
<td>11</td>
<td>Name of requesting physician</td>
<td>1840</td>
<td>99.5</td>
</tr>
<tr>
<td>12</td>
<td>Telephone number of requesting physician</td>
<td>370</td>
<td>20</td>
</tr>
<tr>
<td>13</td>
<td>Signature of requesting</td>
<td>1001</td>
<td>54.1</td>
</tr>
<tr>
<td>14</td>
<td>Time of specimen collection</td>
<td>771</td>
<td>14.7</td>
</tr>
<tr>
<td>15</td>
<td>Overall completeness of laboratory request forms</td>
<td>14.3</td>
<td></td>
</tr>
</tbody>
</table>

The overall completeness of data on request form was 14.3%, as only 2 out of 14 variables on the request form were filled completely. Age / date of birth of patients were written in 97.6% of all request forms whereas gender was captured in 99.8% of forms evaluated. Patients hospital number was filled in 1800(97.3%) of request forms and ward address in 1780(96.2%). On clinical information, provisional diagnosis made by requesting physician was absent in 20% of request forms. Clinical details were also not written in 40.8% of forms. History of previous medication was omitted in 58.6% of request forms. Time of specimen collection was seen in only 77(41.7%) of all forms. Finally, the name, signature and telephone number of requesting physician was written in 99.5% 54.1% and 20% of request forms respectively.

DISCUSSION
The first line of communication between the physician / patient and the laboratory is the laboratory request form [9]. Proper completion of data on laboratory request form is therefore, essential for diagnostics.

In our study, the overall completeness of data on laboratory request form was low; patient surname and first name were filled completely. This was similar to earlier studies [3,10] in which only the patient’s full name was stated on the request forms evaluated. It is as expected because the laboratory personnel will reject laboratory request forms in which the patient’s name was absent.

Age and gender of the patients were well written on the request forms. The variables are relevant in specimen identification apart from the association between patient’s demographic data and reference ranges. The reference ranges of some tests like haemoglobin concentration and stool culture vary with age and gender [11,12]. Inadequate information on demographic data may lead to misleading and potentially harmful comment [1].

Provisional diagnosis was not stated on 20% of the request forms and there were no clinical details on 40% of the forms evaluated. This is comparable to a study in Pakistan [13]. It has
been demonstrated that provision of adequate clinical information prevents inappropriate investigation [8] and also helps in correctly interpreting test results. In some cases, the correct interpretation of result may depend upon the provisional diagnosis indicated on the request form [3], since it will be easy to classify a patient with abnormal serum glucose as known diabetic than otherwise.

Our results revealed that history of previous medication was recorded in 41.7% of request forms. This was an improvement on 0% recorded in study at Ile-Ife, Nigeria [3]. In some cases, for example, culture and sensitivity, correct interpretation of a test result may depend on knowledge of previous antibiotic therapy indicated on the request form.

In more than 50% of the request form evaluated, time of specimen collection was not captured. The time of specimen collection, transportation and analysis may alter a result, leading to wrong interpretation and treatment outcome. Delay in semen analysis could affect motility of sperm cells due to prolonged time between collection and analysis.

The name and signature of requesting physician was seen in 99.5% and 54% of forms respectively. It is an improvement on 7.7% of physicians signature in a study conducted in Tanzania[14]. Non-identification of requesting physician could result in delay in initiating treatment and unnecessary cost to the patient when tests have to be repeated.

Telephone number of requesting physician was written in only 20% of laboratory request forms. Mobile telephony is relatively new in Nigeria. Besides, the current laboratory forms in use at the study center have existed for more than three years without improving upon it. Communicating critical results to the requesting physician will make for early decision on treatment. It is therefore impertinent to make the request forms more informative and space for telephone number provided.

CONCLUSION
The completeness of data on laboratory request form was low (14.3%). Important variables such as provisional diagnosis / clinical details, history of previous medication and time of specimen collection were not properly documented. The absence of essential information on laboratory request form affect clinical advice and interpretation of results. These contribute to pre-analytical errors.

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