

A Study on Reduction of Errors in the Laboratory in one of the Multispecialty Hospitals in Hyderabad

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ABSTRACT

Laboratory error is defined as any defect starting from the ordering of the report to the interpretation of the end test result. Though laboratory error has a low frequency rate it has a huge impact on patient management because most of the diagnosis is made through the help of laboratory tests and also the quality of service determined by it. Since laboratory report is of much importance, ways of reducing these errors is crucial. In this era of technology with automation in laboratory, efficiency and service has become safer but still the error persists. This paper is to examine carefully the error occurring in the laboratory and ways to reduce it in the selected hospital. A checklist was framed and data was collected through observation and also from records in that hospital in order to study various errors in the hospital. The expected outcome of this paper is the improvement in already existing methods and framing new techniques to reduce the error. The findings helps in with future research work.

KEYWORDS - Laboratory error, automation, reduce, new techniques

1. INTRODUCTION

1.1 DEFINITION

A laboratory error is defined as “A defect occurring at any part of the laboratory cycle, from ordering tests to reporting results and appropriately interpreting and reacting on these”

1.2 TYPES OF ERRORS

The errors in laboratory practice are classified into preanalytical, analytical, and post analytical phase depending on the time of presentation, in which pre and post analytical errors are of more importance.

1. THE PREANALYTICAL ERROR

It comprises of all the processes occurring before the sample being processed in the laboratory. The reported types of preanalytical error are ordering tests on the wrong patient, misidentification of patient, ordering the wrong test, missing samples and test request, wrong or misidentification, contamination from infusion route, clotted and insufficient samples, inappropriate containers, improper labelling of containers, inappropriate transport and storage conditions.

2. THE POST ANALYTICAL ERROR

Errors in the post analytical phase that occur after the analysis is complete but within the confines of the four walls of the laboratory itself and under the control of the laboratory. The types of post analytical errors are transcription error, software problem, and delay in reporting, failure of reporting and incorrect interpretation

1.3 OBJECTIVES

- To study the reduction of error in the laboratory
- To find the major reasons for errors occurring in the laboratory
- To provide suggestions to reduce the errors in the laboratory

2. REVIEW OF LITERATURE

According to **Sergi (2018)**, Pre-analytical, analytical, and post-analytical matters will consolidate the fate of any laboratory process. Pre-analytical issues need to be cleared off before the laboratory physician can dispatch the result to the in charge. Currently, applying the new modes of making sure relevant information is transmitted without interrupting the standard workflow of the primary physicians in charge, who eventually need a fast line of action for results that may be life-threatening is taken care off.

According to **JawaharKalra (2016)**, the quality of healthcare is an emerging concern worldwide. The clinical laboratories are reporting an error rate of 9% .These errors can be minimised by the use of quality tool like six sigma which provides realistic solution for the existing problem. This helps to improve the quality of diagnosis.

According to **Sandra C. Hollensead(2004)**,reducing errors and improving quality are an integral part of Pathology and Laboratory Medicine. The rate of errors is reviewed for the pre-analytical, analytical, and post-analytical phases for a specimen. The quality systems in place, in pathology today are identified and compared with benchmarks for quality. Seven recommendations are made to reduce errors in future for Pathology and Laboratory Medicine.

3. METHODOLOGY

This is an exploratory research that aims to reduce the error in the clinical laboratory in the selected hospital. The simple random sampling is used in order to collect data. About 10091 samples were tested during the period of three months starting from December 2019 to February 2020 in the hospital and by considering the Morgan's table with 95% confidence and 5% of error, 379 data was collected. For this purpose a checklist has been designed to make sure that the data collected do justice to what the researcher is trying to find. This data provides direction and shape for the research. These data was collected both by observation and from the records in the hospital. The checklist contains demographic details of the patient, laboratory departments, reason for preanalytical and post analytical errors.

4. ANALYSIS

In this study to calculate the frequency percentage of error observed in OPD and IPD

$$\text{Frequency percentage} = \frac{\text{Error observed}}{\text{Total sample size}} * 100$$

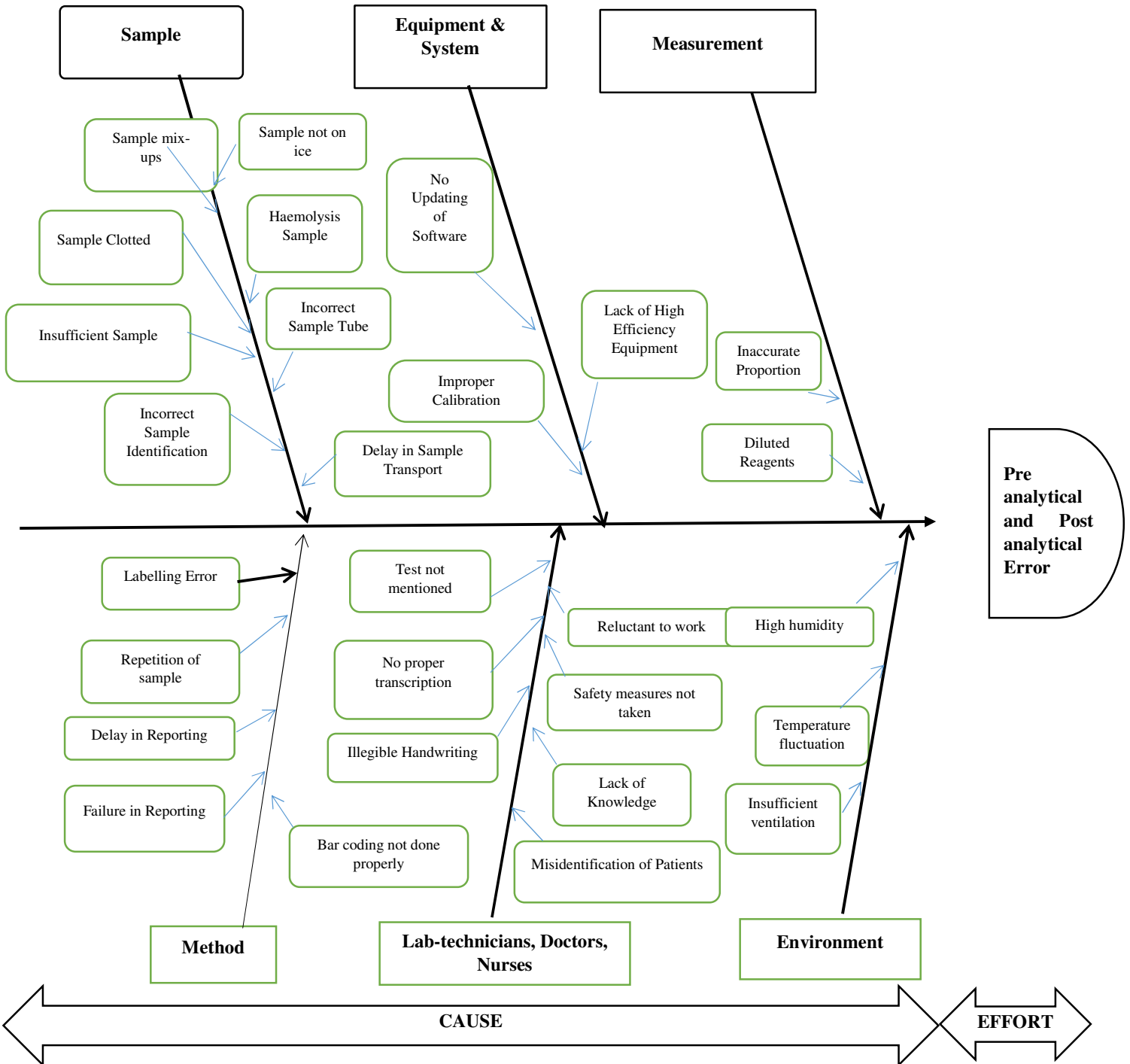
TABLE 4.1 SHOWS THE PERCENTAGE OF PRE ANALYTICAL AND POST ANALYTICAL ERRORS

SNO	TYPE OF ERRORS	NO OF TESTS	PERCENTAGE
1	PRE ANALYTICAL	274	72%
2	POST ANALYTICAL	105	28%
	TOTAL	379	100%

INTERPRETATION

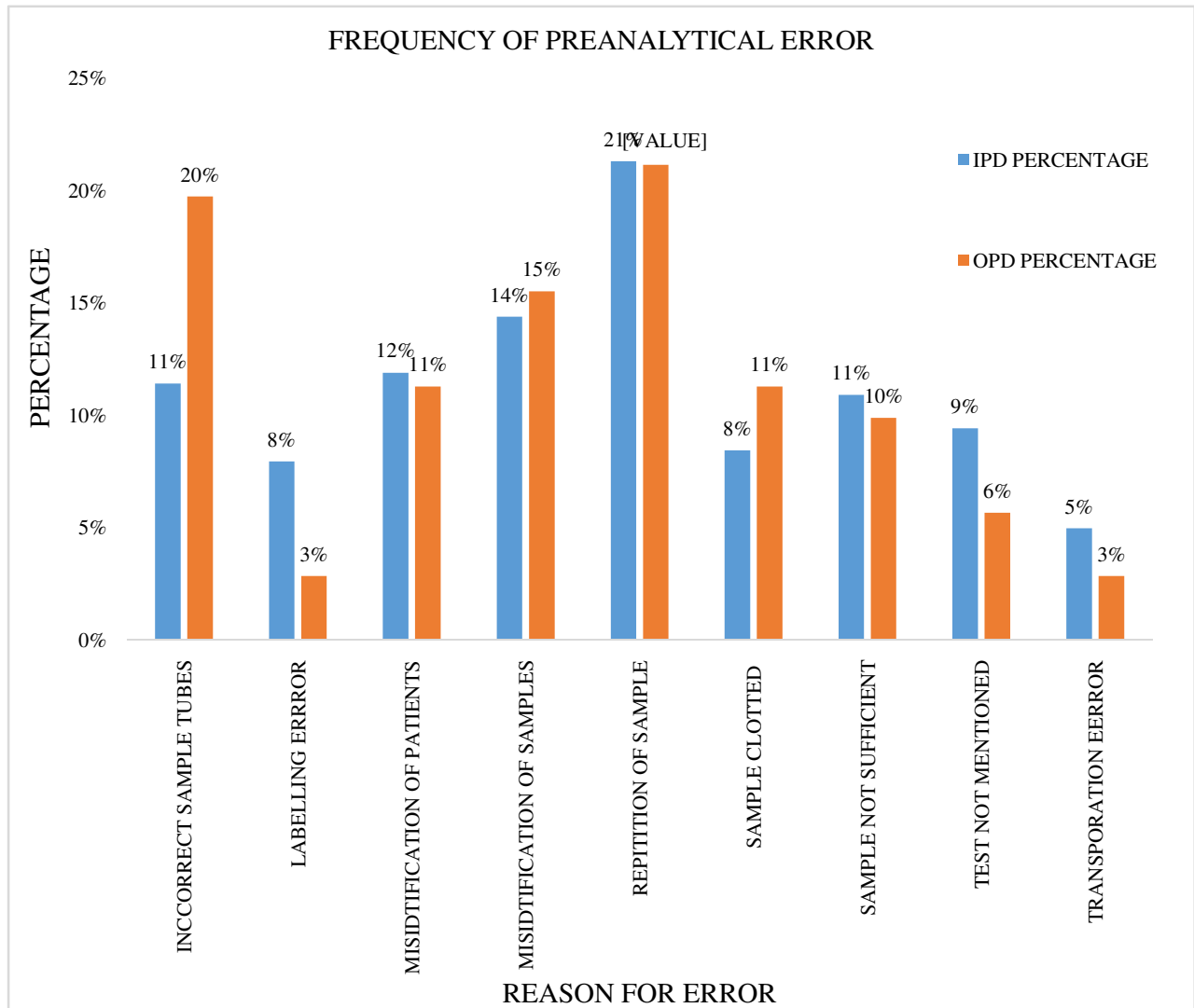
The above table shows that the pre analytical error exceeds the error caused in the post analytical phase

CHART 4.2 CAUSE AND EFFECT DIAGRAM SHOWING THE MAJOR AND MINOR CAUSE OF PRE AND POST ANALYTICAL ERRORS



The above fishbone shows the major and minor cause of pre and post analytical error and this quality tool helps us to take action and reduce the errors occurring ,

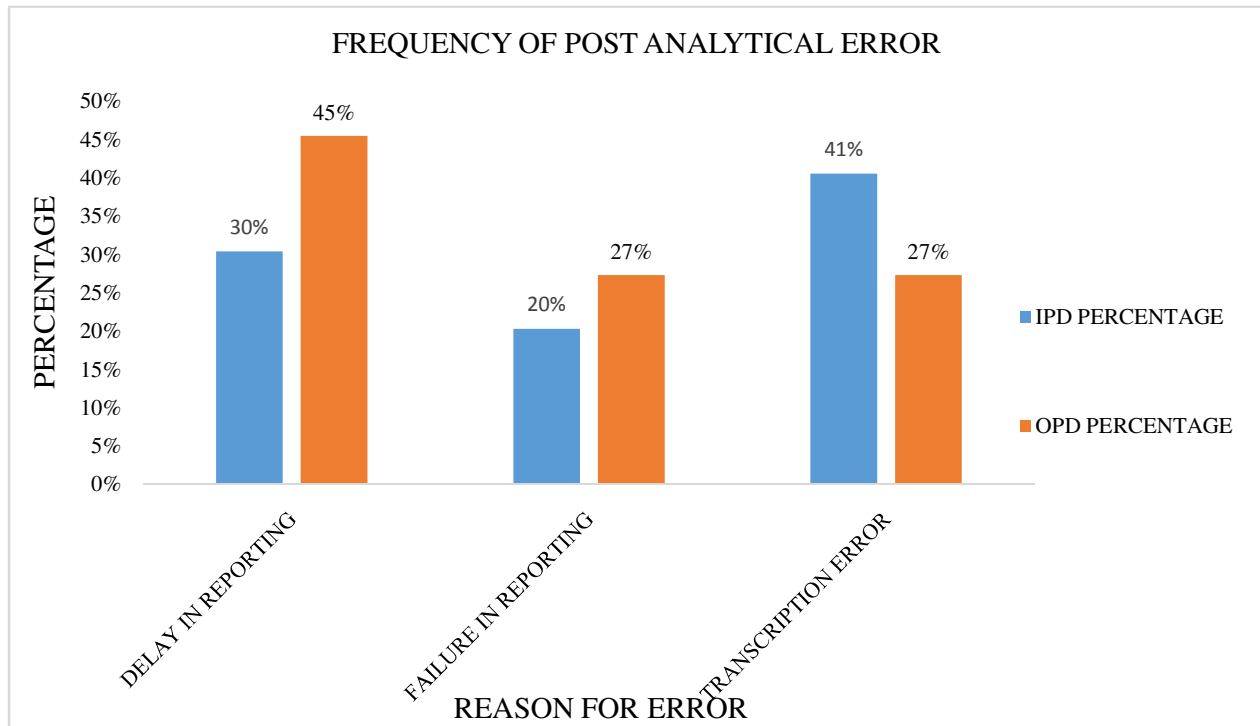
CHART 4.3 SHOW THE FREQUENCY PERCENTAGE OF PRE ANALYTICAL ERROR



INTREPRETATION

The above chart show that the maximum reason for pre analytical error is repetition of samples and the minimum reason seems to be transportation error

CHART 4.4 SHOW THE FREQUENCY PERCENTAGE OF POST ANALYTICAL ERROR



INTREPRETATION

The above chart show that the maximum reason for post analytical error is transcription error in IPD and delay in reporting in OPD and the minimum reason seems to be failure in reporting

5. FINDINGS AND RECOMMENDATION

- About 72% of the errors are caused by pre analytical error and 28% by post analytical errors
- The highest reason being repetition of sample in pre analytical phase and transcription error and delay in reporting in post analytical phase
- The maximum error occurs while testing Inpatient samples which can reduce the quality of service

RECOMMENDATIONS

- Electronic lab reporting can be implemented in the hospital to reduce the errors occurring in the laboratory. The ELR helps in time management. It is more accurate by automatic transmission of

reports .Reports are complete and the consistence of the data is maintained .It causes paperless work.

- Proper trainings should be given to all employees handling samples because miscommunication can cause unnecessary delay
- Training on all equipment should be given to the all lab technicians
- Daily registration and analysis of preanalytical and post analytical errors occurring in the lab should be done
- System updating can help in the faster generation of requisition
- Robotics may be a tool to reduce errors in both pre analytical and post analytical phase
- Barcode should be made mandatory for all the samples to reduce the error

6. CONCLUSION

This study has been carried out to find the errors occurring in the pre analytical and the post analytical phase in both the inpatient and outpatient departments. Though there are a lot of development in these phase of testing in the laboratory, many errors still occur and they will continue to occur in these phase, as there is human intervention in every step, right from filling the requisition form to receiving and preparing the samples for analysis. So it is essential to give good training to the laboratory staff to improve the quality of the clinical laboratory. Competency checks should be done for improvement in the preanalytical phase and post analytical phase after regular training programmes to the staff, which will result in the increase efficiency. Proper record maintenance will helps to know the where the error occurs and the corrective action that can be taken. Electronic lab reporting system can be implemented to increase the effectiveness of reporting .Bar code should be made mandatory to reduce the misidentification errors occurring. So by making minor changes in the overall process the error in the clinical laboratory can be minimised to a great extent

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