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A Study on Outstanding Significance of Critical Alert Value in NABL Accredidated Laboratory - "A Panic Value"

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Abstract: The Aims and objectives of the study are toprovide a standard for good laboratory practice, to increase the clinical effectiveness, patient safety and operational efficiency and designing better and more evidence-based systems for the timely notification of laboratory results which represent potentially hazardous to the patient.This concept was introduced 46 years ago by Lundberg. It is a result, indicating that patient is in imminent danger unless therapy is initiated immediately. A prospective cross-sectional study was done at ASRAMS, a 1000 bedded hospital at Eluru, from July 2017 to June 2018 for a period of 12 months. The laboratory performed 2,22,574 tests in haematology and 2,92,055 tests in clinical pathology. The preparation and approval of critical alert value list was done in consultation with our hospital board and clinician's panel. During a one year period of study, a total of 7148 critical values were reported. 45.32% of critical alert values belong to inpatient, 48.9% to outpatient and 5.8% to emergency department.We finally Conclude that it is crucial for patient safety, Effective use of the available resources, Creates professional responsibility and Regular quality assurance, meeting with technical staff and strict vigilance are key reasons for low figures in our setting.
Keywords: Critical alert value, patient safety, hematology.

INTRODUCTION

The concept of critical value was introduced more than 46 years ago by Lundberg and has been widely adopted as a standard of good laboratory practice. It suggests that a result which indicates that patient is in imminent danger unless therapy is initiated immediately [1-3]. CAP (college of American pathology) has made critical value reporting as a part of requirement for accreditation. Health and safety in clinical laboratories is becoming increasingly important subject currently.

The preparation and approval of critical alert value list should be done in consultation with the concerned hospital board/clinician's panel and it is essential to discuss the possible mode of implementation of the same with local facilities [4].

MATERIALS AND METHODS

A prospective cross-sectional study was done at ASRAMS, a 1000 bedded hospital at Eluru, from July 2017 to June 2018 for a period of 12 months. The laboratory performed 2,22,574 tests in haematology and 2,92,055 tests in clinical pathology. 45.32% of critical alert values intimated belong to inpatient, 48.9% belongs to outpatient and 5.8% belongs to emergency department. The values were informed to consultants /postgraduates/medical officers/nurses/clerical staff, over phone. All the current data is obtained from the critical alert register of central laboratory, ASRAMS.

RESULTS

During a one year period of study, a total of 7148 critical values were reported.

Table-1: The critical values in Hematology and Clinical pathology

Test parameter	Lower limit	Upper limit
Haemoglobin	<4 gm%	>20gm%
Total WBC count	<2000	>30,000
Platelet count	<50,000	>10,00000
Presence of Blasts in smear	+	
Presence of Malaria parasite	+	
Urine ketone bodies	+	

Table-2: Evaluation of critical alert values at ASRAMS

Test Parameter	No. of critical alerts reported
Low Haemoglobin	4966
Low White blood cell count	183
High White blood cell count	1034
Low Platelet count	798
High platelet count	03
Blasts	08
Malaria parasite	3
Urine Ketones	153
Total	**7,148**

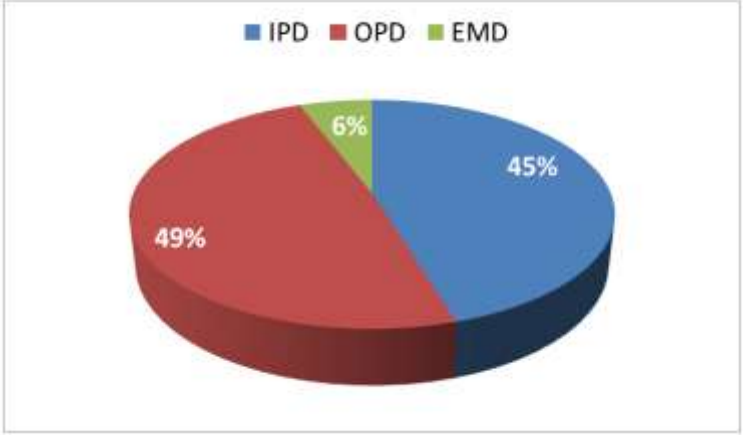

Fig-1: Distribution of critical alerts values

The turnaround time for each critical value was determined to assess the timeliness of critical alert value reporting. It is the mean time taken for conveying the information to the patient attenders/clinicians in cases of OPD and clinician/PG/nurses/clerical staff in cases of IPD.

The turnaround time taken was 15 -30 minutes for IPD, 30 – 45 minutes for OPD and 10 – 30minutes for EMD. It was found that the preanalytical cause for delay in TAT of critical alert value is hemolysed/clotted blood sample, incomplete patient details, and usage of wrongly labelled or inappropriate container. Analytical causes for prolonged TAT machine breakdown or Noncompliance with quality controls. Postanalytical reasons are amended reports due to typing errors [5].

The critical alert values were maximum during morning shift and minimum during night shift.

Table-4: frequency of critical call backs in each shift

Timing	Early morning	Afternoon	Evening	Night	Total
No. of critical call back	54.5%(3901)	19.0%(1363)	21%(1492)	5.5%(392)	7148

DISCUSSION

In the following study we provided a blanket view of critical value reporting process in a large medical centre with NABL accreditation. Many of these parameters are applicable to a variety of settings and the analysis provides conditions for comparison and process of improvement. The laboratory should ensure that critical results, where applicable and are communicated effectively to meet the users' needs.

Table-5: Comparision of No. of critical alerts reported

Test Parameter	Killoletal study	Our study
Haemoglobin	5212(26.8%)	4966(69.5%)
Low White blood cell count	-	183(2.6%)
High White blood cell count	3331(17.1%)	1034(14.5%)
Absolute neutrohil count	521(2.7%)	-
Immature to total neutrophil ratio	412(2.1%)	-
Low Platelet count	2022(10.4%)	798(11.2%)
High Platelet count	-	3(0.04%)
Blasts	63(0.3%)	8(0.1%)
Malaria parasite	1556(0.8%)	3(0.04)
Malarial antigen	148(0.8%)	-
Urine Ketones	3100(16.0%)	153(2.0%)
CSF – cell count	1100(5.7%)	-
INR	1958(10.1%)	-
Total	19423	7148

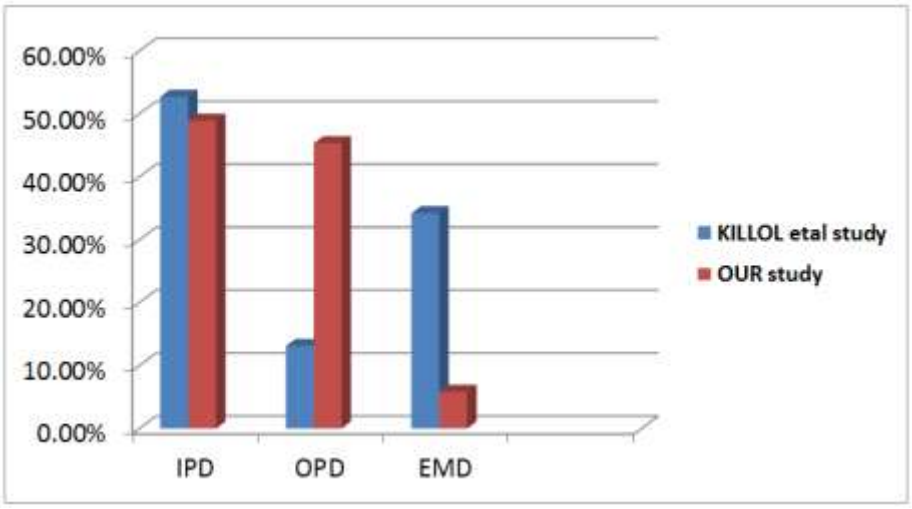

Fig-2: Comparision of distribution of critical alerts values

Increasing workload in the clinical laboratory makes it important to achieve efficient results and maximizes clinical benefits. The critical call back list should meet the citeria of imminent danger to the patient which requires immediate therapy/attention or else if it does not meet the criteria, it may lead to unnecessary interruption for clinicians. The boundaries of the critical values are to be defined in consultation with the clinicians.

Outpatient critical alert value communication is challenging as there are different approaches in various practices for determining patient coverage, and no fixed patient coverage. The other cause for delay of outpatient report was missing patient information. The laboratory must have on-call coverage and work with outpatient practices to improve communication skills.

The implementation of laboratory information system (LIS) facilitates a bidirectional communication.

CONCLUSION

- As critical value reporting is crucial for patient safety, standardization of this practice would be beneficial.
- Essential for effective use of the available resources.
- Creates professional responsibility.
- Regular quality assurance, meetings with technical staff and strict vigilance are the the key reasons for low figures in our setting.

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